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Causes of EHR projects stalling or failing: A study of EHR projects in Saudi Arabia

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ABSTRACT

Background: Electronic Medical Records (EMRs) are designed to automatically collect, store, and retrieve patients' information from healthcare providers within an organization. They assist clinicians in deciding the future course of treatment. The primary objective of this study is to investigate the practices of Electronic Health Record (EHR) project managers regarding the causes of EHR projects getting stalled or failing in Saudi Arabia.

Methods: Three focus groups were identified across three main cities of Saudi Arabia, namely Riyadh, Jeddah, and Dammam during the years 2013 and 2014. Each group consisted of 10–15 experienced EHR project managers. Qualitative analysis consisted of immersion and crystallization to develop a coding scheme that included both preconceived and emergent themes.

Results and conclusion: The findings of this study highlight the difficulties, which ensue between EHR and project management practice as well as the issues that can arise from the common use of these terms. It highlights how the aims of an EHR project and its management are transformed, and how the reputation of the project management is to achieve the exact and short-term objectives associated with the comprehensive aims of an EHR project.

1. Overview of Electronic Health Records

1.1. Introduction to Electronic Health Record

Health technology's primary goal is to support and improve patient care. One of the applications of health technology is conversion of paper-based patient medical records to Electronic Medical Records (EMRs). EMR was designed to automatically collect, store, and retrieve patients' information from healthcare providers within an organization [1]. EMR benefits have a direct impact on the safety and quality of healthcare of patients. It enables clinicians to easily access the medical history of a patient and monitor their present condition, thereby, helping them in deciding the future course of treatment [2]. However, it has been noted that its use is restricted to only some specific organizations. Therefore, the concept of Electronic Health Record (EHR) was introduced. It enables stakeholders to share medical information, which can be referred to at any point in time during treatment of patients among themselves [3].

EHR has the potential to transform the healthcare scenario. It enhances the delivery of high-quality care and allows the sharing of documentation over a reliable network. The successful implementation of EHR will have a positive impact on healthcare providers, patients, and hospitals. The positive effects of EHR from the perspective of healthcare providers are as follows:

- It provides quick, accurate, up-to-date, and complete information about patients at the point of care.
- It allows easy navigation across the medical history of patients and leads to faster retrieval of lab or x-ray results.

Moreover, EHR helps reducing medical errors and adverse events with the help of decision support tool, clinical alerts, and reminders tools. In addition, EHR engages patients through patient portals, which negates the need to fill new forms during every visit and also allows patients to view their medical and lab reports at any point in time [4].

The above-mentioned advantages necessitate the complete adoption of EHR. However, according to Trites and Gelzer [5], there are some factors that may lead to getting EHR projects stalled or failing altogether. The first reason is leadership failure and/or poor project management.

Abbreviations: EMRs, Electronic Medical Records; EHR, Electronic Health Record; NGHA, National Guard Health Affairs; CPR, Computerized Patient Record; HIMSS, Healthcare Information and Management Systems Society; KFSHRC, King Faisal Specialist Hospital and Research Center; KKESH, King Khaled Eye Specialist Hospital; EMRAM, Electronic Medical Record Adoption Model; CSF, critical success factors.

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Inadequacies in any of these properties might lead to complete failure of the project. Second, EHR/EMR software vendors must be chosen according to their capabilities, qualities, and commitment to work, and not on the idea of reaping personal benefits. Third, overcoming the shortage of health informatics (e-Health) specialist and IT specialists to lead the project managers, and selection of system or functionality to be implemented must be performed according to the requirements of the healthcare organization and not the technological techniques or capabilities available. The last factor would be the resistance to bring a change in the higher management or the end users because of their minimal involvement during the project selection or implementation.

1.2. Electronic Health Record in Saudi Arabia

The health care system in Saudi Arabia is a national system, which provides free healthcare services to citizens and, in some cases, residents as well. In Saudi Arabia, the Ministry of Health (MOH) is the major provider and financer of healthcare services. Other government agencies include Security Forces Medical Services, Army Forces Medical Services, National Guard Health Affairs (NGHA), and Royal Commission for Jubail and Yanbu health services, which provide services to a defined population, usually employees and their dependents. Moreover, there are referral hospitals (e.g., King Faisal Specialist Hospital and Research Center), Ministry of Higher Education hospitals known as teaching hospitals (e.g., King Abdulaziz University Hospital), health units in schools affiliated to the Ministry of Education, and the Red Crescent Society. All of them provide health services to residents during crises and emergencies. In addition, the private sector contributes to the delivery of healthcare services in the major cities [6]. The organizational structure of the healthcare system in Saudi Arabia is shown in Fig. 1.

In Saudi Arabia, the utilization of EHR projects in healthcare has increased. Some health organizations are expanding their IT infrastructure and applications to advanced stages. The advancement in healthcare IT projects such as implementation of patient-carried record (PCR), electronic patient record (ECR), digital medical record (DMR), and Electronic Medical Record (EMR) combined with other factors such as strong infrastructure, knowledge, organization awareness, and trained people have proved the worth of these systems in the hospitals. In 2010, the Arab Health Conference awarded the Middle East Excellence Award in electronic health records to National Guard Health Affairs (NGHA) [7]. In 2012, the Healthcare Information and Management Systems Society (HIMSS) recognized King Faisal Specialist Hospital and Research Center (KFSHRC) as a Stage 6 hospital in the deployment and use of clinical information technology [8]. Recently, King Khaled Eye Specialist Hospital (KKESH) has achieved Stage 7 on the Healthcare Information and Management Systems Society's (HIMSS) Electronic Medical Record Adoption Model (EMRAM). KKESH becomes the first hospital in the Middle East to achieve this global recognition. However, there are a lot of variations in the healthcare organizations in terms of EHR projects. Even though a majority of Saudi healthcare organizations are in their early stages of adopting e-Health projects, there are still many hospitals and medical care centers that maintain paper-based records. Also, human errors are becoming more common in medication administration due to many reasons, including the shortage of well-trained staff in these hospitals. The reasons behind the failure of adoption of the EHR include the absence of national policies and standards, poor electronic health strategies, insufficient understanding of the technology, and lack of required skills and tools for selecting the right vendor [9,10]. The confusion associated with implementing and using these new technologies is also prevalent, which could be solved through an efficient project management plan.

