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Benefits of Using an Electronic-Medical-Record in the Emergency Department: A Systematic Review

Eduardo Paguntalan Monroy
Walden University

Walden University

College of Nursing

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Eduardo Monroy

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Review Committee
Dr. Patricia Schweickert, Committee Chairperson, Nursing Faculty
Dr. Lilo Fink, Committee Member, Nursing Faculty
Dr. Mirella Brooks, University Reviewer, Nursing Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
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Abstract

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Eduardo P. Monroy

MSN, University of Nevada, Las Vegas, 2007

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

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Abstract

Low quality of care is a problem for many United States (U.S.) emergency departments (E.D.). The use of electronic medical records (EMR) with quick embedded tools, treatment plans, and protocols decrease E.D. overcrowding, reduce boarding time, to approximate the 4- hour recommendation by the Joint Commission on Accreditation of Healthcare Organizations, and improve quality of care. The project question asked whether a systematic review of EMRs with quick embedded tools, treatment plans, and protocols decreased overcrowding and boarding time, and improved E.D. quality care. This systematic review used the Johns Hopkins Model to answer the project question by guiding selection, evaluation, and assessment of best evidence to answer the project question. The evidence guiding this project was obtained via the Walden University library databases and included 31 articles from CINAHL & MEDLINE, Cochrane Database of Systematic Reviews, as well as the Centers for Disease Control and Prevention Interactive Data Base Systems, EBSCOhost, Google Scholar, and Joanna Briggs Institute Evidence-Based Practice (EBP) Databases. Results supported usage of E.D. EMRs with quick embedded tools, treatment plans, and protocols to reduce E.D. patient overcrowding, and improve E.D. boarding time. Additionally, improved quality care was supported by EMRs, with embedded quick embedded tools, treatment plans, and protocols, through improved clinical decision making, increased quality of patient diagnosis, and increased timeliness of diagnosis. This enabled more effective decision-making in patient care, improved patient safety, and enhanced satisfaction. Using EMRs with embedded quick tools, treatment plans, and protocols can therefore contribute to social change by improving patient health through improved quality E.D. care.

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Dedication

Above all, I thank God for my patience, resilience, and perseverance to climb uphill against all odds and obstacles to arrive at the finish line in high spirits. I dedicate this work to my devoted and loving wife Lisa, who was patient and untiring, making my work environment very pleasant to finish my work, to my children, Lester, Shenna, Ferdie, Maggie, Andrea, Katrina, and Vincent, and to my grandchildren Kyle and Kei, with their prayers and encouragement pushing me to finish this formidable task.

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Section 1: Nature of the Project

Introduction

Many problems are plaguing emergency departments E.D.s, including long patient waiting times and overcrowding in the emergency department, as these negatively impact the quality of patient care (Lorenzetti et al., 2018). The Affordable Care Act has not relieved E.D. crowding but instead has served to increase patient volume, according to the American College of Emergency Physicians (ACEP, 2015). E.D. overcrowding could impact the boarding time of E.D. patients to more than the 4-hour recommendation by the Joint Commission that negatively impacts patient quality care (JCAHO, 2012; Morley et al., 2018). EMRs with quick embedded tools, treatment plans, and protocols, improved E.D. boarding time with the efficient flow of patient information (Sha et al., 2019; Schmit-Pokorny et al., 2019). Seventy percent of physicians in Texas and Colorado, stated that the E.D. was not adequately prepared to handle increased patient volume (ACEP Poll, 2015). Strategies were needed to address these issues. The use of electronic medical records (EMR) in the E.D. was one such strategy, as EMRs could facilitate patient flow, reducing E.D. overcrowding compared to using paper medical records and paper systems of care (Frederic et al., 2015). EMRs with quick embedded tools, protocols, and treatment plans helped the staff and healthcare providers to have fast sources of differential diagnoses and diagnoses with corresponding signs and symptoms, appropriate tests, laboratory workup, and ancillary procedures. EMRs quick embedded tools, treatment plans, and protocols could help to decongest patient volume and to promote the smooth flow of patient care by reducing the waiting time between patients, and by reducing current boarding time and improved ED patient quality care. EMRs streamlined the triaging of patients and enhanced patient

assessment and treatment plans avoiding delays in patient care experienced with paper medical record systems (Hanauer et al., 2015).

The American Recovery & Reimbursement Act (ARRA) of 2009, updated on July 20, 2019, (Amadeo et al., 2019), stated that the Office of Inspector General oversaw an estimated $150 billions of Recovery Act funding and Tax relief through the Treasury Department's oversight responsibilities (Office of Inspector General, 2016). It promoted information technology initiatives to improve E.D. care. Health informatics invigorated the healthcare milieu by unifying the healthcare system's data stream and enhancing and improving the current fragmented healthcare system (Park et al., 2015). The implementation of health information technology (HIT) into care enabled health care professionals to achieve the greater extent of their clinical practice through the meaningful use of electronic health record; empowerment of interdisciplinary care; the structure of a coherent patient story; and the enhancement of evidence-based practice permeating the whole spectrum of patient care through improved safety, quality and health care delivery system efficiency. It opened strategies for improvement and innovation leading to appropriate technological solutions. The nationwide adoption of EMRs in the E.D.s reformed medical records documentation (Lorenzetti et al., 2018). The question remained as to whether the EMR improved the quality of care in the ED. Therefore, this project explored the evidence to assess whether use of EMRs with embedded quick tools, treatment plans and protocols in the E.D. decreased overcrowding, improved boarding time, and improved the quality of care delivered.

Problem Statement

Overcrowding, long waits, and prolonged E.D. length of stay decrease the quality of care in the E.D. setting despite the use of EMRs. The question remains whether use of the EMR with embedded quick tools, treatment plans, and protocols, can improve E.D. care by reducing boarding times and enhancing quality patient care. EMR quick embedded tools, treatment plans, and protocols in E.D.s would improve patient quality care. However, many U.S. hospitals that use EMRs remain overcrowded, and improving E.D. boarding time by evaluating usage of health informatics technology is needed. Patient diagnostic accuracy was enhanced with access to EMR, that improved the clinical decisions. The comparison with and without access to EMRs showed that EMR access enhanced the quality of clinical findings among E.D. physicians (Ben-Asuli et al., 2015). The American College of Emergency Physicians (ACEP) survey discovered that the Affordable Care Act increased patient volume and worsened E.D. crowding (ACEP Poll, 2015). Prolonged E.D. waiting times, extended boarding times more than the JCAHO 4-hours' recommendation, delays in treatment plans, and ER documentations overwhelming staff and health care providers, are some of the current problems E.D.s are facing in many US hospitals (Ben-Assuli et al., 2015). These issues jeopardized patient quality care and increased in-hospital mortality by not prioritizing the patients promptly (Sha et al., 2019; Schmit-Pokorny et al., 2019). The ED staff is adversely affected by redundant and unnecessary nursing tasks including paper documentation that prevent them from attending immediate and prioritize needs of the patients. This contributes to prolonged E.D. patient stay (Colligan et al., 2015). Health Information Technology (HIT) usage in the emergency room could provide improvement in E.D. healthcare delivery. The prolonged E.D. discharge has the lasting negative financial impacts and cripples

hospital resources (Shaikh et al., 2018). EMRs were efficient communication tools that decreased the time to take care of each patient by reducing E.D. charting and ordering errors (Di Simone et al., 2018). This project assessed whether the use of an EMR quick embedded tools , treatment plans, and protocols in an E.D. could impact overcrowding, boarding time, and patient quality care 1) by using EMRs and 2) by using EMR quick assessment tools, treatment plans and protocols.

Information technologies integrate patient flow and are used by many hospitals throughout United States. Britain, Australia, Canada, and New Zealand also followed in the usage of EMRs to reduce ED boarding time to the JCAHCO 2004 “four-hour rule” (ACEP, June 2016). The EMR has integrated tools to enhance diagnoses and specific treatment plans in the E.D. (Jarvis, 2016). Timely medical interventions offered by the EMR included quick tools for health care providers as they cut unnecessary time in the prompt diagnosis and appropriate treatment plans of each patient. Patients were promptly triaged, and patients with immediate needs could be prioritized. The tools incorporated in the health information technologies could drastically cut E.D. overcrowding, discourage walkouts, prevent wrong treatment plans and erroneous diagnoses, leading to improved care. However, it was unclear whether the evidence supported that EMRs with quick embedded tools, treatment plans, and protocols improved overcrowding and enhanced quality care. This project therefore explored the literature for evidence to answer this question.

Purpose

The purpose of this project was to assess whether using EMRs quick embedded tools, treatment plans, and protocols in the E.D. setting could improve overcrowding, boarding time and the quality of patient care. The gap in practice that this doctoral project addressed was a lack of knowledge as to whether EMR quick embedded tools, treatment plans, and protocols could improve patient quality care, could increase patient satisfaction through revitalized nursing care, and could decrease overcrowding and E.D. boarding time. Greater knowledge was needed regarding the improvements in quality care impacted by the EMR in the E.D. setting. The project question asked whether using EMRs with quick embedded tools, treatment plans, and protocols in the E.D. could impact E.D. quality of care, and decongest E.D. volume/crowding by decreasing boarding time. E.D. patient congestion brought patient longer waiting time and impacted timely treatment plans. Patients were tempted to walk out rather than be treated adequately. Delayed and prompt diagnosis and treatment of E.D. patient hampered quality care (Santistevan et al., 2017)

Use of the quick embedded tools, treatment plans, and protocols could decrease overcrowding and enhance patient quality care. The lack of effective tools could delay treatment plans and would increase preventable medical errors. The usage HIT and incorporated tools helped providers to make the right diagnosis with appropriate treatment plans. The EMRs prevented unnecessary wasteful time with the patient care related to paper charting. The health information technology facilitated the efficient patient flow from the E.D. triaging room to the treatment room, until the E.D. staff admitted or discharged the patient. The evidence-based practice and clinical scholarship through the new acquisition of knowledge (Essential III) enable

usage of information technology designed for patient care (Essential IV) (Zaccagnini et al., 2011) with the use of treatment plans and protocols. The lack of treatment plans and protocols incorporated at EMRs could delay prompt and adequate diagnosis and treatment. A variety of factors impacted the quality of care in the E.D. in addition to patient volume, the flow of patient information, availability of quick tools, and use of treatment plans and protocols.

There were other indicators of improvement in quality care when using EMRs with quick embedded tools, treatment plans and protocols. This review discovered other improvements in the quality care and we could discuss the incidental findings relevant to the main two areas of inquiry. The users' satisfaction and the usability of the technology could change the effectiveness of an E.D. . These comprise outcomes that define patient safety, length of stay (LOS), and mortality rates. These are also reflective of decreasing medical errors or improving clinician's adherence to practice guidelines and evidence-based practice. Additionally, financial issues, including tangible/intangible costs and direct/indirect benefits could impact the quality of care. The E.D.s give weight to the anticipation of changes in Medicare reimbursement rates, software and hardware costs, and shifts in healthcare management methods, when doing the return of investment analysis. The use of health information technology stopped the unnecessary usage of paper medical records that contributed to the delay in the treatment of patients. Park et al., 2015, showed that the innovative restructured ED EMR through technological and organizational adaptations enhanced clinicians' practice. The quality care for E.D. patients through use of EMRs with quick embedded tools, treatment plans, and protocols decongested patient volume, and enhanced the flow of patient information, with good use of short tools for prompt diagnosis and treatment as well as treatment plans and protocols.

