**Module 9- Evaluation paper**

Naga Praneeth Cheela

Department of Health Informatics

INFO B535- Clinical Information Systems

Dr. Cathy R. Fulton

November 17, 2023

**ABSTRACT:**

This paper presents a structured evaluation of a newly implemented text reminder system within a patient portal, aiming to enhance patient engagement in health screenings. The study unfolds over multiple phases: pre-implementation, immediate post-implementation, and one-year post-implementation, utilizing a variety of statistical methods to analyze data drawn from electronic health records (EHR). Pre-implementation, descriptive statistical analysis establishes baseline data on screening eligibility, rates, and patient portal usage. Post-implementation, the chi-square test assesses immediate behavioural changes in patient screening adherence. One year after, logistic regression analyses determine the long-term effects of the reminder system on screening frequencies. The evaluation team, comprising project managers, data analysts, research specialists, healthcare professionals, statisticians, IT specialists, and support staff, collaborates to ensure a rigorous evaluation process. Stakeholders, including patients, healthcare providers, IT developers, and insurers, have a critical interest in the project's success. The expected outcome is a comprehensive understanding of the text reminder system's impact on patient health outcomes and the optimization of the patient portal. This evaluation contributes to the body of knowledge on health informatics and patient engagement technologies, providing evidence-based insights for healthcare quality improvement.

**INTRODUCTION**:

The importance of rigorous evaluation frameworks in health information systems cannot be overstated (Andargoli et al., 2017, p. 195). Their methodical review underscores the need for robust evaluative measures to gauge the efficacy of technological interventions in healthcare. Systematic review of factors that contribute to the success or failure of eHealth interventions, providing a crucial backdrop against which the effectiveness of patient portal features can be assessed (Granja et al., 2018, p.1).

Further grounding our approach is the rich insight, which delves into probabilistic clinical reasoning within biomedical decision-making. This perspective informs our methodological considerations, ensuring that the evaluation plan not only measures effectiveness but also appreciates the nuances of clinical workflows and patient decision processes (Owens et al., 2021, p. 83).

Moreover, for the improvement of health informatics science through validated instruments and outcome measures. This principle is woven into the fabric of our evaluation plan, which aims to deploy validated methodologies to discern the tangible benefits or lack thereof text reminders in patient portals (Scott et al., 2014, para. 3-4).

As we embark on this journey to evaluate the recent enhancements to patient portals, we leverage the combined wisdom of these scholarly works. The purpose of this paper is to meticulously analyze how the introduction of a text reminder system can alter patient behavior and foster a more engaged patient population, with the ultimate goal of advancing the quality of healthcare delivery and outcomes.

Our evaluation plan is structured around a comprehensive pre- and post-implementation analysis, informed by the best practices outlined in our guiding literature. By integrating these insights into our evaluation framework, we aim to contribute meaningful evidence to the ongoing conversation about the efficacy of health information technologies and their role in shaping the future of patient-centered care.

**PURPOSE:**

The purpose of the evaluation paper is to assess the effectiveness of innovative features in patient portals, particularly a text reminder system aimed at increasing patient engagement with health screenings. The paper highlights the pivotal role of patient portals in healthcare, emphasizing how they serve as a bridge to promote active patient participation and advance the quality of healthcare delivery and outcomes.

It delves into the significance of these portals in fostering communication between patients and healthcare providers, and how this enhanced interaction can lead to better health management and outcomes. By focusing on the text reminder system, the evaluation seeks to determine if such digital nudges can significantly improve patient compliance with health screening protocols. The paper sets out to measure the impact of the text reminder system by comparing patient engagement levels before and after its implementation.

**EVALUATION PLAN:**

The evaluation plan for the patient portal's text reminder system is structured to measure its impact on increasing patient engagement with health screenings. The plan involves a pre- and post-implementation analysis. Before the new feature is introduced, baseline data on patient engagement levels will be collected. This will provide a control for comparing post-implementation statistics. After the text reminder system goes live, patient engagement will be monitored to observe any changes in the frequency and consistency of health screenings.

The evaluation will specifically look at the number of patients scheduling, the reminders sent, and the actual turnout for health screenings.

**GOALS**:

**Baseline Evaluation**: Ascertain the existing screening compliance rates among women aged 40 to 49 for mammograms and men aged 55 to 69 for prostate cancer screenings, within 2-6 months prior to the deployment of the text reminder system.