In Saudi Arabia, there is an urgent need to adopt EHR for two main reasons. The first reason is the rapid growth of Saudi population across the country's wide geographical spread. The second reason is the vast amount of health information generated by different health sectors using multiple systems with poor interoperability among them. Unfortunately, there has been no significant progress in this area. A study conducted in Saudi Arabia shows that the rate of failure of healthcare EHR projects is extremely high [11].

To cope with the resistances in the implementation of EHR systems in Saudi Arabia, it is necessary to devise an industry standard system comprising of wide-ranging quality management principles and

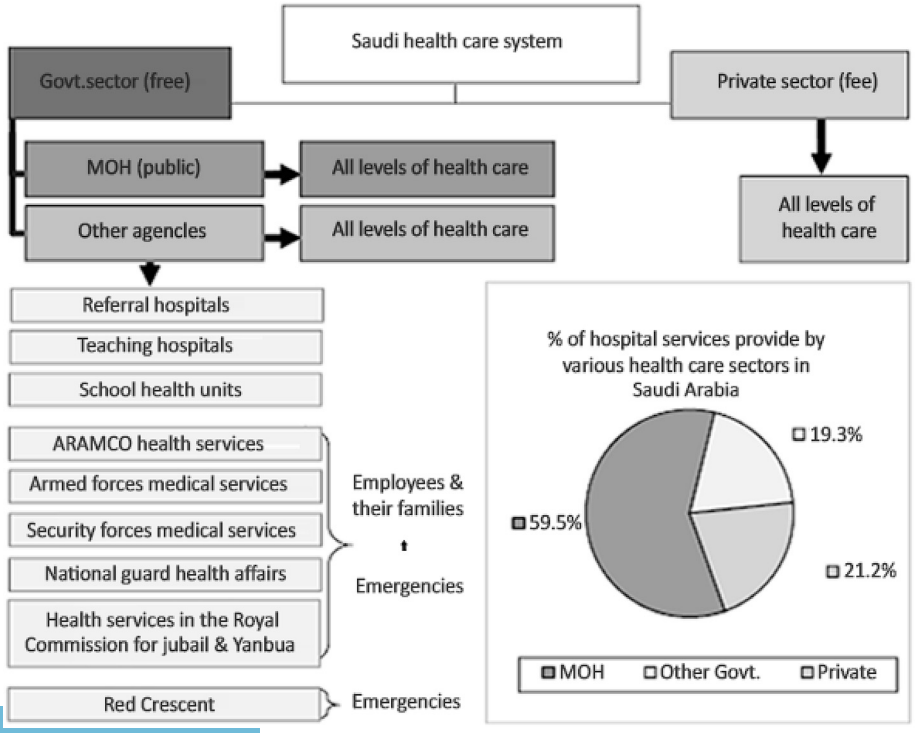

Fig. 1. Structure of healthcare system in Saudi Arabia [6].

processes to ensure that EHR products meet a minimum level of safety, consistency, and usability in an organization. In addition, establishing an internal reporting system to identify the concerns related to EHR along with the errors and any other related issues at project implementation stage is also required. Again, project guidelines outlining the use of documentation techniques to guarantee inclusive, and quality documentation should be developed for both vendors and users of EHR systems. Staff engagement at all phases of implementation can translate staff feedback into system updates. It is only through making small changes to the system that would help in facilitating better workflows, ease the process of implementation, and deal with the resistance to change. Project management should also focus on rigorous training of staff so that they can offer technical assistance to address any concerns rapidly. Monitoring the continuous quality improvement by evaluating the progress of EHR project and responding to the staff needs can ease the implementation.

1.3. Literature review Electronic Health Records implementations

EHRs promise to improve the healthcare delivery outcomes, clinical management processes, enhance efficiency, security of coding, and billing. It also has the potential to increase the quality of healthcare, reduce costs, and increase productivity. EHR has been implemented by many hospitals in countries such as Malaysia, America, UK, Korea, China, and Singapore, but they still have not achieved the desired rate of distribution [12].

Authors have unanimously agreed in their literature reviews that EHR cannot be implemented effectively due to a number of organizational and technical limitations such as human skills, organizational structure and culture, infrastructure, financial resources, coordination, uncertain return on investment, standard of technology, level of acceptance to change, no standardization, complicated operation that slows down the workflow, and lack of technologically competent staff [12–15]. Inability to address these limitations in the planning phase may lead to a failed EHR project [16].