Nature of the Doctoral Project

This project was a systematic literature review to evaluate the E.D.'s use of EMRs with quick tools, treatment plans and protocols to address overcrowding, boarding time, and to improve the quality of patient care in the E.D. setting. The purpose of the project was to assess whether the use of EMRs with quick embedded tools, treatment plans, and protocols at the E.D. improved patient quality care in the E.D. by decongesting ED crowding and improving boarding time. The literature review used the Johns Hopkins model. Appropriate permission was granted, via email for its proper use, (see "Appendix"). The PRISMA chart was likewise used. The reformed usage of HIT with its shared governance among professionals impacted patient safety, quality care, and timeliness (Park et al., 2015). The E.D. staff redirected timeliness of patient care (Jarvis, 2016).

Significance

Quick embedded tools, treatment plans, and protocols have a considerable effect on ED healthcare delivery system. The stakeholders in this project included the E.D. staff nurses and healthcare providers, E.D. hospital administration, and E.D. patients. This project was significant since EMR with quick embedded tools, treatment plans, and protocols could impact the E.D. nurse by lessening their documentation, decreasing medical errors, lowering stressful patient care, and improving nursing retention (Selck et al., 2015). The use of EMRs in place of paper documentation streamlined the flow of patients and decongested crowding, giving nurses enough room and time for quality patient care. The E.D. staff could be impacted with the improved workload, less errors, and increased satisfaction. EMRs with quick embedded tools, treatment

plans, and protocols might also increase nursing retention. It could create E.D. working environments conducive to nursing empowerment inpatient care through robust team interactions. Nurses could confidently attain the self -fulfillment in their nursing tasks of quality patient care. EMRs with quick embedded tools, treatment plans, and protocols could energize the E.D. staff and the healthcare providers with transformed care. EMRs using short tools might facilitate appropriate diagnoses and treatment plans (Yarmohammadian et al., 2017). Prompt laboratory workup and ancillary procedures suggested by quick tools could enhance quality patient reassessment with proposed proper treatment plans. Different appropriate therapeutic suggestions by short tools enhanced prompt delivery of treatment plans and care. EMRs with quick embedded tools, treatment plans, and protocols addressed overcrowding and E.D. boarding time positively.

When EMRs with quick embedded tools, treatment plans, and protocols could decrease boarding time and decongest the E.D., patients could be taken care of more promptly and could discourage walkouts without being treated. Patients with high acuity could be prioritized and given appropriate attention. The E.D. staff could prevent medical errors. The patient satisfaction could therefore be more significant. This could result to greater nurse retention and decreased patient mortality rate. The E.D. management could expect more financial gains, and more effective heath care providers. The potential contribution of the doctoral project to nursing practice is the increased quality E.D. patient care, decreased E.D. overcrowding, and improved E.D. boarding time.

Lastly, the positive social change from this project could make the E.D. nurses and healthcare providers become more effective vehicles of social change in the fast-changing

healthcare milieu. The project study addressed appropriately the gaps in the healthcare environment by using the scientific and literature reviews that incorporated evidence-based principles. The nurses with their caring passion could use the HIT and informatics to enhance the quality care and safety of patients, families, and communities (Ball et al., 2011). The E.D. staff could redirect the timeliness of emergent needs.

Summary

An increase in the E.D. use of information technologies that integrate patient flow with communication systems and provide enhanced access to patient records by providers might positively impact E.D. patient quality of care, reduce overcrowding, and improve boarding time. The consequences of crowding, slow flow of patient information, nonuse of quick tools and nonuse of treatment plans and protocols delays access to emergency care, and increases walkouts, medical errors, deaths, ambulance diversion, and interference with the patient-centered care model. Through this project, I systematically reviewed the evidence using the hierarchy of evidence postulated by Johns Hopkins model and usage of PRISMA chart. Section 2 discusses concepts that supported this project; relevance to nursing practice; gap-in-practice revealed in the literature; local background and context; and role of the DNP student.

Section 2: Background and Context

Introduction

The project question asked whether using EMRs with quick embedded tools, treatment plans, and protocols in the E.D. could address E.D. overcrowding, improve boarding time and enhance patient quality care. The project aimed to evaluate through systematic review of available peer-reviewed articles from the year 2015 to 2020, regarding whether EMR with quick embedded tools, treatment plans, and protocols usage in E.D. could reduce overcrowding, improve boarding time, and enhance patient quality care. 31articles were used for the systematic review. Overcrowding in the hospital E.D. exacerbated patient boarding time beyond the JCAHCO recommended 4-hours (Merley et al., 2018). Overcrowding was a nationwide experience of U.S. hospitals that impacted quality patient care (Lorenzetti et al., 2018). The U.K. National Health Services recommended a standard length of 4-hour stay for every patient at the E.D. (Oredson et al., 2015). The Swedish Council posted a systematic review for Health Technology that scrutinized strategies to improve E.D. patient flow and impacted E.D. quality care (Jarvis, 2016) by utilization of rapid assessment, doctor triage, and point of care testing technologies. Evidence also revealed that EMR with quick embedded tools, treatment plans, and protocols enhanced the quality of care by improving the availability of the patient's medical history, current diagnoses, and present medications (Yarmohammadian et al., 2017). The EMR enabled E.D. healthcare providers' better communication, and informed clinical judgment. It also enhanced care coordination among the E.D. staff, enabling better decision making, more accurate diagnoses, and enhanced healthcare delivery through improved effective workflow; and overall cost savings (Sha et al., 2019; Schmit-Pokorny et al., 2019). EMRs with quick tools, protocols, and treatment plans enhanced diagnostic speed with the appropriate point of care testing, laboratory workup, ancillary procedures, and suggested plans of care and treatment. They streamlined patient assessment and avoided delays

inpatient care (Hannuer et al., 2015). The literature review showed how EMRs with quick embedded tools, protocols, and treatment plans addressed overcrowding, improved boarding time, and improved quality of E.D. care.

Concepts, Models, and Theories

The principles and hierarchy of evidence postulated by the Johns Hopkins model and PRISMA usage guided this systematic review. The model enhances and highlights the best evidence put into practice in scrutinizing of practice problems, and guiding practitioners to acquire skill and determine resources to achieve program goals and objectives. It interlinks efforts of researchers and needs of practitioners to synergize the healthy collaboration in creating evidence-based practice approaches with appropriate respective accountabilities. My project assessed how EMRs with quick embedded tools, protocols, and treatment plans could impact E.D. overcrowding, E.D. boarding time and enhanced E.D. quality care. They streamlined patient flow and helped in prompt and safer patient care. The literature review helped define the components of the qualitative study, the sources, and databases to search with the help of relevant terms: EMR, quick tools, protocols, treatment plans, overcrowding, and boarding time. It provided the research strategy to evaluate the project questions posed.

The systematic review used the Johns Hopkins Model and the PRISMA Chart. The best proof from sources, studies, and clinical data defined the patient safety and quality care. The evidence-based problem solving approach energized the health delivery system. The level of proof is classified into the hierarchy of evidence/seven categories: level 1-evidence from a systematic review or meta-analysis of randomized controlled trial or systematic reviews of RCTs having same

results; level II- Evidence from multi-site RCT; level III-evidence from quasi-experimental from controlled trials without randomization; level IV-evidence from well-designed cohort studies; level V-evidence from the systematic review of descriptive and qualitative studies (meta-synthesis); level VI- evidence from a single descriptive or qualitative study; and level VII-evidence from the opinion of authorities/or reports of expert committees. The project question directed several phases: comprehensive information of relevant terms: EMR, quick tools, protocols, treatment plans, boarding time, E.D. length of stay; initial screening; the qualitative study with application of second screening and systematic synthesis (Saini et al., 2012).

Relevance to Nursing Practice

The nursing qualities that the nurse leader should assimilate are challenges that the American Association of Colleges of Nursing (AACN) teaches in the practice of essential VII, VIII nurses' core qualities. The nurses as patients' advocates, promote patient quality care, and use essential IV that calls for leadership in the wise use of informatics in the healthcare delivery system (Zaccagnini et al., 2011). My role as the scholar-practitioner and prime mover of efficient, positive social change (Laureate Education Inc., 2011) challenged me to change the E.D. environment to promote better patient care using EMRs. A systematic review of peer-reviewed research work under the guidelines of the EBP model of Johns Hopkins, and PRISMA usage showed that EMRs with embedded protocols, quick tools and treatment plans enhanced and improved E.D. patient healthcare delivery system. The hospital E.D. needed EMR with quick embedded tools, protocols, and treatment plan to improve current E.D. patient quality care. The EMR reduced the boarding time per JCAHCO's 4-hr recommendation, and decongested the E.D. The EMR streamlined patient flow and quick appropriate treatment.

The E.D. employed several strategies to mitigate E.D. congestion, patient traffic, and boarding time. An E.R. rapid assessment team assessed patient's acuity status. An annexed outpatient department (OPD) took care of the non-emergent consultations. Nurse practitioners and physician assistants helped the physicians with the traffic of patient care during the flu seasons and epidemics. All such strategies did not impact the boarding time, thereby enhancing patient quality care (American College of Emergency Physicians, May 2016). The constructive collaboration of all stakeholders in accomplishing the program objectives and goals created openness, cooperation, initiatives, and best practices for the EMR appropriate engineered standard design (Ruff et al., 2017). The project might strengthen past researchers' conclusions that the usage of EMRs, quick tools, protocols and treatment plans enhanced patient quality care, decreased overcrowding and improved E.D. boarding time.

My project highlighted the caring quality nurses have for patients. The EMR, quick tools, protocols, and treatment plans embedded in EMR could enhance patient quality care by improving boarding time, mitigating patient traffic, and affecting patient smooth flow from the triage room to treatment room, could diminish errors, improve staff efficiency, and increase patient satisfaction. The nursing profession experiences numerous benefits from enhanced nursing quality care, quick nursing decisions, prevention of errors, and quality patient care delivery system. The nurses being the end-users of the HIT technology, must champion its meaningful usability to provide better quality care. It ensures better population health, and provides the substantial reduction in health costs (Mcbride et al., 2019). The E.D. usage of EMR with quick tools, protocols, and treatment plans could improve patient quality care.

The enhancement of the workflow from the emergency room triage to the emergency room through the use of EMR with embedded quick embedded tools, treatment plans, and protocols might lessen the E.D. boarding time and crowd. The EMR could facilitate patient safety and quality care. The constructive collaboration of all stakeholders in accomplishing improved E.D. patient outcomes created openness, cooperation/initiatives, and use of best practices (Rupp et al., 2017).