**Immediate Impact Analysis**: Evaluate the initial response and the effect of text reminders on the adherence to mammogram screenings in women and prostate cancer screenings in men, at the 3-month post-implementation mark.

**Long-Term Effectiveness Assessment**: Determine the ongoing efficacy of the patient portal modifications and text reminders on maintaining or improving screening regularity for mammograms and prostate cancer, one year after implementation.

**EVALUATION TEAM:**

Evaluation team typically consists of professionals who are tasked with the systematic collection and analysis of data to assess the performance, effectiveness, and impact of a program or initiative. In healthcare, an evaluation team might include:

1. **Project** **Manager**: Oversees the evaluation project, ensuring that it meets its objectives within the set timelines and budget.
2. **Data Analysts**: Responsible for gathering, processing, and making sense of quantitative data.
3. **Research Specialists**: Conduct qualitative research, such as interviews and focus groups.
4. **Healthcare** **Professionals**: Provide insights into the practical implications of findings.
5. **Statisticians**: Assist with the design of the study and the analysis of the data.
6. **IT** **Specialists**: Support data management systems and ensure data integrity.
7. **Administrative** **Support** **Staff**: Handle logistical and clerical tasks related to the evaluation.

**POTENTIAL STAKEHOLDERS:**  
Potential stakeholders in the evaluation of a patient portal's new text reminder system encompass a diverse group of individuals and entities with vested interests in the project's outcomes. These stakeholders include patients, who stand to benefit directly from improved health management; healthcare providers such as doctors and nurses, who rely on the system for better patient communication and care coordination; IT professionals responsible for the portal's development and maintenance; healthcare administrators overseeing the operational aspects; and insurers who have a stake in cost-effective care delivery and improved patient outcomes. Each of these stakeholders plays a pivotal role in the system's success and stands to be affected by the evaluation's findings.

**2-6 MONTHS BEFORE THE IMPLEMENTATION:**

To ensure the successful implementation of a patient portal's new features, it is crucial to establish a set of comprehensive evaluation metrics prior to rolling out these changes. The period of 2-6 months before implementation is pivotal for setting benchmarks and gathering baseline data, which is indispensable for assessing the impact and effectiveness of the intervention. This stage involves identifying patient demographics, such as age, gender, and pertinent past medical histories related to the planned adjustments. Males aged 55 to 69 are urged to make their own decision about prostate cancer screening (Centres for Disease Control and Prevention, 2022). Females in the 40-49 age group are advised to have a conversation with their doctor about the appropriate timing and regularity for initiating mammogram screenings. Prior to reaching the age of 50, it is important for women to evaluate the benefits and potential drawbacks of screening examinations to make an informed decision on whether to proceed with mammography (Centres for Disease Control and Prevention, 2022).

**Descriptive Statistical Analysis**:

It involves several strategic steps. Initially, it requires gathering Screening Eligibility Data from EHR, which includes demographics and health history, to identify patients eligible for screenings as per CDC guidelines. This phase also involves evaluating Baseline Screening Rates to understand current patient engagement with screenings and Technology Interaction Data to assess how patients use the patient portal, which predicts their responsiveness to new reminders. (Son & Nahm, 2023, p.1). The data collection process employs Automated EHR Extraction methods to pull the necessary information efficiently, while Data Aggregation compiles screening frequencies and demographic information for a holistic analysis (Farrand et al., 2023, p.3). Additionally, Survey Data is collected to gauge patient and provider sentiments about the portal and its services. The analysis encompasses Data Summarization to encapsulate the state of patient engagement, Trend Identification to discern behavioural patterns in portal usage, and Gap Analysis to pinpoint disparities between current screening rates and the goals established by health guidelines (Son & Nahm, 2023, p.3). These processes are crucial for ensuring that the reminder system is tailored effectively to patient needs and behaviours, enhancing the likelihood of its successful adoption and impact on patient health outcomes (Hoogenbosch et al., 2018, p.4).