Jha et al. [15] argued that many hospital characteristics such as hospital size and location, teaching status, technology markets, and presence of basic systems impact the adoption of EHR. In this regard, hospitals possessing basic systems are more likely to adopt EHR by adding more functions, which serves as an upgrade and face few adoption barriers during the process. The adoption rate of EHR in US hospitals is low, and more than 90% of US hospitals do not meet the specified requirements. Even though the findings of Jha et al. [15] seem reasonable, we cannot rely on it because 37% of US hospitals did not respond to the survey. Moreover, the study is focused on adoption and not on the usage of EHR. According to Lorenzi et al. [14], physicians were not willing to adopt EHR but urged to do so because they would miss great advantages by not implementing EHR. Unfortunately, we cannot rely on this finding as well because of the subjective nature of the research and the qualitative results so the extent cannot be measured and verified. In addition, as per Thakkar and Davis [16], lack of involvement of physicians' involvement in each phase of implementation may lead to resistance and improper use of EHR, which might ultimately lead to its failure.

In Saudi Arabia, EHR remains an important issue. The overall adoption rate in Saudi Arabia is relatively low. Moreover, quite a few hospitals still face several problems, and many previous EMR projects have failed. Several studies have found that failures of information technology projects in the healthcare environment are very common [10]. In Saudi Arabia, there are no governmental or organizational statistical reports to show the success and failure rate of EHR projects [17]. However, a few studies have been conducted in the country to address the causes of failure of such projects while others have analyzed their Critical Success Factors (CSF). A study was carried out in 2012 to investigate the failure and factors of the success of EHR projects [18]. In 2013, another study was conducted in two major hospitals in Saudi Arabia, one was private and the other was government hospital [19]. In another study, 52 projects were reviewed in six large hospitals of Saudi Arabia from 2007 until 2011 [9].

Qualitative and quantitative research methodologies were used in the studies conducted. Consequently, the methods used to collect data ranged from surveys and questionnaires to interviews and case studies. One of the studies used a questionnaire to collect data from a random sample of healthcare professionals. In the 2013 study, 158 valid respondents participated in a survey where there was equal representation from both hospitals [19]. The study carried out by Alfaadel et al. [18] targeted 308 project managers in Saudi Arabia and used a questionnaire to collect responses. The studies came up with different conclusions about the causes of failure. One of the studies found that the six main reasons for EMR failure from the perspective of healthcare professionals included human, financial, legal, organizational, technical, and professional barriers [19]. Another study concluded that the planning phase is more critical than other phases as most failures are caused in this phase [9]. According to it, the main four factors of project failure are scope of the project, stakeholders, communication, and risk management, which are all related to the planning phase. The key stakeholders during electronic health record (EHR) implementation include EHR Team Lead, EHR Implementation Manager, Physician Champion, Nurse Lead, Medical Assistant Lead, Scheduler Lead, Registration Staff Lead, Laboratory Staff Lead, Radiology Staff Lead, Pharmacy Staff Lead, Information Technology Lead, Billing Staff Lead, Meaningful Use Lead, Workflow Redesign Lead, Training Lead, Contact Management Representative, and Department of Finance Representative. Depending on the size and type of your organization, the concerned organization may assign employees to more than one role. In addition to these factors, one of the studies found that unclear goals and values, unspecified requirements, and lack of competent project manager and leadership are the three major categories of barriers and challenges in the way of successful implementation [18]. The studies also pointed out other factors such as increased cost, user dissatisfaction, quality issues, and extended time.

Most of the studies did not mention the problems encountered during research and the study limitations. We believe that one of the most important problems include the number of responses and the alternative data collection methods in this case. The reviewed studies did not mention how the internal and external validity were addressed and increased. Several considerations must be taken into account in order to increase both internal and external validity. According to the literature review, possible determinants for successful implementation of EHR include identification of clinics with workflow adjustment, careful budgeting, training and evaluation, interoperability, availability of trained technical support staff, and provision of financial support [15,16]. Thakkar and Davis [16] suggested that potential risk and barriers from the perspective of managers and directors, who are using the system, should also be considered. Al-Aswad [12] recommended that, in future, further research should be conducted on this topic in order to cover all its aspects as it still has not been possible to implement EHR in all countries.

1.4. Electronic Health Records project management

Project planning should be the first step that managers should proceed with. For better planning, project managers should determine the scope of work. Project scope is defined as part of project planning that involves determining and documenting a list of specific project goals, deliverables, tasks, costs, and deadlines [20]. It is natural to change the scope of the project along the way to accommodate the changes that might happen during the project. Therefore, it is better to document every detail to keep a record of any changes that might have occurred during the project [20]. Documentation of the all the details is a crucial process to keep all the stakeholders aware of the project's progress.

The stakeholder is defined as an individual who is affected by or who can affect a project's outcome [21]. There are two types of stakeholders: internal and external. The role of the external stakeholders is usually

limited to consultations, and they are usually not accountable for project planning activities. On the other hand, internal stakeholders are responsible for planning activities such as project scope estimation, staffing, and cost estimation. It is also crucial to have clear communications with all the stakeholders and team members about the objectives, costs, and any changes in the process. Regardless of the preparations required for project planning, there are many associated risks that may arise at any given point in time. Therefore, project manages should identify the risks and know how to overcome them.

One of the common obstacles encountered during a project is budget. If budget allocation has been done efficiently, a major part of the project is accomplished. Resource allocation is one the most important and difficult part of project management. Everyone can perform well when a huge budget is allocated, but only a professional and an experienced project manager can work in adverse situations. It is important to be focused and work according to a specific plan. We have to study if the idea of this project or the solution to be implemented is valuable and would make a change. It is a probable measurement to the outcome of implementing this solution in a project. This study will discuss the importance of project planning, analyze and discuss the findings, and finally conclude and provide recommendations for future research.