Local Background and Context

Many U.S. hospitals use EMRs to mitigate overcrowding, reduce E.D. boarding time, and give prompt treatment care (Ben-Assuli et al., 2015). The introduction of EMR with quick embedded tools, treatment plans, and protocols to the E.D. introduced enhanced better decision support for appropriate treatment plans (Wang et al., 2017).). The approach took advantage of the benefits offered by Health Information Technology for Economic and Clinical Health Act (HITECH) monetary incentives (Centers for Medicare and Medicaid Services, 2013). The Institute of Medicine (IOM) recommended increased usage of information technologies for more significant access to patient's records (Evans, R.S., 2016). The EMRs usage in hospitals E.D. improved promptness inpatient care, significant reduction of boarding time, improved communicability among E.D. staff and physicians, enhanced support for timely appropriate information, quality patient care with better effective coordination, and better patient care through proper data analysis. The new EMR model approaches addressed the prompt inpatient care (Baysari et al., 2017).

Role of the DNP Student

As nurse practitioner, and nurse leader, I assumed the roles of DNP to assimilate the American Association of Colleges of Nursing's (AACN) Essentials of doctoral education for advanced nursing practice (2006). I practiced the skills of the Essentials VII, VIII which deal with the comprehensive approaches of proper patient quality care, and the Essential IV that provides leadership in the usage of information systems in the health care delivery system (Zaccagnini et al., 2011). My role as the scholar-practitioner and prime mover of efficient, positive social change (Laureate Education Inc., 2011) motivated me to search for peer-reviewed literature for the systematic review with the Johns Hopkins guidelines and usage of PRISMA chart. The systematic review assessed E.D. quality care with EMR usage. As DNP student, I scrutinized the literature review to show how leadership in the usage of information system enhanced the health care delivery system at the E.D.s with the use of EMR with embedded quick tools, protocols, and treatment plans, and improved E.D. quality patient care. My chair and the committee members served as the second reviewers, and the librarian helped with the literature search.

Summary

E.D. overcrowding could be a severe problem as many hospitals have prolonged E.D. boarding time beyond the JCAHO recommendation. The proper usage of EMR with quick tools, treatment plans, and protocols, might enhance quality care by reducing patient boarding time within JCAHO recommendation. The EMR mitigated overcrowding, delivered prompt response to appropriate patient care, and improved treatment plans. EMR usage minimized the trial and error by providing the accurate decisions in patient treatment plans. EMR maintained proper

patient records and helped in reducing the overall health costs. The American Academy of Emergency Medicine suggested that so far, there seemed to have no best strategy that solved overcrowding at hospital E.D.s (ACEP Poll, 2015). Therefore, the evidence for improved care in the E.D. when using EMR with embedded quick tools, treatment plans and protocols should be further assessed. This project aimed to assess whether EMR with quick embedded tools, treatment plans, and protocols in E.D. impacted overcrowding and boarding time and improved patient quality care. The principles embedded in the Johns Hopkins model guidelines and PRISMA Chart guided the project program throughout. The project presented a systematic review of peer-reviewed articles from the year 2015- 2020 on whether EMRs with quick embedded tools, treatment plans, and protocols could enhance quality patient care in the E.D. Section 3 presented the evidence supporting the project, including defining the practice-focused question, purpose and how this approach addressed the practice-focused question, operational definitions of key aspects of the doctoral project, the literature review, archival and active data, procedures, ethical protections, and planned analysis and synthesis for the project

Section 3: Collection and Analysis of Evidence

Introduction

Many E.D.s experienced problems of overcrowding, long waits between patients and issues that affect the quality patient care. Prolonged E.D. patient boarding time adversely impacted prompt patient treatment and decreased quality care (Lorenzetti et al., 2018). The project's purpose was to evaluate, by the systematic review of the literature, whether EMRs with embedded quick

tools, treatment plans, and protocols could impact E.D. overcrowding, boarding time, and enhance E.D. patient care. The project question asked whether a systematic review of EMR with quick embedded tools, treatment plans, and protocols, used in the E.D.s could show improved quality care, improve overcrowding and impact boarding time. The usage of EMR with quick embedded tools, treatment plans, and protocols could help meet the current patient boarding recommendation of 4-hours. EMR and Health Information Technology (HIT) were efficient communication tools that could decrease the time to take care of each patient, thereby reducing patient E.D. stay with reduction of E.D. charting and ordering errors (Park et al., 2015). Additionally, the use of EMR quick tools, treatment plans, and protocols could address overcrowding and boarding time, improve throughput and timely care of patients as these computers installed tools for health care providers cut unnecessary time in the prompt diagnosis and treatment of patients (Jarvis, 2016). The E.D. healthcare providers could appropriately triage and prioritize patients with EMR usage with quick embedded tools, treatment plans, and protocols. One cause of low quality of care in E.D.s is E.D. crowding and long boarding of admitted E.D. patients, which impacted patient care. The project evaluated whether there might be evidence to support use of the EMR with quick embedded tools, treatment plans, and protocols in addressing E.D. overcrowding, boarding time, and in improving quality care in the E.D. setting.

Practice Focused Question

Hospitals have problems with prolonged boarding patient time, which is one cause of low quality of care. The project goal evaluated whether there could be an evidence to support improved E.D. care quality, reduced overcrowding, and improved boarding time by using EMRs with quick

embedded tools, treatment plans, and protocols. The gap in practice that this doctoral project addressed are the lack of knowledge of the improvements in E.D. overcrowding, E.D. boarding and quality care impacted by the EMR with quick embedded tools, treatment plans, and protocols in the E.D. setting. Therefore, the project question asked whether a systematic review of EMR with embedded short tools, treatment plans, and protocols used in E.D.s showed reduced overcrowding, improved boarding time and enhanced patient care quality. This project utilized the steps of evidence-based practice using the Johns Hopkins Model, and the PRISMA Chart.

The EMR with quick embedded tools, treatment plans, and protocols enhanced prompt patient treatment and avoided delays experienced with paper medical record systems (Park et al., 2015). However, overall improvement in the quality of patient care was not clear. The project's purpose was to assess the evidence that EMR with quick embedded tools, treatment plans, and protocols use reduced E.D. overcrowding, improved boarding time, and enhanced the quality of patient care in the E.D. This project's purpose aligned to the posed project question and approach by targeting increased E.D. quality in the setting of EMR with quick embedded tools, treatment plans, and protocols use.

Operational definitions for this project included:

- Health Information Technology (HIT) refers to electronic designs to support and enhance healthcare usage for both health care providers and their patients (Reads the- stimulus.org.2009, (2009)
- The definition of Protocols is standing orders, preprinted order sets, advanced nursing interventions, advanced triage protocols, and computerized order sets (Gurney et al., 2015).

- Qualified Electronic Health Record (EHR/EMR) refers to an individualized health-related information electronic record. It includes the patient's clinical health information and demographic data that supports inputs of clinical decisions of the health provider and physician order with stored information of health quality care (Reasthestimulus.org., 2009).
- Boarding time: When the patient is admitted to the ED or another temporary place before being transferred to as the hospital-inpatient or discharged home, it defines his boarding time. (The Joint Commission, 2013; Morley, et al., 2018).

Sources of Evidence

Evidence-based practice promotes enhanced quality care. The steps of evidence-based practice by the Johns Hopkins model and PRISMA usage guided the search. 16 peer- reviewed articles showed that the use of EMR with quick embedded tools, treatment plans, and protocols in the E.D. reduced E.D. patient length of stay (LOS) and mitigated E.D. overcrowding. 20 articles showed enhanced patient quality care. Two pieces directly focused on reducing the E.D. waiting time. The article of Park et al. (2015) found that immediate technological adaptation, and corresponding organizational adaptation after an EMR with quick embedded tools, treatment plans, and protocols usage at E.D. decongested patient traffic, and shortened patient waiting times. The Duke University E.D. hospital in Durham, North Carolina, used the Duke Maestro Care electronic health record system to improve waiting times and significantly reduced E.D. boarding time (Duke Nursing, 2017). The evidence showed relevance to the usage of EMR with quick embedded tools, treatment plans, and protocols at E.D. improved patient E.D. boarding time approximating the 4 hours recommendations, decreased E.D. overcrowding and enhanced quality

of care. Treatment plans, protocols, and quick tools increased improvements in physician documentation. Emerging technologies to enhance improved physician documentation in E.D. settings with EMR embedded protocols, short tools, and treatment plans promoted patient quality care (Lorenzetti et al., 2018).

Published Outcomes and Research

The literature review provided the foundation of evidence to support the doctoral project. The Walden University Library databases were used for this project, and CINAHL & MEDLINE Cochrane Database of Systematic Reviews, Centers for Disease Control and Prevention Interactive Data Base Systems, EBSCOhost, Google Scholar Joanna Briggs Institute EBP Databases, National Library of Medicine-NIG, the SAFER Medline, Guides, Additional ONC Resources, AHRO Resources, HIMSS Library, the Joint Commission and ECRI Institute: Partnership for Health IT Patient Safety, and the American Academy of Nurse Practitioners. The systematic review in the search for evidence got valuable assistance from the Walden librarian. My chair served as the second reviewer of the evidence. The systematic reviews, RCTs, meta-analysis works were searched and included accordingly. The project used the peer-reviewed scholarly research and professional organization evidence. Key search terms for this project included: emergency department quality of care, use of EMR in E.D., E.D. overcrowding, E.D. process flow, EMR quick tools, EMR protocols, EMR treatment plans of EMR in E.D., Ed overcrowding, E.D., process flow, ED-boarded patients, ED EMR information gap, E.D. boarding time, HIT, and E.D. waiting time.

The literature review in terms of years searched encompassed from the year 2015 to 2020. The literature review was all peer-reviewed and published in the different journals: Journal of Emergency Medicine, Annals of Emergency Medicine, Western Journal of Emergency Medicine, Journal of Research in Medical Sciences, Academic Emergency Medicine, Clinical and Experimental Emergency Medicine, Academic Emergency Medicine, Simulation (The Society for Modeling and Simulation International), Modern Healthcare, Emergency Medicine Journal, Journal Medical System, Emergency Medicine Journal, The Society for Academic Emergency Medicine, and Med J Aust. This systematic review that used the Johns Hopkins model and the PRISMA chart showed the relevance of EMR with embedded quick embedded tools, treatment plans, and protocols usage at the E.D. to improve E.D. quality of care, decongest overcrowded E.D, and improve boarding time. The literature review discussed the different strategies using HIT incorporation that mitigated E.D. crowding, improved boarding time and enhanced E.D. patient care.

Impact of EMR in the E.D.

The appropriate use of an EMR with quick embedded tools, treatment plans, and protocols, could enhance the prevalent patient E.D. boarding time to the 4-hours JCAHO recommendation (Morley et al. 2018). The EMR and HIT usage could decrease E.D. stay, streamline E.D. charting and minimize ordering errors and duplications with the use of quick tools, treatment plans, and protocols (Jarvis, 2016). The usage of EMR through technological adaptation by the users and organizational transformation by healthcare organizations synergized the effectiveness of its usage to mitigate E.D. crowding and prolonged boarding time (Park et al., 2015).