2. Objectives of the study

Identifying the causes of failure or stalling of EHR projects are crucial as the Saudi healthcare delivery system faces many business-related challenges in its implementation. Many hospitals incur heavy financial losses due to incomplete implementation of EHR project and face lower potential for EHR value as a result of poor project implementation. The primary objective of this study is to investigate the practices of EHR project managers regarding the causes of EHR projects getting stalled or failing in Saudi Arabia. Specifically, the study investigates:

- Practical definition, basic objectives, minimum requirements and the problems experienced by EHR project managers in Saudi Arabia
- Practical definition for each EHR project phase (inception phase, preparation phase, tendering phase, implementation phase, and close-out phase)
- Basic objectives set by project managers for each phase of the EHR project
- Minimum requirements set by project managers for each phase of the EHR project
- Problems experienced by project managers for each phase of the EHR project

Focus groups of 35 highly skilled EHR project managers with more than 10 years of experience in project management were identified in three main cities across Saudi Arabia, namely Riyadh; 15 EHR project managers (6 females and 9 males), Jeddah; 10 EHR project managers (6 females and 4 males) and Dammam; 10 EHR project managers (2 females and 8 males) during the years 2013 and 2014. Each group consisted of ten to fifteen experienced EHR project managers with more than ten years of experiences in EHR project management. Participants were recruited voluntarily during free workshops conducted by the researcher in criteria for the success of e-Health projects in Saudi Arabia. The researcher utilized questions to start the focus group discussions and organize the flow of conversation (Appendix 1). Discussions were organized topically in the following categories on causes of EHR Projects getting stalled or failing that are experienced by the EHR project managers in Saudi Arabia with emphasis on project management, inception phase, preparation phase, tendering phase, implementation phase, and close-out phase. Participants were asked about familiarity and experience with each category as well as their practical definition, basic objectives, minimum requirements and the problems experienced by EHR project managers (Appendix 1). The NVivo qualitative data analysis software (version 10) was used for analysis of the focus group audio files after they were transcribed. The qualitative analysis consisted of the following steps:

(a) Process of immersion (which involved reading and exploring the data as a whole and in pieces)
(b) Process of crystallization (which involved reflecting and recognizing relevant substance, themes, and patterns derived from the immersion process)

The researcher reprised this nonlinear process to develop a coding scheme that consisted of both preconceived and emergent themes. All the common themes across focus groups were identified and compiled in each of the following Tables 1–6.

3. Results

There are five main skills that any project manager should possess: communication, team building, conflict management, industry and solution knowledge, and time management. These are critical skills that determine the success of the project. Project managers need to increase their knowledge by reading books, attending courses, and participating in workshops. To be a successful project manager, one should deal with them by integrating experience and knowledge. The project manager should take up new projects only when he/she is able to handle them. If engaged in a project, project manager should not be assigned a new one.

In addition, factors like commitment, time, focus, and dedication would help in carrying out the project successfully; otherwise, the project will fail because the project manager will not be able to carry all the steps or stages with full commitment. This is really a crucial step because meeting the requirements will identify the future use of the project. If failed, then the project has no benefit and will bring no change. The project will be a waste of time, effort, and cost. It is a process of understanding what the end users require. It requires full understanding of the workflow to specify exactly the roles of the business.

To maintain a written record of all the requirements, a Request for Proposal (RFP) has to be initiated. The RFP identifies the baseline of the project. These requirements will be forwarded to the vendor to be more clear and specific regarding which the contract and agreement are provided. An approved vendor list is a list of available suppliers that the company has agreed to work with. Usually, any supplier who wants to be added to the company's vendor list must follow the guidelines and requirements of the company. Vendor evaluation refers to the process of assessing and approving potential suppliers with the help of different kinds of evaluation. Proper documentation of all the steps and details of the project is a crucial part of a project's success [22]. So as the process changes and develops, the documented details will always be available for review. Contract finalization is a written contract with the supplier to ensure that all needed requirements are available.

Team members should be involved in the development of activities and tasks, as they possess varied experience and knowledge, and can contribute with valuable inputs. Such team activities motivate the team to have more commitment and positive attitude towards achieving the project objectives [23]. Team members can always come up with new ideas, remind those concerned of forgotten tasks, and provide insight to the overall project [23]. In addition, it is helpful if the whole team clearly understands the project's scope.

The project manager has to be involved from the start of the project until the end because he/she is the main person who is aware of all the details, the weaknesses, and the strengths of the project. Also, it is important to involve the project managers in the contract finalization process because he/she is the one who has set all the negotiation and the rules in the contract. Almeida [24] explained that defining milestones upfront will make the objectives of the project visible and accomplishable. The author also mentioned the importance of defining team roles and responsibility.

In an EHR project, the managers have to set varied phase-based

Table 1
Project management.

Practical Definition	Basic Objectives	Minimum Requirements	Defined Problems
EHR Project Management is application of knowledge, skills, tools and techniques to meet project requirements	• Define the purpose of the project	• Assign qualified and expert project manager (Team building)	• Assign unqualified and in expert project manager
	• Capture project requirements	• Involve team members in the project details	• Lack of project sponsor and ownership
	• Specify quality of the project deliverables	• Gain support of higher executives and managers	• Leave project team members with unclear idea about the project details
	• Estimate project resource and timescale	• Complete previous phase (Planning, executive support, budget)	• Fail to get support from the higher managers
	• Secure corporate agreement and funds	• Develop communication plan between team members and meet on a regular basis	• Unclear project development methodology
	• Develop and implement project management plan	• Define specific and limited scope and monitor the project against the scope	• Lack of relationship and interdependences within task
	• Lead and motivate the project team members	• Solve problems and make decisions	• Lack of communication between team members
	• Manage risks, issues and changes in the project plan	• Assess project and make changes if necessary (Be flexible and accept changes)	• Undefined project scope that keeps changing and stick to the original plan even if the change is needed
	• Monitor progress and compare it to the original plan	• Apply change in management plan if necessary	• Not being able to track changes when it occurs
	• Manage the project budget	• Develop risk analysis plan	• Expect project management software to solve all of the management issues
	• Maintain communications with stakeholders	• Have a system to approve and track changes	• Unclear meaning of project successful completion to the stakeholders
	• Close the project when appropriate	• Choose appropriate project management software • Define meaning of successful project completion to the stakeholders	

Table 2
Inception phase.