Through the American Recovery and Reinvestment ACT of 2009, (Ball et al., 2011), the meaningful use of EMR reduced the total E.D. contact time with EMR usage with embedded individualized treatment plans. The EMR gave ready access to patient medical information, efficient usage of diagnostic workup of laboratory and radiology, effective communication systems and documentation, and prompt specialty consultation giving importance to accessibility to HIT throughout the throughput component (Jarvis, 2016). The output component needed efficient technology support, without which it lacked efficient patient care, and prolonged E.D. stay. ED could discharge patients with ongoing diagnostic and therapeutic treatment plans. Without the help of EMR, there could be a bottleneck on the E.D. discharge phase. In studies of U.S. hospitals population sub-groups, patients had E.D. boarding time on average between 4.4 and 34 hours (Stone et al., 2017). They showed that the EMR information system showed positive results via enhancement of admission decisions. The usefulness of the EMR with embedded quick embedded tools, treatment plans, and protocols facilitated a fast patient health treatment system. Additionally, a 2-year study of causes of E.D. overcrowding of 18 Beijing City hospitals concluded that each hospital ED needed the EMR with quick embedded tools, treatment plans, and protocols to impact urgent improvement of overcrowding.(Wang et al., 2017). A prototype of an electronic online digital dashboard lessened ED crowd. The EDs' overcrowding showed potential decrease of 34-44% in the average length of stay by simulation analysis (Mazor et al., 2016). Van Deen et al. 2019 showed that E.D. performance dashboard was useful in reducing patient length of stay in the E.D. with teamwork collaboration of all stakeholders. A systematic review performed in 2015 showed the point-of-care testing (POCT) in the E.D. reduced E.D. crowding with decreased E.D. patient boarding time compared before POCT was utilized (Lorenzetti et al., 2018). The usage of

EMR with quick tools, treatment plans and protocols was important to effect patients' fast streaming. Streaming is directing patients with similar disease acuity to the specific treating medical group. Other studies also showed that point-of-care testing incorporated with EMR resulted in 40% reduction of decision time (Jarvis, 2016). The computer tracking of laboratory times gave meantime for results under 1 hour compared to 1 hour without computer tracking when physicians took hold of x-ray and C.T. scan results. The usage of EMR reduced patient waiting time by reducing queuing time. The relevance to the queuing models utilizing hourly throughput utilized an EMR. Discrete Event Simulation allowed waiting times and queue sizes statistics to be processed into the adequate model to impact waiting times and enhance patient flow in the E.D. (Clissold et al., 2015). Discreet Event Simulation impacted management decision-making in mitigating E.D. overcrowding (Ben-Assuli et al., 2015). The development of triage systems using EMR with quick tools, treatment plans, and protocols improved patient flow as well. In a review of strategies to mitigate E.D. overcrowding, Yarmohammadian et al. (2017) recommended the appropriate usage of HIT EMR with quick tools, treatment plans, and protocols in the triage systems. This could help approximate the 4-hour target to reduce LOS in E.D.s. Yarmohammadian et al. reviewed 2016 journal articles and government documents in English and Persian, and out of 1006 articles, same acuity to specific medical team from the triage room reduced waiting time; development of triage systems using EMR with quick tools, treatment plans, and protocols improved patient flow.

With POS testing, there was also an efficient reporting system electronically driven that enhanced distribution of laboratory results and reduced E.D. waiting time. The importance of E.D. satellite labs, POS, are basic E.D. infrastructure in the E.D. EMR to manage patient flow and

streamline the reporting of data for decision making could not be overlooked. The Bay state Patient Progress initiative (BPPI) used the EMR with significant reduction of patients' LOS (Artenstein et al., 2017). This improved care by improved patient progress to earlier discharges, and decreased LOS. The usage of EMR with quick tools, treatment plans, and protocols improved throughput throughout the literature search from 1999 to 2019 performed by Zodda et al. (2019), which showed significant improved E.D. throughput. The EMR evolution should be transitioned to meaningful usage. The CMS set criteria for meaningful use for EMR incentive monetary funding. EMR quick embedded tools, protocols, and treatment plans reduced medical errors, avoided unnecessary tests, and enhanced information flow. EMR gave information about other conditions that might not be treated directly, and created alerts for preventative care, and increased patient satisfaction.

Thirty-one literature reviews showed promising results of toolkits, treatment plans, and protocols embedded to E.D. EMR that could impact E.D. overcrowding, improve boarding time and enhance patient quality care. Quimby et al. (2018) showed in their studies that EMR incorporation of HINTS (impulse test HI), characterization of nystagmus (-N-) and test of skew (TS), enhanced E.D.'s appropriate assessment of patients with dizziness. Newhouse et al. (2018) demonstrated an embedded toolkit in E.D. EMR: The Screening, Brief Intervention, and Referral to Treatment (SBIRT) is a valuable toolkit to alert clinicians for appropriate intervention and referral of people at risk of substance use. SBIRT impacted the substance use disorders during the opioid epidemic and improved quality patient care. Girgis et al. (2018) showed that EMR embedded toolkit: Patient Reported Outcome Measure for Personalized Treatment and Care (PROMT-CARE 2.0) of patients receiving cancer care improved the ongoing supportive care with

better cancer outcomes. Lewis et al. (2018) showed that linkage of EMRs between transferring facilities enhanced patient quality care with a decrease of lost significant data. Toolkit with ED EMR that facilitated linkage between EMRs of transferring facilities showed that appropriate dissemination of the most useful transfer documentation gave quick and quality patient care upon transfer from E.D.. Chaimers et al. (2019) demonstrated that the embedded toolkit of statewide prescription drug monitoring programs (PDMP) to E.D. EMR minimized misuse of opioid pain medication during the opioid epidemic. Young et al. (2017) demonstrated that the wide usage of the toolkit that incorporated electronic-Florida Online Reporting of Controlled Substance Evaluation Program (EFORCE), and PDMP to E.D. EMR mitigated opioid misuse among chronic pain opioid users when seen at E.D.s. Jin et al. (2016) showed that the toolkit using the risk stratification algorithm identified heavy E.D. users which reassessed their clinical patterns for appropriate healthcare resource utilization and population management. This toolkit incorporated with E.D. EMR enhanced healthcare outcomes for patients. Jung et al. (2020) showed that enhanced EMR E.D. with frequent mobile EMR improved E.D. consultation delays. Martel et al. (2018) showed that treatment plan protocol embedded with EMR E.D. addressed food insecurity in patients seen in the E.D.. The toolkit linked EMR E.D. to partner organizations for food resources as food resources referrals. Sundaresan et al. (2018) demonstrated that appropriate separate algorithms to identify asthma-related E.D. visit using EMR provided prompt and appropriate treatment plans for asthma exacerbations. It improved morbidity in asthma. Xu et al. (2017) showed that protocol embedded in E.D. EMR predicts in-hospital mortality for cirrhosis patients. Model for end-stage liver disease (MELD) and Child-Turcotte-Pugh (CTP) index incorporated as protocol embedded at E.D. EMR improved the discrimination power of predicting

in-hospital mortality. Bibok et al. (2018) demonstrated that toolkit embedded to E.D. EMR using a novel triage system for TIA/minor stroke patients reduced the time to unit arrival from symptom onset for referred true TIA/minor stroke patients with low and moderate ABCD2 scores. Lorenzetti et al. (2018) showed that E.D. EMR-based machine learning enhanced complete physician documentation for patient quality care. Seymour et al., (2016) showed that the alert system toolkit utilizing the prescription reporting and immediate medication utilization mapping (PRIMUM) intervention embedded to E.D. EMR helps health care providers improve point of care in addressing narcotic prescribing. Xu et al. (2016) demonstrated that E.D. EMR toolkit National Language Processing (NLP) that converts unstructured free-text into structured data enhanced the Chinese EMRs, which allow multiple EMR, section linkage. The EMR extraction method enhanced EMR definitions of comorbidities and treatments of illnesses using Chinese EMRs. Tasleem et al. (2019) demonstrated that E.D. EMR embedded protocol using an automated EMR-based screening program using opt-out testing effectively identified and screened eligible patients for HIV and HCV in episodic care safety net settings. Dipaola et al. (2019) showed that Natural Language Processing (NLP) algorithm embedded in E.D. EMR automatically identifies syncope from E.D. EMRs. It helped the effective management of syncope in E.R. and personalization of prognosis. Inokuchi et al. (2018) showed in their studies that the modified EMR system at E.D. EMR for medical and trauma finding at EMR decreased time for clinical documentation, especially for level 2 and 3 trauma patients. It improved effective quality patient care. Zeng-Tretier et al. (2016) showed that Heart like mine (HLM) design incorporated into E.D. EMR served as a useful tool to enhance patients' participation in shared decision making. It enhanced treatment and diagnostic decisions. Inokuchi et al. (2018) showed that the new EMR system enhanced quality

patient care by reducing patient care time with encouraging patient satisfaction. The toolkit incorporated into E.D. EMR with embedded differential diagnosis table uses FileMaker which costs less than 5000 US dollars with easy EMR linkage. Hinson et al. (2017) used EMR-based intervention on coagulation with the simple interactive prompt incorporated into E.D. EMR. It proved to be effective in mitigating indiscriminate ordering of diagnostic studies, which enhanced patient quality care. Monte et al. (2015), in their studies showed that E.D. EMR needed toolkits to improve the accuracy of EMR medication lists in E.D. with additional strategies that incorporate pharmacy technician reconciliation. In their studies, Rash et al. (2018) showed that toolkit added to E.D. EMR is worth implementing in hospital E.D.s for high frequency patients with chronic pain for enhanced quality care. Heldeweg et al. (2016) showed that protocol embedded to E.D. EMR Singapore General Hospital (SGH) Emergency Department risk stratification model (SDRSM) could give a promising clinical effectivity for cardiovascular risk prediction. Singer et al. (2019) demonstrated that the algorithm model incorporated to E.D. EMR to detect potassium levels of patients at E.D. decreased by 50% mortality with hyperkalemia.

Evidence Generated for the Doctoral Project

A systematic literature review attempts to identify, appraise, and synthesize all the empirical evidence that meets pre-specified eligibility criteria to answer a given research question (Cochrane definition, 2013). The systematic literature review comprises of several salient features: 1) formulation of hypothesis. 2) literature search. 3) meticulous record-keeping in managing findings, 4) analysis of conclusions as to relevance and appropriateness, and 5) structuring the review: abstract, introduction, methods, results, discussions, and conclusion (Piper, 2013).

The project question was to search for evidence-based practice literature review that postulated that EMR with embedded quick embedded tools, protocols, and treatment plans introduced at the E.D. could enhance E.D. quality patient care. The project used protocol to guide the systematic review that defined the clear process to follow and guarantee the reliability of the results. There were no participants in this doctoral project and no participant or patient protections was indicated. The project obtained Walden University IRB approval before conducting the project. There was protection of data collected, with password-protected, computer/database information for five years.

Analysis and Synthesis

The literature review is systematic scrutiny of the research question. It includes serious research developments of the research question. Steps as guidelines to writing literature review include: 1) choosing a system, an organizational structure that keeps track of reading research literature, 2) gathering research works from online databases with the list of save, 3) reading more on findings and discussions sections of the articles, 4) referring to research questions for guidance, and the concepts/terms used for literature search, 5) writing the literature review from the outline, and 6) consistency with the theoretical framework, including its relevance to the study.

Using the steps postulated by the Johns Hopkins model, we followed the rating system of the hierarchy of evidence for Level I – Level VII. The project selected the peer-reviewed articles from the relevant databases. There are things to consider when writing the literature review. These include a synthesized summary of current literature, making 3-5 important concepts applicable to

later findings, data collection, and data analysis with appropriate theories. The systematic review utilizes concept (construct) definition of generalized idea regarding a phenomenon or object; conceptual framework that delineates boundaries of studies; and theoretical framework that defines relationship between concepts.

The project directed the literature review by using the steps of evidence-based practice: 1) cultivate a spirit of inquiry, formulate questions to lay out the groundwork, 2) ask problem questions in PICOT format, 3) search for the best evidence by identifying keywords or phrases that enhance location of relevant articles in massive research databases, 4) critically appraise the evidence, 5) integrate the evidence with applicable relevance, 6) evaluate the right relevance of the evidence to project questions, and 7) disseminate EBP results. The Johns Hopkins model guided the review as well as the usage of the PRISMA Chart.

Summary

The problem question involved whether using EMR with quick embedded tools, treatment plans, and protocols addressed E.D. overcrowding, improved E.D. boarding time and impacted the quality of care in the E.D.. The EMR with quick embedded tools, treatment plans, and protocols is a promising strategy to address the prolonged E.D. patient boarding time. This chapter provided the project question, the evidence to support the project and determined outcomes, and the plan for the data analysis. The project evaluated the evidence to answer the project question. The sources of evidence for this project included the literature review using the Johns Hopkins model and utilization of the PRISMA chart that provided evidence-based analytical review as the foundation for this project. The Walden librarian helped in the search for evidence, and the chair

served as the second reviewer of the evidence. The systematic review scrutinized the systematic reviews, RCTs, and meta-analysis researched-works. The ever-changing practice milieu in the context of scholarly practice demands significant and appropriate changes or modifications, and that the international emphasis for evidence-based practice is crucial. The outputs and outcomes of EMR with quick embedded tools, treatment plans, and protocols usage were in the hands of decision makers as well as the end users. The qualitative process evaluation methodology was used to guide all aspects of the program. All ethical issues were addressed, with potential liabilities adequately identified. The systematic review project directed all major goals and objectives with corresponding strategies.

Section 4 provides the concise description of the local problem, gap-in practice, the practice-focused question, and the purpose of the doctoral project. It defines the findings of the analysis and synthesis of evidence that used the Johns Hopkins model and the PRISMA chart. It discusses anticipated limitations and strengths of the project study with implications to fill the gap in practice.

Section 4: Findings and Recommendations

Introduction

Low quality of patient care prevails among many E.D.s, mainly due to overcrowding and long boarding times. The gap in practice that this doctoral project addressed was the lack of knowledge about the benefit of EMRs with embedded tools in the E.D. settings. The project question asked whether a systematic review of E.D. use of EMRs with quick tools, treatment plans,

and protocols reduced overcrowding, improved boarding time, and enhanced patient care quality. The purpose of this systematic review was to assess whether the evidence supported that EMRs with these embedded options positively addressed overcrowding and prolonged boarding times.

The systematic review scrutinized the 160 articles through the search of literature with the assistance of the Walden University Librarian. The sources of peer-reviewed evidence included Walden Library databases, Cochrane database of systematic reviews, Centers of Disease Control and Prevention, Interactive Data Base Systems, Joanna Briggs Institute EBP Databases, HIMSS Library, the Joint Commission, and EDRI Institute. Search terms included E.D. quality of care, use of EMR in E.D., E.D. process flow, EMR quick tools, EMR protocols, EMR treatment plans, E.D. overcrowding, E.D. boarding time, EMR information gap, and E.D. wait time. The selection and evaluation of evidence used the Johns Hopkins Nursing EBP Model, which served as the framework for this systematic review. The criteria for the selection of the peer reviewed articles included publications between the year 2015 and the year 2020, English language, included use of EMRs with quick tools, treatment plans, and/or protocols. Allowable study types included: quantitative studies, randomized controlled studies, meta-analysis, systematic reviews, quasi-experimental studies, cohort studies, and prospective comparative studies. Studies that did not meet the criteria were excluded from this systematic review. The systematic review identified 160 studies and excluded the 129 articles that did not meet the inclusion criteria. The PRISMA chart below (see Figure 1) noted the reasons for inclusion or exclusion. The assessment steps to define the items included identification of potential studies, screening, evaluating for eligibility according to inclusion criteria, and inclusion of articles meeting all inclusion criteria. There were 31 peer reviewed articles meeting the inclusion criteria.

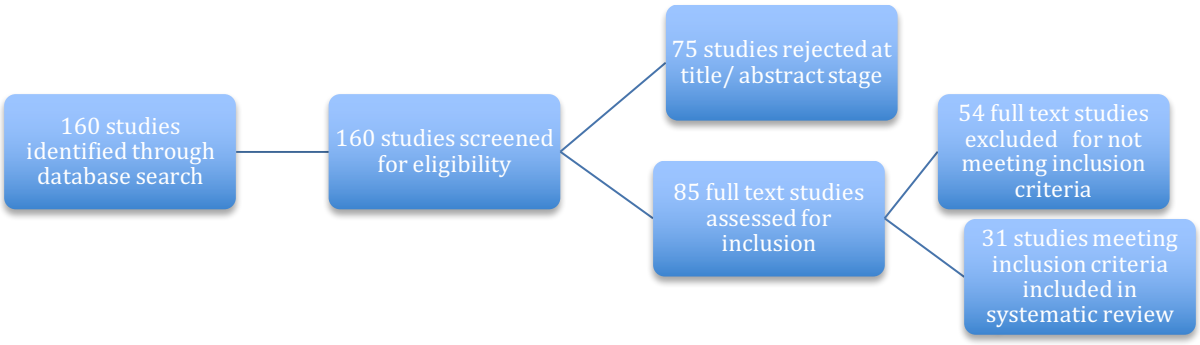

Figure 1: PRISMA *(Preferred Reporting Items For Systematic Reviews and Meta-Analyses) flow diagram*

Findings and Implications

Articles meeting all inclusion criteria were analyzed via the Johns Hopkins Research and Evidence Appraisal Tools via the ©The Johns Hopkins Hospital/The Johns Hopkins University Model (see figures 2 and 3). Dr. Patty Schweickert, DNP, FNP-C served as the second reviewer to improve study consistency with meeting inclusion criteria. A concise summary of the findings are presented below (Table 1). Each of the 31 studies included in the systematic review used EMRs and EMR embedded toolkits, protocols and/or treatment plans and showed evidence of assessed variables of improved boarding time, decreased crowding, and/or improved quality of care.

Table 1.

Summary of Evidence for Systematic Reviews

Author	Year	J.H. Level of Evidence	Quality Rating	Study Design	Sample Size	Intervention	Findings
1. Sun Young Park, Yunnan Chen, and Scott Rudkin, (2015). Technological and organizational adaptation of EMR implementation in an emergency department. *ACM Transactions on Computer-Human Intervention, 22*(1), 1-26 DOI:https://dx.doi.org/10.1145/265623	2015	Level 2	High	Qualitative peer - reviewed	four total number of E.D. staff observed; total data collection time 228.3 hrs.	Deployment EMR system; EMR quick tools, treatment plans, and protocols	It synergizes designers of both technological and organizational for EMR implementation reducing patient length of stay at E.R..
2. Duke Nursing (2017). New approach at DRH eases ED wait time, smoothens transition *Duke Health, 5/2017.* https://www.dukenursing.org/new-approach-drh-eases-ed	2017	Level 2	High	Qualitative	Duke Regional Hospital E.D.	Use of EMR, Quick tools, treatment plans, and protocols	EMR decreases wait times in E.D. for admitted patients who are waiting to be seen; reduces length of stay
3. Yarmohammadian, M., Rezael, R., Haghshenas, A., & Tavakoli, N., (2017). Overcrowding in emergency departments: A review of strategies to decrease future challenges. *Journal of Research in Medical Sciences 2017.*22:23, 1-9.	2017	Level 1	High	Systematic review	30 articles	Upgraded EMR with quick tools, treatment plans, and protocols	The length of stay of E.D. patients is reduced significantly
4. Lorenzetti, D.L., Quan, H., Lucyk, K., Cunningham, C., Hennessy, D., Jiang, J., and Beck, C.A., (2018). Strategies for improving physician documentation in the emergency department: A systematic review. *BMC Emergency Medicine, 18*(36) 1-12. https://doi.org/10.1186/s12873-018-0188-z	2018	Level 1	High	Systematic review	19articles IRCT, 6 quasi-experimental (cross sectional, or pre-post with no comparison studies)	Usage of EMR with point-of-care-testing; EMRs enhanced physician documentation at E.D.	Adoption of EMRS in E.D.s with innovative toolkits radically improved physician documentation and reduced patient length of stay, and enhanced patient quality care
5. Jarvix, P.R.E., (2016) Improving emergency department patient flow. *Clinical and review Experimental Emergency Medicine. 2016 3*(2):63-68	2016	Level 1	High	Systematic review	45 articles	EMR Point of Care Testing	Use or POCT embedded at EMR reduces patient length of stay by improving patient flow
6. Stone, E., (2017). Crowding, boarding, and patient throughput. Position Statement. *Emergency Nurses Association, 2017.*Approved by the ENA Board of Directors: December 2017	2017	Level 2	High	Qualitative	95 articles	EMR usage with toolkits	EMR embedded toolkits reduce crowding, boarding time, and patient throughput