Practical Definition	Basic Objectives	Minimum Requirements	Defined Problems
In this phase, project idea is developed in line with the organization's strategic plan	• To gain a clear understanding of the business benefits of the project •Determine whether it is feasible for the project to go ahead	• Formal project approval • Stake-holders identification	• Project not in line with Strategic Plan
		• Budget allocation	• Project scope not documented
		• Project charter, such as conceptualization and high level scope	• All stake-holders not identified
		• Project feasibility study (Business Case)	• Budget allocation improper
		• Identification of Project Manager and team	• Project feasibility study not done properly • Project Manager and/or team selection improper • Project Manager and/or team are not trained in Project Management skills • Project Manager and/or team are too occupied with other activities

Table 3
Preparation phase.

Practical Definition	Basic Objectives	Minimum Requirements	Defined Problems
In this phase detailed project requirements are gathered and RFP is developed	• Develop RFP (Request for Proposal)	• Identify detailed customer requirements, such as stated needs and implied needs	• Customer requirements not gathered properly, due to gap in understanding and/or unstated needs not understood
		• Develop RFP based on customers' needs and unstated needs	• RFP does not define all requirements (example – EMR functions, IT infrastructure requirements, integration) • Project team not involved in RFP development

objectives. In inception phase, the project manager has to understand what to be done or performed in this project, identify the key system functionalities and other critical requirements, determine possible solutions and ways to make the project a success, understand the costing and risks associated with the project.

In the next step, i.e., the preparation phase, the project manager aims at developing RFP, formulating measures with an intention to keep the motivation persistent among the teammates, maintaining transparency for achieving qualitative and effective results, and designing relevant and feasible methodological tools for application in projects.

In the third phase, they have to identify the vendors and evaluate

Table 4
Tendering phase.

Practical Definition	Basic Objectives	Minimum Requirements	Defined Problems
In this phase RFP is sent to identified vendors and selecting vendor(s) for the project	• Identify vendors • Evaluate vendors • Select vendor(s) for project • Contract	• Identify vendors for sending RFP • Technical evaluation of the proposals against competence, reference analysis and post implementation support • Commercial evaluate of the proposals against the price and vendor stability	• Approved vendors list not available • Criteria for vendor evaluation not documented/ sufficient • Project manager not involved in contract finalization

Table 5
Implementation phase.

Practical Definition	Basic Objectives	Minimum Requirements	Defined Problems
In this phase, project is implemented in collaboration with vendor(s)	• Execute project as per project plan	• Selection of client project manager and team • Selection of vendor project manager and team • Detailed project plan development includes defining the roles and responsibilities of the team, WBS and the communication of plan between teams: project managers (client and vendor), immediate stakeholders and senior management. • Risk identification and mitigation plan • Quality Management plan • Escalation plan • Project Control planning includes meeting frequency and project monitoring against time-line perspective and cost perspective	• Detailed project plan not developed • Roles and responsibilities for team not defined • WBS not granular • Communication plan not developed • Project deliverables not specified • Risks not identified, Plan B note made • Project acceptance criteria not defined • Escalation process not defined – too much or too little escalation to senior management • Project team meetings not executed as per plan • Decisions taken in team meetings neither communicated nor monitored to closure • Project completion status not updated • Project team not providing required focus due to "competing priorities" • Department managers not providing necessary support to project due to manpower issues and/or political issues

them before selecting them for project followed by signing contracts. It is followed by the Implementation Phase, where the managers have to focus on conducting, coordinating, and managing the work activities. They also need to perform continuous activities to ensure the quality of the end-result, identify and monitor the risks, and trigger along with implementing strategies for any untoward event, distribute information to project stakeholders, and manage the required changes in the project.

In the final phase, the project managers have to monitor the outcomes and associated risks of the project. Their main focus remains on two key points, i.e., estimated time to completion and budget at completion of the project.

Milestones should be set by the management, and the rest of the team should mainly concentrate on achieving them [25]. Defining milestones at the start helps in controlling the project's progress, taking required corrective actions at the right time in order to meet the targeted date of accomplishment, and providing high quality deliverables [25]. To reach project milestones, LeCompte [25] identified ten points to be taken into consideration. In brief, when setting project milestones, the project manager has to set specific, measurable, attainable, relevant, timely, open, small, assignable, progressive, and significant milestones [25].

Wiscedu stated that adopting the approach of the Project Work Breakdown Structure (WBS) is the foundation of project planning. WBS is a list that includes deliverables and the scope of the project, but not tasks, activities, plan, or schedule. WBS is totally different from organizational hierarchy [26]. While deliverables do not change through the life cycle of the project, activities and tasks may change, depending on circumstances [26]. The main objectives of WBS are to define and organize the scope of the project as a whole, assign responsibilities and allocate resources, monitor and control the project, and enable the correct estimation of cost, risk, and time [26]. WBS is a process that creates a list, which can be used by stakeholders to review all deliverables and ensure that all of their requirements are fulfilled [26].