7. Wang, H., Ojha, R.P., Robinson, R. D., Jackson, B.E., Shaikh, S.A., Cowden, C.D., Shyamanand, R., Leuck, J., Schrader, C.D. & Zenarosa, N.R., (2017). Optimal measurement Interval for Emergency Department Crowding Estimation Tolls. *Annals of Emergency Medicine 70*(5): 632-639.e4	2017	Level 2	High	Qualitative	18 Beijing hospitals 117,442 patients	EMR use with toolkits	Reduced hospital overcrowding and reduced patient length of stay
8. Mazor, I., Hart, T., and Even, A, (2016). Simulating the impact of an online digital dashboard in emergency departments on patient's length of stay. *Journal of Decision Systems(25): suppl,* 343-353. https//.doi.org/10.1080/12460125.2016.118742	2016	Level 2	High	Qualitative	3 EDs	EMR/digital dashboard	The decreased average length of stay up to 44%
9. van Deen , W.K., Cho,k E.S., Pustolski, K., Wixon, D., Lamb, S., Valente, T.W., and Menchine M., (2019). Involving end-users in the design of an audit and feedback interventions in the emergency department setting-mixed method study. *BMC Health Services Research 19*(2700. https//doi.org/101186/s12913-019-4084-3	2019	Level 2	High	Mixed method qualitative peer - reviewed	13 semi-structured interviews with attending physicians	EMR/dashboard	Decreased length of stay
10. Zodda, D., and Underwood, J., (2019). Improving emergency department throughput evidence-based strategies aimed at reducing boarding and overcrowding. *American College of Physician Executives. May/June 2019, (6)*(3), p. 70-73	2019	Level 1	High	Systematic literature review	26 articles	EMR usage	Improved throughput with a reduced patient length of stay
11. Artenstein, A.W., Rathlev, N.K., Neal, D., Townsend, V., Vernula, M., Godlust, S., Schmidt, J., and Visintainer, P, (2017). Decreasing emergency department walkout rate and boarding hours by improving inpatient length of stay. *Western Journal of Emergency Medicine. 2017. (7)*(34). https//doi.org/10.5811/WESTJEM.2017.7.34663.	2017	Level 2	High	Qualitative	Over 300 employed clinicians and non-clinicians	Use of HIT, EMR	Reduced significantly boarding time
12. Quimby, A.E., Kwok, E.S.H., Lelli, D., Johns, P., and Tse, D., (2018). Usage of the HINTS exam and neuroimaging in the assessment of peripheral vertigo in the emergency department. *Journal of Otolaryngology 47*(1) 54. https//doi.org/101186/s40463-018-0305-8.	2018	Level 1	High	Randomized study	500 randomly selected E.D. visits	EMR embedded toolkit HINTS exam (Head impulse test (HIT) nystagmus (N) Test of skew (TS)	Improved quality care of patient and reduction in patient boarding time
13. Newhouse, R., Janney, M., Gilbert, A., agley, J., Bakoyannis, G., Ferren, M., Mullins, C.D., Johantgen, M., Schwindt, R., and Thoelem, K.M., (2018). Study protocol testing toolkit versus usual care for implementation of screening, brief intervention, referral to treatment in hospitals: a phased cluster randomized approach. *Addiction Science & Clinical Practice 13*(28). https//doi.org/10.1186/s13722-018-0130-4.	2018	Level 1	High	Randomized study	2562 randomized selected medical records	EMR embedded toolkit SBIRT, screening brief intervention, and referral to treatment	Improved quality care of risky patient alcohol, drug, and tobacco use
14. Girgis, A., Durcinoska, E., Gerges, M., Kaadan, N., Arnold, A., Descaliar, J., Delaney, G.P., & on behalf of the PROMPT-CARE Program Group, (2018). Study protocol for controlled trial in an eHealth system utilizing patient reported outcome measures for personalized treatment and care: PROMT-CARE 2.0. BMC Cancer 18(845). https//doi.org/10/1186/s12885-018-4729-3	2018	Level 2	High	Qualitative	352 intervention 1408 control patients	EMR embedded toolkit PROMPT-CARE-2.0 eHealth platform	Enhanced patient's care enabling cancer patients achieve and maintain cancer outcomes
15. Lewis, J.J., Schoenfeld, S.W., And Landry, A., (2018). Assessing utility and completeness of information transmission during emergency department transfers. *International Journal of*	2018	Level 2	High	Prospective, observational convenience sample study	100 surveys	EMR embedded toolkit transfer documentation	Reduced E.D. length of stay and improved

	Emergency Medicine 11(14). https//doi.org/101186/s12245-018-0203-x.							patient quality care
16.	Chaimers, C., Mullinax, S., Brennan, J., Vike, G.M., Oliveto, A.H., and Wilson, M.P., (2019). Screening tools validated in the outpatient pain management setting poorly predict opioid misuses in the emergency department: A pilot study. *The Journal of Emergency Medicine. 56*(6). P;601-610. https//doi.org/10.1016/j.jemermed.2019.03.018	2019	Level 2	High	Observational pilot study	154 participants	EMR embedded screening toolkit with prescription drug monitoring program +medical examiner database	Enhanced patient quality care in assessing drug-aberrant behavior in the E.D. setting
17.	Jung, K. Y., Kim, S.J., Kim, K., Lee, E.J., Kim, K., Lee, J., Choi, J.S., Kang, M., Chang, D.K., and Cha,W.C., (2020). Frequent mobile electronic medical records users respond more quickly to emergency department consultation requests: retrospective quantitative study. *JMIR eHealth and uHealth 8*(2). https//doi.org/10.2196/14487:102196/14487	2020	Level 2	High	Retrospective quantitative study	24,454 consultations	Mobile EMR usage	Enhanced patient quality care, mitigate E.D. crowding
18.	Martel, M.L., Klein, L.R., Hager, K.A., and Ckutts, D.B., (2018). Emergency department experience with novel electronic medical record order for referral to food resources. *Western, Journal of Emergency Medicine: Integrating emergency care with population health 19*(2). https//doi.org/105811/westjem.2017.12.35211.	2018	Level 2	High	Retrospective observational study	Study population County E.D. with greater than 110,000 annual visits	EMR toolkit patient referral to partner food resources organization	Enhanced patient quality care, addressed food insecurity in patient seen in E.D.
19.	Sundaresan, A., Schneider, G., Reynolds, J., and Kircher, H.L., (2018). Identifying asthma exacerbation-related emergency department visit using electronic medical record and claims data. *Applied Clinical Informatics 9*(3):528-540. https//doi.org/10.1055/s-0038-1666994	2018	Level 2	High	Retrospective study	Patients aged 4-40years Ed visits for 7 years	EMR Claims database with separate algorithms	Enhanced quality care, provides better clinical data like vital signs in asthma exacerbations complete picture; reduced patient E.D. length of stay
20.	Xu, Y., Li, N., Lu, M., Dixon, E., Myers, R.P., Jolley, R.J., and Quan, H., (2017). Comparison of risk adjustment methods in patients with liver disease using electronic medical record data. *BMC Gastroenterology 17*(5). https//doi.org/10.1186/s12876-016-0559-4	2017	Level 2	High	Qualitative peer - reviewed	11,121 cirrhotic patients	EMR embedded risk adjustment methods for predicting in-hospital mortality in cirrhosis	Enhanced patient quality care, improved prediction in-hospital mortality
21.	Bibok, MB., Votova, K., Balshaw, R.F., Lesperance, M.L., Croteau, N.S., Trevedi, A., Morrison, J., Sedgwick, C., and Penn, A.M., (2018). Reducing time-to-unit among patients referred to an outpatient stroke assessment unit with a novel triage process: a prospective cohort study. *BMC Health Services Research 18*(1) https//doi.org/1186/s12913-018-2952-x	2018	Level 2	High	Prospective cohort study	2929 prospective referral cohort 2942 historical referral cohort	Novel triage system HIT	An enhanced quality patient care, time to unit arrival reduced significantly for TIA/minor stroke patients with low and moderated ABCD2 scores
22.	Seymour, R.B., Leas, D., Wally, M.K., Hsu, J.R., and PRIMUM Group, (2016). Prescription reporting with immediate medication utilization mapping (PRIMUM): development of an alert to improve narcotic prescribing.	2016	Level 2	High	Qualitative peer-reviewed	40 hospitals,6 freestanding emergency departments,28 urgent care,800 physician practices with over 15,000 physicians between December 2014 and May 2015	EMR embedded prescription reporting and immediate utilization mapping utilization	Enhanced patient quality care by improving point of care in addressing narcotic prescription

23.	Xu, Y, Li, N., Lu, M, Myers, R.P., Dixon, E., Walker, R., Sun, L., Zhao, X., and Quan, H., (2016). Development and validation of method for defining conditions using Chinese electronic medical record. *BMC Medical Informatics and Decision Making* 16(110). https//doilorg/10/1186/s12911-016-0348-6.	2016	Level 2	High	Qualitative peer-reviewed	YouAn teaching hospital Beijing Chinba	Toolkit National Language processing (NLP) embedded to EMR	Enhanced patient quality care by multiple linkages and enhanced EMR definitions of comorbidities and treatment of illness using Chinese EMR
24.	Dipaola, F., Gatti, M., Pacetti, V., Bottacchioli, a.G. Shiffer, D., Minozio, M., Mene, R., Levra, A.G., Solbiati, M., Constantino, G., Anastasio, M., Sini, E., Barbie, F., Brunetta, E., and Furlan, R., (2019). Artificial intelligence algorithms and natural language processing for the recognition of syncope patients on emergency department medical record. *Journal of Clinical Medicine 8*(10). https//doi.org/10.3390/jem8101677.	2019	Level 2	High	Retrospective diagnostic cohort study	Humanitas Research hospital EMRs of patients older than18 years old	Embedded EMR NLP algorithms for syncope diagnosis	Enhanced quality patient care by a significant reduction in the time to analyze extensive database and improved syncope management
25.	Inokuchi, R., Machara, H., Iwai, S., Iwagami, M, Sato, H., Yamaguchi, Y., Asada, T., Yamamoto, M., Nakamura, K., Hiruma, t., DOI, K., and Morimura, N., (2018). Interface design dividing physical findings into medical and trauma findings facilities clinical document entry in the emergency department: a prospective observational study. *International Journal of Medical Informatics. 112*143-148. https//doi.org/10.1016/j.ijmedinf.2018.01/017.	2018	Level 2	High	Prospective observational study	2141 patients using the previous 1207 using modified EMR system	Modified EMR System	Using different interfaces for trauma findings shortened the time for clinical documentation for trauma patients and enhanced quality of care
26.	Inocuchi, R., Sato, H., Iwagani, M., Komura, Y., Iwai, S., Gunshin, M., Nakamura, K., Shinohara, K., Kitsuta, Y., Nakajima, S., and Yahagi, N., (2015). Impact of a new medical record system for emergency department designed to accelerate clinical documentation. A crossover study. *Medicine 94*(26). https//doi.org/10.1097/MD.0000000000000856	2017	Level 1	High	Randomized crossover study	526 patients six resident 277 using standard system 249 using a new system	Enhanced EMR system FileMaker	Toolkit FileMaker embedded in EMR for differential diagnoses table reduced patient assessment time for patient quality care
27.	Hinson, J.S., Mistry, B., Hsien, Y.H., Risko, N., Scordino, D., Paziana, K., Peterson, S., and Omron, R., (2017). Using electronic medical record to reduce unnecessary ordering of coagulation studies for patients with chest pain. *Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health. 18*(2). https//doi.org/10.5811/westjern.2016.1231927.	2017	Level 2	High	Pre-and post quasi - experimental study	103 patients pre-intervention 104 patients post-intervention	EMR embedded toolkit interactive prompter	Enhanced patient quality care; it proved to be effective in mitigating indiscriminate usage of diagnostic studies.
28.	Monte, A.A., Anderson, PlknHoppe, JA., Weinshillboum, R.M., Vasilou, V., and Heard, K.J., (2015). Accuracy of electronic medical record medication reconciliation in emergency department patients. *The Journal of Emergency Medicine. 49*(1). Pp. 76-84. https//doi.org/10.1016j.jemermed.2014.12.052.	2015	Level 2	High	Qualitative	502 patients	EMR toolkit	Toolkit embedded in EMR improved medication lists in E.D. and enhanced patient quality care
29.	Rash, J.A., Poulin, P.A., Shergill, Y., Romanow, H., Freeman, J., Taljaard, M., Hebert, G., Stiel, I.G., and Smith, C.E., (2018). Chronic Pain in the Emergency Department: A pilot interdisciplinary programs demonstrates improvements in disability, psychosocial function, and healthcare utilization.	2018	Level 2	High	Prospective cohort Study pilot study	14 patients with chronic pain who frequented ED of Urban Tertiary care hospital	EMR toolkit for patients with chronic pain	Enhanced quality care for high -frequency ED patients with chronic pain