On the other hand, a communication plan describes how project communications will occur. It facilitates effective and efficient communications with the stakeholders and work groups. A good communication plan generally includes communication objectives, target audiences, key content, and methods. The act of communicating to others about how to overcome risks benefits others by not falling prey to the same mistakes. When the project manager is being clear while assigning responsibilities for each individual in the team for the next 4–6 weeks, it will increase team members' efficiency, productivity, morale, and considerations [27]. This will prevent the uncertainty that could lead to delay in accomplishing the set target [28]. The ideal time frame within which an individual should complete an assigned task is 4–6 weeks, which also ensures that time is not wasted. This time duration takes the emergence of problems and discussions held into account to resolve them.

Further changes to the already approved scope, budget, schedule, or deliverables should be obtained through the Commitment Change Request, Commitment Change Request Log, and Updated Baselines Forms [29]. By signing these forms, the concerned parties would have complete knowledge and commitment inputs about changes. They have the right to discuss, agree, disagree, and approve changes. Changes should be embraced, adopted, and utilized by team members to achieve

Table 6
Close-out phase.

Practical Definition	Basic Objectives	Minimum Requirements	Defined Problems
In this phase, project is technically and commercially closed	• Technical and commercial closure of project	• Ensure that all the requirements as per contract and project plan are completed • Customer has signed off on the deliverables • Inspection and test records are completed and available • All payments have been processed • Project learning are captured	• All aspects of contract or project plan are not completed • Premature project closure • Project closed "conditionally" • Project learning are not captured

success; therefore, engaging team members would impact positively on achieving the project's vision [30]. Also, it helps imbibe collaboration, value, and formality within the team [31–33]. Aldosari [21] stated that having a alternate plan for when the original plan does not work is the cornerstone to the success of the project. When problems occur, instead of enforcing risk management plan, corrective actions should be taken.

Project meeting "is a regular event that involves everyone, who shares or is interested in the project, in communicating with other participants and stakeholders by discussing issues, making proposals, approving or rejecting offers, for the purpose of generating group decisions that contribute to quicker project delivery, according to the planned goals and expected results". It is an effective method to share information and communicate with the team and stakeholders [21]. The meetings should be conducted on a regular basis (daily, weekly, bi-weekly) to ensure that progress and changes in plans are communicated by the different team members. Teams usually produce better quality decisions because of the integration of different backgrounds and knowledge. People with specialized expertise tend to have better knowledge and are more likely to make accurate assumptions, which will be used in the decision-making process. It is important to set target dates for each milestone, and there are three important reasons for doing so: 1) it makes the progress tangible and measurable, 2) it sees to it that the next step of a project can be carried out if the current step is valid and takes corrective action if not, 3) and supports team members to plan resources and prepare needed budget [34,35].

Enterprise Performance Life Cycle (EPLC) helps in project scheduling by taking into consideration some key requirements such as linking the schedule directly to the WBS, sequencing the tasks and activities, clarifying the relationship between them, showing their dependencies, and determining the tasks constraints [8]. A project manager should be aware of assigning individuals who are not qualified for the tasks and the job in general to ensure that the work is completed within the project schedule. "The monitoring and controlling process group consists of those processes required to track, review, and orchestrate the progress and performance of a project, identify any areas in which changes to the plan are required, and initiate the corresponding changes" [36].

The process of tracking and controlling helps in discovering any deficiencies, or drift off plan at early stages, which aid in taking the right corrective and preventive actions in time as well as detecting the risks at early stages to help avoid delaying the project's completion and maintain quality of deliverables [37]. It also helps in reducing costs by preventing risks. Dependencies show the relationships among tasks and the order in which they have to be performed; there are some tasks that have to be achieved before others, these tasks are called preceding tasks; each task may have one preceding task or more.

Furthermore, there are four dependency relationships which are as follows: finish-to-start, start-to-start, finish-to-finish, and start-to-finish. To ensure completion and success of the project, each responsibility identified task has to be achieved within the order identified at the beginning of the project [38]. Sanchez [39] considered project presidencies as part of the organizations strategic issues if not applicable.

Giving clear instructions to all team members gives them an idea of what is expected from each one of them. It is advisable that each member of the team knows his/her activities in relation to others' responsibilities and activities so that they can figure out if they are supposed to wait or get started with an activity [29].

Project close-out finalizes all activities across all phases of the project to formally close the project and transfer the completed or cancelled project as appropriate. The purpose of project close-out is to assess the project, ensure completion, and derive any lessons learned and best practices to be applied to future projects. However, if the close-out is not achieved, it will be hard to make decisions and reach the conclusion of a project. The ability to use lessons learned from a project is key to ensuring an organization's successful journey to the next project [29].

Table 1 indicates that project management, nowadays, is given high priority as all the facilities by companies and healthcare providers, small or large, are at one time or another that will involve new implementation of innovation project. This project may be an individual project, but some tools, management techniques, and problem solving approaches have proved that these tools are more effective than others in bringing the project to a successful end. In addition, the basic objective of effectively utilizing project management is to ensure that vital resources such as skills, tools, knowledge, and techniques are available throughout the process. Managing the implementation of risk assessment through all phases of the project will eliminate unnecessary cost and maintain available resources. The main problems experienced range from the lack of required expertise, unclear developmental methodology and project scope, and lack of clear communication between members to the lack of a clear risk analysis plan. These problems form the basis of failure of EHR systems leading to challenges during implementation.

The inception phase (Table 2) is a vital stage in the project creation process because it allows the idea of EHR system to become aligned with the strategic plan of the company. It is at this point that, the organization decides whether the project is feasible by evaluating budget and selecting the project manager and his team. The system is bound to fail if a project is not in line with the strategic plan. This includes problems such as improper budget allocation, improper selection of team, and lack of scope of documentation.

Preparation phase (Table 3) is about the formulation of plans depending on the manpower, equipments, and budget required for the execution of the project. It comes after all the changes that have been implemented to create a clear scope of work. It is at this point that, the detailed requirements for a project are noted and RFP is developed. Various problems such as unclear customer requirements or lack of involvement of the project team in developing the RFP may come up during this stage. The emergence of these problems mean that the project started without a clear guideline on what the team is supposed to do in order to deliver a system in line with customer needs.

On analyzing Table 4, which is about the tendering phase of the EHR project, it was found that the practical definition of tendering phase is the process by which RFP invites identified vendors and selects new vendors for the project.

The implementation phase (Table 5) is the most critical phase, which can be defined as "project is implemented in collaboration with vendor(s)". This phase, also called execution phase, is about executing the plans and project, which are continuously monitored and altered as per the project scenario for successful completion. During this phase, proper control and communication is essential for implementation of the project. The project will be executed as per the plan, which is the basic objective of the implementation phase (Table 5).

Table 6 illustrates the basic objective of close-out phase, i.e., closing the project technically and commercially. This phase is about checking

out whether all the desired objectives have been achieved and deliverables have been completed. It also involves the drafting of the final reports of the project.

4. Discussion

"Think THEN Do" is worth to operational project management. We mainly need to establish the EHR project and then measure as well as regulate its implementation. It is not easy to misjudge the status of a suitable practice for an EHR project [4]. In general, project failures, can be traced back to deficiencies in the planning process [9]. There are three major deliverables from the project practice process—project definition, work plan, and project management (PM) procedures. PM primarily organizes the project and then monitors and controls the implementation of the EHR [34]. The EHR project management practice scope or framework means that it will be used to achieve the project. This will cover parts on how the staffs remain speechless about the project problems, scope changes, risks, quality, communication, and so on [16,39]. It is important to achieve the EHR project methodically and positively, and confirm that the project team and all stakeholders share a sympathetic know-how of the project. If the shared techniques have already been recognized for your organization, then they should be applied in the EHR project [33].

There is a recent development in the EHR projects in KSA to short-change the practice process with importance on hopping and growing high of the inaugural EHR practices, which is not right [6–8,10,11]. The time expended appropriately on the repetition of the EHR projects will result in reduced cost and time, and increased quality over the lifecycle of the project [4]. The project definition is the key deliverable from the EHR projects practice and defines all benefits of the project at an astonishing level [23,35,38]. Once acknowledged by the customer and relevant stakeholders, it translates the groundwork of the EHR project practice for the accomplishment of the project. Project management is the application of mixed knowledge, tools, skills and techniques to meet the requirements of the project. By understanding the project management practices, it can help in setting targets to achieve the desired goals and deal with the expected risks that affect the project in terms of accuracy. Moreover, project management should focus on participation and selection of the appropriate people to handle the planning part along with deciding the set of arrangements, motivation, and innovation for new solution that return benefit to project. Furthermore, project management needs qualified manager to lead and supervise the implementation of the project by making impactful communication between team members and stakeholders, controlling and completing the deliverables. In addition, other project management requirements are evaluation, leadership skills to solve problems, creative thinking, and guidance to design a better process that would be accepted by the stakeholders.

The inception phase is an essential phase. It is the beginning of any EHR project. It is in this phase that strategic direction of the business is reviewed and priority is given to high-level business requirements. It is then sent to be approved by all stakeholders on the lifecycle of the project objectives. Thus, it is critical for all projects to understand the domain of effort, high-level requirements, and significant risks before deciding on processing the EHR project [23]. The project preparation phase is a very significant phase because it is the basis of a successful project where, the project requirements will be defined, necessary permits will be obtained, and the project plan will be made or updated. A good project preparation will ensure that the project can be realized with the lowest potential lead-time and savings for developing RFP [11,29]. The tendering phase is the process by which vendors are identified, evaluated, and invited to carry out specific packages of assembly work. The phase should adopt and observe the key values of fairness, precision, and responsibility as well as support the idea that the apportionment of risk to the party is best placed to assess and manage the work, which is fundamental to the success of a project. The EHR project takes shape during the implementation phase, which involves the production of the actual project result [13,14,19]. IT workers are occupied with programming designers involved in developing graphical interface, contractors are building, and the actual restructuring take place [8,9,18]. It is during this phase that the project becomes visible to foreigners, to whom it may seem that the project has just started. To be present in the close-out phase, the EHR project must have fulfilled all the requirements as well as participated and gained the control access of it. Therefore, the close-out phase contains actions and activities, which are a part of all project management processes and are carried out to formally complete the project or honor the contractual commitment. It is important to ascertain that the project is closed in an appropriate manner. Several projects do not have an obvious end-point due to no formal sign-off. In addition, it is important to get the customers' agreement that the project has ended and no more work will be done.

As this study is the first of its kind to investigate the causes behind the failure or halting of the EHR projects in Saudi Arabia, we have stressed the measures required for the smooth execution of each phase of project management. Most importantly, qualified project managers and team members should be hired having successful completed projects in their past experiences. Starting from the initiation to close-out phase, it is wise and effective if each and every phase has been planned and implemented accordingly. We have also focused on the future of EHR systems based on their benefits and success in procuring desired results.