30. Heldeweg, M.I.A., Liu, N., Kob, Z.X., Fook-Chong, S., Lye, W.K., Harms, M., and Ong, M.E.H., (2016). A novel cardiovascular risk stratification model incorporating ECG and heart rate variability for patients presenting to the emergency department with chest pain. *Critical Care 20*(1):179. https//doi.org/101186/s13054-016-1367-5	2016	Level 2	High	Observational cohort study	783 patients above 21 years of age at Singapore General Hospital	EMR embedded non-invasive and objective ECG and HRV-based risk stratification tool (SDRSM) Singapore General Hospital (SGH) Emergency Department risk stratification model	Enhanced patient quality care with chest pain. The toolkit performed well against TIMI score
31. Singer, A.J., Thode Jr., H.C., and Peacock, W.J., (2019). Rapid correction of hyperkalemia is associated with reduced mortality in ED patients. *American Journal of Emergency Medicine. 30*(40). Httpos//doi.org/10.1016/j.ajem.2019.12.12	2019	Level 2	High	Qualitative	114,977 ED visits	EMR toolkit for potassium levels	50% mortality reduction, normalization of potassium level; enhanced quality care.

Overcrowding and Boarding Time

Eleven articles impacted overcrowding and boarding time with an EMR embedded toolkit: one article from the year 2015, two articles from the year 2016, six articles from the year 2017, one article from the year 2018, and one article from the year 2019. They were all Level 1 and Level 2 evidence and had high -quality rating per Johns Hopkins EVP Model. These 11 articles demonstrated that EMRs with quick embedded tools, treatment plans, and/or protocols decreased E.D. overcrowding and improved boarding time. Park et al. (2015) showed that EMR systems with quick tools, treatment plans, and protocols reduced overcrowding and patient boarding time. Duke Nursing (2017) used EMRs with embedded quick tools, treatment plans and protocols to reduce patient boarding time and E.D. overcrowding. Stone et al. (2017) found that with EMR embedded toolkit, overcrowding was mitigated and reduced boarding time with improved patient throughput. Wang et al. (2017) exhibited that in 18 Beijing hospitals, EMR with toolkit reduced hospital overcrowding and improved patient boarding time. vanDeen et al. (2017) indicated that EMR/Dashboards reduced patient boarding time. Mazor et al. (2016) showed that EMR/dashboards decreased patient E.D. boarding time. Lorenzetti et al. (2018) also found that

the systematic review of two thousand fifteen studies showed that EMRs with a point of care testing (POCT) and embedded EMRs reduced E.D. crowding, compared before POCT usage. Jarvis (2016) presented that POCT embedded in EMR resulted in a 40% reduction in the decision time of treatment plans, reduced patient boarding time and E.D. overcrowding. Yarmohammadian et al. (2017) reviewed 20,016 journal articles and government documents in English and Persian. Out of which, 1000 articles showed that E.D. triaging using EMR with embedded toolkits improved patient flow and waiting time and could approximate the 4-hour boarding target time. Zodda et al. (2019) with their studies of a literature search from the year 1999 to the year 2019, showed improved E.D. throughput with EMR usage. It mitigated E.D. overcrowding and reduced patient E.D. boarding time. Artesian et al. (2017) showed that EMR embedded E.D. satellite labs significantly reduced patient length of stay/boarding time.

Quality of Care

Twenty articles showed improved patient care quality with toolkits, protocols, and or treatment plans embedded within the E.D. EMR. 1 article from the year 2015, 3 articles from the year 2016, 2 articles from the year 2017, 11 articles from the year 2018, 3 articles from the year 2019, and 1 article from the year 2020. Levels of evidence were level 1 and level 2, all with high-quality ratings per the Johns Hopkins EBP model. Five articles showed reduced E.D. patient LOS. Quimby et al. (2018) illustrated in their studies that EMRs with incorporated HINTS (impulse test HI) characterization of nystagmus enhanced appropriate assessment of patients with dizziness. Newhouse et al. (2018) showed that EMR embedded Brief intervention and Referral to Treatment (SBIRT) enhanced quality patient care with substance abuse during opioid epidemic.

Girgis et al. (2018) found that embedded EMRs with patient-reported outcome measure for personalized treatment and care (PROMT-CARE 2.0) enhanced quality care of cancer patients for ongoing supportive care and better cancer outcomes. Lewis et al. (2018) produced results that supported the linkage of EMRs between transferring facilities, preserving important data, and enhancing quality patient care. The embedded toolkit of statewide prescription drug monitoring programs (PDMP) minimized misuse of opioid pain medication during the opioid epidemic (Chaimers et al., (2019). Incorporated electronic-Florida Online Reporting of Controlled Substance Evaluation Program (EFORCE), and PDMP to ED EMR lessened misuse among chronic pain opioids users seen at E.D.s. Toolkit that applied risk stratification algorithms identified heavy E.D. users and reassessed their clinical resource budgeting and population management clinical patterns. Jung et al. (2020) showed that enhanced EMR E.D. with frequent mobile EMR improved E.D. consultation delays. The toolkit embedded with EMR to partner organizations for food resources as food resources referrals addressed food insecurity in patients seen in the E.D. (Martel et al., (2018). Sundaresan et al. (2018) demonstrated that algorithms to identify asthma-related E.D. visit using EMR provided prompt and appropriate treatment plans for asthma exacerbations. Xu et al. (2017) found that EMR embedded protocol predicting in-hospital mortality for cirrhosis patients improved the discrimination power of predicting in-hospital mortality. Bibok et al. (2018) demonstrated that EMR toolkit with the usage of a novel triage system for TIA/minor stroke patients reduced the time to unit arrival from symptom onset for referred true TIA/minor stroke patients with low and moderate ABCD2 scores. Lorenzetti et al. (2018) presented results suggesting that ED EMR based machine learning helped significantly complete physician documentation towards quality care. The alert EMR toolkit Prescription

Reporting and Immediate Medication Utilization Mapping (PRIMUM) assisted the health care provider to improve point of care in addressing narcotic prescribing (Seymour et al., (2016). The EMR extraction method toolkit National Language Processing (NLP) allows multiple EMR section linkages and enhanced EMR definitions of comorbidities and treatments of illnesses using Chinese EMRs, which enhanced quality patient care (Xu et al., (2016). Dipaola et al. (2019) showed that the natural language processing (NLP) algorithm helped the effective management of syncope in ER and personalization of prognosis, and improved patient quality care. Inokuchi et al. (2018) in their studies, showed that the EMR toolkit for medical and trauma finding at EMR decreased time for clinical documentation, especially for level 2 and 3 trauma patients, and enhanced quality care. Toolkit Heart Like Mine (HLM) design embedded in EMR enhances patient's participation in shared decision making. Inokuchi et al. (2018) showed that the toolkit FileMaker embedded in EMR for differential diagnosis table reduces patient assessment time for patient quality care. Hinson et al. (2017) utilized a toolkit EMR based intervention on coagulation with interactive prompt. It proved to be effective in mitigating indiscriminate usage of diagnostic studies, and improved patient quality care. Monte et al. (2015) showed that toolkit embedded at EMR improved the accuracy of EMR medication lists in E.D. with additional strategies that incorporate pharmacy technician reconciliation. Toolkit integrated to ED EMR for high-frequency patients with chronic pain improved quality care (Rash et al., 2018). Heldeweg et al. (2016) found that ED EMR Singapore General Hospital (SGH) Emergency Department risk stratification model (SDRSM) for cardiovascular risk prediction could contribute a promising clinical effectiveness for patient quality care. Singer et al. (2019) demonstrated that algorithm

model embedded to ED EMR detected potassium levels of the patient at E.D. which decreased by 50% mortality with hyperkalemia.

Recommendations

The systematic review of searched articles from the year 2015 to the year 2020 showed how the use of electronic medical records with quick embedded tools, treatment plans, and protocols decongested E.D. overcrowding and enhanced patient care. The application of such a strategy in emergency departments is a must in the overcrowded E.D.s. The embedded toolkits in the electronic medical records should address the needs of the majority of patients that are seen daily in the E.D.. The selection of embedded toolkits takes its relevance from improving the treatment plans and enhancing patient assessment. The experiences of different E.D.s in the literature would help determine what quick tools, treatment plans, and protocols are appropriate. Expertise in navigating the EMRs with quick embedded tools, treatment plans, and protocols has to be attained through proper and periodic orientations of E.D. staff.

The E.D. needs remain multifaceted as the spectrum of care delivered is all-encompassing, and the specialized needs relevant to the emergency care setting impact care delivery. The E.D. health delivery system should improve the quality patient care. The systematic review demonstrated how EMR with embedded special toolkits could predict prognosis of cancer patient, improve morbidity rate and mortality rate, enhance health provider diagnostic acumen and help in timely interventions with cardiac and stroke patients.

Strengths and Limitations of the Project

The project gets its strength from the consistent use of approaches to select the peer-reviewed articles using the Johns Hopkins Nursing Evidence-Based Practice Model as its framework. The systematic review comprises of 31 articles within level 1 and level 2 levels of evidence and with high quality ratings per the Johns Hopkins EBP Model. The systematic review illustrated that EMRs with embedded protocols, treatment plans, and toolkits significantly improved patient quality care, reduced E.D. overcrowding and improved E.D. boarding time. These results are consistent with other systematic reviews that demonstrated enhanced quality of E.D. patient care, decreased overcrowding and improved boarding time with EMR use. This project's strength includes review of articles with level 1 and level 2 evidence and high quality ratings per the Johns Hopkins Hierarchy of evidence. The project's limitations included the limited number of categorized studies that used embedded protocols, toolkits, and treatment plans that improved patient quality care. Had there been more studies of the same category, the collaborative strength to show patient quality care with its usage could have been stronger.

This systematic review demonstrated that E.D. healthcare delivery system could be improved by decreasing overcrowding, improving boarding time and enhancing patient quality care by using EMR with embedded quick tools, protocols and treatment plans. The embedded toolkits enhanced dramatically the treatment plans, the prognosis of patients seen at E.D. It caused a reduction in E.D. overcrowding and boarding time. However, the number of articles searched may not be enough to collaborate same findings with other systematic reviews. More articles might illustrate how the EMR with embedded quick tools, treatment plans and protocols decongest E.D., improved boarding time and enhanced patient quality care. So that the project question opens for more research studies in the future.

Section 5: Dissemination Plan

Dissemination of Plan

The systematic review is a powerful tool to demonstrate the positive changes that could take place at the E.D. to address E.D. overcrowding, improve boarding time, and enhance quality of patient care. A conference with E.D. hospital administration and E.D. staff is a must to disseminate the planned improvements in the E.D. healthcare delivery system that could impact the quality of care. The embedded quick tools treatment plans and protocols could not only reorient health care providers towards innovative treatment plans and protocols geared for patient care but also decongest E.D. overcrowding and shorten prolonged E.D. boarding times. The different E.D. hospitals' experiences from the systematic review could transform and reorganize the E.D. delivery system with EMR with embedded quick tools, protocols and treatment plans. The E.D. staff and healthcare providers are given several options to choose from different quick tools, treatment plans, and protocols to be incorporated at the E.D. EMR. This may affect significant changes of the current EMR by installing toolkits like POST, treatment plans, and protocols that will facilitate in a timely manner the quality assessment and care of E.D. patients. This could improve the boarding time and decongest E.D. for greater patient satisfaction.

The E.D. of the project institution is recommended to review the results of this project as it suggests that an EMR with embedded toolkits-clinical treatment plans, quick tools, and protocols could decrease the waiting time, decongest E.D., improve boarding time, and potentially serve to improve quality care in the E.D.. The systematic review of the searched studies demonstrated that EMR with embedded quick tools, treatment plans, and protocols improved boarding time that

approximated the 4-hour recommendation by the Joint Commission on Accreditation of Healthcare Organizations. The project study showed improved quality patient care through different spectrums of E.D. health care delivery system. The gap in practice was supported by the systematic review and how this was addressed by different hospital E.D. with their EMR embedded with appropriate toolkits. This showed the change in EMR E.D. use that improved patient quality care. The E.D. environment displayed reinvigorated teamwork among the E.D. nursing staff and health care providers with appropriate usage of EMR toolkits. Treatment plans aided by embedded clinical treatment plans, quick tools, and protocols for enhanced overall patient care were the powerful adjuncts to aid in provision of E.D. care.

Analysis of Self

I graduated from BSN in Nursing in 1990 from St. Jude College of Nursing, Manila, Philippines. I worked as a registered nurse from 2004 to 2008 at different hospital wards: ICU, medical/surgical wards, E.R., and psychiatric wards. I was a Star Awardee Nominee, Employee year Award 2008, and consistent employee of the month award. I graduated Master of Science in Nursing from the University of Nevada-Las Vegas, U.S.A. in 2007. I was ranked 2nd highest GPA MSN-FNP program with 3.86 GPA among graduating class, UNLV-May 2007. My research and presentation were: Efficacy of pulmonary delivery of Insulin to efficient glycemic control in diabetic patients UNLV-February 11, 2007; Type 1 Diabetes Mellitus among Adolescents UNLV-March 19, 2007; and Briefing Paper: Diabetes Mellitus UNLV-November 12, 2006 –Group presentation. I worked with several family practice clinics in Las Vegas seeing patients from days old to the adult patient population. I am a board certified via the American Academy of Nurse

Practitioners. While working at E.D.s, I experienced a high number of patients leaving without being seen due to long waiting time. When I embarked in the DNP program with Walden University, I found the opportunity to address this gap in practice: prolonged E.D. boarding time and overcrowding. As nurse leader I satisfy roles of DNP to assimilate the American Association of Colleges of Nursing's essentials of doctoral education for advanced nursing practice essential VII and VIII, which bring through comprehensive approaches proper patient quality care, and the essential IV, which provides leadership in information systems usage in the health care delivery system. My role as the scholar practitioner and prime mover of efficient positive social change motivated me to search for peer reviewed literature for systematic review with Johns Hopkins model guidelines to assess for improved E.D. care using the EMRs and assess for improved E.D. care using EMRs with embedded toolkits. My role as the DNP student encourages me to scrutinize the literature review to show how leadership in the usage of information systems enhances the health care delivery system at the E.D.s with EMRs and embedded quick tools, protocols, and treatment plans that improve E.D. quality patient care.

The completion of the project went through a winding and rough journey, with formidable challenges that usually intimidate beginners like me. My chair has been a great help and inspiration to tackle the odds along the way. My wife Lisa and my children were my tenacious support both mentally and psychologically. There were some moments of almost giving up due to the constant stresses. I was sure that prayers, patience, perseverance, and resilience paid off as I was harnessed and trained to face difficulties in life with courage. The revisions of sections to perfection made me a professional from a beginner student. This was my professional metamorphosis through the patient guidance of my chair to get all things the right way. The systematic review project was

made possible with the help of my chair, the committee members, Walden University librarian, my professors who prepared me well to face the daunting project. I got my inspiration from these constant reminders: “Consult not your fears but your hopes and dreams. Think not about your frustrations but your unfulfilled potential. Concern yourself not with what you tried and failed in, but with what it is still possible for you to do” (St. Pope John XXIII).

Summary and Conclusion

Hospital E.D.s needing relevant EMR quick tools, treatment plans, and protocols may find this systematic review helpful from the assessment of toolkits that may be relevant to their current needs. The social impact of these findings could be significant as the safety, quality of E.D. care of patients, families, and communities could be enhanced (Ball et al., (2011). Nurses and healthcare providers are transformational agents of social change through reinvigorated E.D. patient quality care. The national adoption of embedded quick tools, treatment plans, and protocols in EMRs in E.D.s can reform medical records documentation by enhancing clinical judgment of health care providers and providing appropriate treatment plans in a timely manner that would impact the E.D. overcrowding and E.D. patient quality care with improved boarding time (Lorenzetti et al., (2018). E.D. nursing care can be transformed with timeliness and coordinated care through EMR with quick tools, treatment plans and protocols usage. The potential contribution of the doctoral project to nursing practice is by way of this systematic evaluation of EMR with quick embedded tools, treatment plans, and protocols can aid in reducing crowding and decreasing E.D. boarding time with enhanced E.D. patient care. Adoption of these strategies by ED departments may serve to improve E.D. overcrowding, mitigate boarding time

and enhance the quality of E.D. patient care that will introduce healthier milieu in the E.D. healthcare delivery system.

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APPENDIX

Johns Hopkins Nursing
Center for Evidence-Based Practice

Thank you for your submission. We are happy to give you permission to use the JHNEBP model and tools in adherence of our legal terms noted below:

- You may not modify the model or the tools without written approval from Johns Hopkins.
- All reference to source forms should include "©The Johns Hopkins Hospital/The Johns Hopkins University."
- The tools may not be used for commercial purposes without special permission.

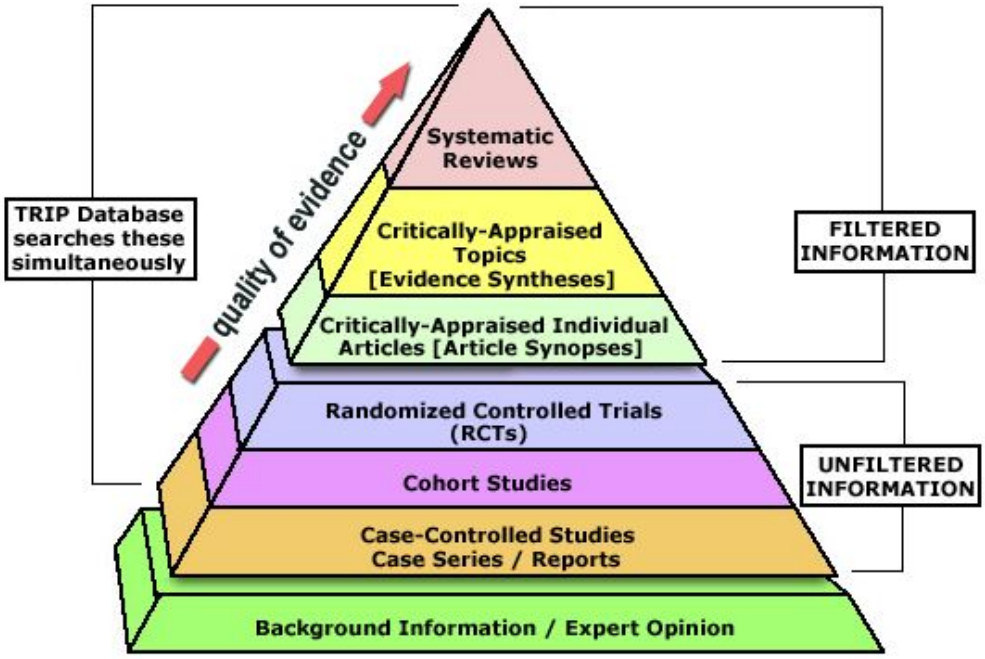

Figure 2

Hierarchy of Evidence

Figure 3

Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool

Table 2: Quality Appraisal of Research Studies (31 studies)	**YES**	**NO**	**N/A**
1) Does researcher identify what is known about the problem and how the study will address any gaps in knowledge?	**31**	**0**	**0**
2) Was the purpose of the study clearly presented	31	0	0
3) Was the literature review current (years 2015-2020)	31	0	0
4) Was sample size sufficient based on study design and rationale?	31	0	0
5) If there is a control group:			
Were the charrettes and /or demographics similar in both the control and intervention groups?	31	0	0
If multiple settings were used, were the settings similar?	31	0	0
Were all groups equally treated except for the intervention groups?	31	0	0
6) Are the collection methods described clearly?	31	0	0
7) Were the instruments reliable (Cronbach's a(alpha)_>25%?	31	0	0
8) Was instrument validity discussed?	31	0	0
9) If tables were presented, was the narrative consistent with the table content?	31	0	0
10) Were study limitations identified and addressed?	31	0	0
11) Were conclusions based on results ?	31	0	0

Table 3: Quality Appraisal of Systematic Review with or without Meta-Analysis or Meta-Synthesis (4 studies)			
	YES	**NO**	**N/A**
1) Was the purpose of the systematic review clearly stated	4	0	0
2) Were reports comprehensive, with reproducible search strategy?	4	0	0
Key search terms stated	4	0	0
Multiple databases searched and identified	4	0	0
Inclusion and exclusion criteria stated	4	0	0
3) Was there a flow diagram studies presented (design, sample, methods, results, outcomes, strengths and limitations)?	4	0	0
4) Were methods for appraising the strength of evidence (level and quality) described?	4	0	0
5) Were conclusions based on results?	4	0	0
Results were interpreted	4	0	0
Conclusions flowed logically from the interpretation and systematic Review question	4	0	0
6) Did the systematic review include both a section addressing	4	0	0

limitations and how they were addressed?			
31 articles level 1 and level 2 in the hierarchy of evidence per Johns Hopkins Model			