5. Conclusion

This study investigates the causes of EHR projects getting stalled or failing in Saudi Arabia. The findings of this study highlight the difficulties, which are ensued between EHR system and project management practices as well as the issues that can arise from the common use of these terms. Project achievement could be assessed using assessment standards based not only on project management practices, but also on other outside principles that are important for the actual implementation of an EHR project. This means that there is no universal approach when it comes to implementing the EHR solutions. The general guidelines presented here describe the basic process and components. The situation should improve rapidly in the future due to the increasing numbers of users who are familiar with computer technologies, more user-friendly systems, and the rapidly increasing number of systems in place. In addition, countries are beginning to evaluate EHR initiatives and share their results. We conclude this section by stressing upon the degree to which the regional cooperation is both desirable and beneficial in the field of EHR.

To run the project smoothly, the executive management should have a clear understanding of what is going on in the project, while the project manager should be aware of what the team members are working on. However, the essence of project management is to ensure that tools, processes, and people work together effectively and efficiently to achieve the common goal and the desired project results. This can be done by increasing the visibility between the three levels of project delivery. In addition, the executive management team should clarify the scope of the project and identify the key stakeholders who can lead to successful completion and implementation of the system. Inception phase is a flexible phase where many changes can be incorporated into the system. The best recommendation for handling the preparation phase is to come up with a survey on customer needs so that when coming up with a budget and a schedule they will all be mapped to incorporate customer requirements. The preparation phase, on the other hand, is vital in ensuring that minimal changes will be made during the entire life of the system development. In the tendering phase, the project manager should be involved in the finalization of contracts because he is the bridge between the company and project delivery team. The list of vendors should be documented and made accessible to all stakeholders together with the vendor evaluation criteria. However, to avoid the disadvantages associated with the ineffective execution of tasks at the implementation stage, the communication gaps must be closed, and enough training must be provided to ensure that each party understands their roles and

responsibilities. The only way to avoid the problems arising at the close-out phase would be to ensure that all other phases are successfully handled before the project is closed.

Thus, for an EHR project to be successful, first the aim of project management practice within EHR projects must be decided on, and then this aim must be cited within the framework of a broader EHR project together with other external standards and long-term objectives. Second, the project manager must let the customer contribute dynamically to the planning, development, and implementation phases, and at the same time the participation of the project team has to be prolonged into the deployment phase. This must be accommodated correctly in an EHR project assessment practice that inspects not only the implementation practices but also the commercial and business performance.

This study is the first of its kind to investigate the causes behind the failure or halting of the EHR projects in Saudi Arabia and provides an initial assessment of causes behind EHR project getting stalling or failed. In addition, the results obtained in this study can be generalized to other e-health projects. As such, it is understood that successful project management practices can aid in the accomplishment of EHR projects; however, nothing can abort the failure of a project if it is based on an unsuccessful idea and theme. Hence, more researches should be done with reference to previously failed projects in Saudi Arabia. This will help analyze the causes of failure and come up with suggestions on what they lacked. It is also advisable to conduct another study to include resources other than project managers, such as executive management, medical directors, heads of IT departments, and senior members of the EHR development teams.

Summary

Electronic Medical Records (EMRs) was designed to automatically collect, store, and retrieve patients' information from healthcare providers within an organization. The causes of failure or stalling of EHR projects are crucial as the Saudi healthcare delivery system is facing many business-related challenges in its implementation. Hence, the aim of this study is to investigate the practices of EHR project managers regarding the causes of EHR projects getting stalled or failing in Saudi Arabia. This study investigates on the practical definition, basic objectives, minimum requirements, and the problems experienced by EHR project managers during the project phases (inception phase, preparation phase, tendering phase, implementation phase, and close-out phase).

The study showed that a project manager should possess five basic skills, like communication, team building, conflict management, industry and solution knowledge, and time management. It further investigates the causes behind the failure of EHR projects in Saudi Arabia. Hence for effective project results, the aim of the EHR projects must be decided on its usage in designing the framework of a broader EHR project together with other external standards and long-term objectives. Secondly, the project manager must let the customer contribute dynamically in the planning, development, and implementation phases, and at the same time the participation of the project team has to be prolonged into the deployment phase.

This first of its kind study can provide an initial assessment of causes behind EHR project getting stalled or failing, which can be generalized to other e-health projects. We also conclude that although successful project management practices can aid in the accomplishment of EHR projects, but nothing can abort the failure of a project if it is based on an unsuccessful idea and theme. Hence, more researches should be done on previous failed projects in Saudi Arabia in order to analyze the causes of failure and suggestions on what they lacked.

Declarations

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Authors' contributions

B.A. has performed the study conception and design, acquisition of data, analysis and interpretation of data, drafting of manuscript, and critical revision of the manuscript.

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Appendix 1

Focus group questionnaires

1. In your opinion, what is the practical definition of project management practice, basic objectives, minimum requirements and the problems experienced by EHR project managers in Saudi Arabia.
2. In your opinion, what is the practical definition for each EHR project phase (inception phase, preparation phase, tendering phase, implementation phase, and close-out phase)
3. From your perspective, what are the objectives set by project managers for each phase of the EHR project (inception phase, preparation phase, tendering phase, implementation phase, and close-out phase)
4. On the basis of your experiences, what are the minimum requirements set by project managers for each phase of the EHR project (inception phase, preparation phase, tendering phase, implementation phase, and close-out phase).
5. What are the problems experienced by project managers for each phase of the EHR project.

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