**Rationale for the Selection of Descriptive Statistical Analysis:**

Descriptive Statistical Analysis is selected for its effectiveness in providing a clear picture of the current situation without making inferences or predictions. It is the best method for the pre-implementation phase as it allows us to set a benchmark and identify target areas for improvement through the new text reminder system (Hoogenbosch et al., 2018, p.3). The use of Descriptive Statistical Analysis is a foundational method in data analysis, supported by its widespread application in healthcare research to establish baselines and inform intervention design. It is a method recommended by health informatics literature for its ability to organize and present data in a way that is easy to understand and actionable (Son & Nahm, 2023, p.3). Descriptive Statistical Analysis is specifically chosen over other methods for its direct approach to quantify and characterize existing data without delving into causality or hypothesis testing. This makes it particularly useful in the pre-implementation phase where the objective is to create an accurate and detailed snapshot of the current state of patient engagement and portal usage. Unlike inferential statistics, which attempt to make predictions or test theories, descriptive statistics provide the groundwork for understanding the baseline from which any changes due to the implementation of the text reminder system can be measured.

**3 MONTHS AFTER IMPLEMENTATION:**  
Three months following the deployment of a patient portal's new text reminder feature, the chi-square test will be instrumental in evaluating the initiative's impact on patient behaviour, particularly focusing on screening adherence rates. This statistical method will analyze the actual number of screenings conducted post-implementation in comparison to the expected numbers projected from historical data, illuminating any significant increases attributed to the reminder system. Data for this analysis will be rigorously collected from the Electronic Health Records (EHR), noting the volume of reminders sent out and the corresponding patient actions. This before-and-after approach is critical in gauging the effectiveness of the portal's enhancements (Hoogenbosch et al., 2018, p.4). By applying the chi-square test to this data, we can provide a quantifiable measure of the text reminders' success in promoting patient screenings. The outcome of this analysis will not only affirm the value of the intervention but also pinpoint where further improvements may be needed to optimize the patient portal's functionality and its role in patient care. This structured evaluation will ensure that the health intervention is both effective and aligned with patient needs and expectations.

**Metrics**

The metric employed for the chi-square test is the comparison of actual patient screenings completed after the implementation of the text reminders against the expected screening rates, which are projected from historical trends (Ndabu et al., 2022, p.3). This direct comparison provides a clear, measurable outcome of the patient portal's new feature effectiveness, enabling a statistical evaluation of its impact on patient behavior regarding health screenings.

**Rationale**:

The chi-square test, a quantitative method which is selected for its robust capability to ascertain the association between the newly implemented text reminder feature in a patient portal and the resultant changes in patient screening rates. Specifically chosen for its unique robustness in analyzing categorical outcomes, it provides a non-parametric alternative that does not require the data distribution assumptions necessary for other statistical methods. The chi-square test is often used for short-term evaluations because it is particularly suited to analyzing whether the frequencies of categorical outcomes, like the number of patients attending screenings, differ from what would be expected by chance. It's a straightforward method that doesn't require complex calculations or assumptions about the data, making it ideal for initial, quick assessments where the goal is to see if there's an immediate effect of an intervention without the need for considering multiple variables or long-term trends (McHugh, 2013,p.143).

**1 YEAR AFTER IMPLEMENTATION:**

One year after implementing the text reminder feature in a patient portal, the evaluation of its sustained impact requires robust statistical methods. Logistic regression is ideal in this scenario, as it allows for the assessment of how likely patients are to adhere to screening schedules in response to the reminders. It's particularly useful when examining the influence of multiple predictors on a binary outcome, such as screening attendance, over the course of a year. Meanwhile, Multinomial Logistic regression is employed to analyze the mean screening rates across different time points post-implementation or among various patient groups, identifying significant variations that could be attributed to the portal's features (Xu et al., 2017, p.5). Both methods provide a comprehensive picture of the intervention's effectiveness over a substantial period, capturing both the probability of individual patient actions and the average trends across the patient population.

**Metrics:**the rate of patient screenings will be the dependent variable in our study, indicating the frequency at which patients attend their recommended screenings. The independent variable of interest is the presence of the text reminder feature within the patient portal. This feature's implementation is hypothesized to increase screening rates. The analysis will control for confounding variables such as patient age, sex, health history, and previous screening history, which could influence the likelihood of attending screenings independently of the reminder system. By adjusting for these variables, we can isolate the effect of the text reminders on screening rates.

**Rationale**: The rationale for employing logistic regression in evaluating the long-term effectiveness of a patient portal's text reminder feature is its ability to model the probability of a binary outcome—whether patients follow through on their screenings. This method is adept at handling binary dependent variables and allows for the inclusion of multiple independent variables, providing a more precise understanding of the factors influencing patient adherence. Logistic regression is specifically chosen over other methods for this one-year post-implementation evaluation due to its capacity to adjust for time and control for confounding variables that may influence screening adherence, offering a clear, statistically significant picture of the intervention's long-term success (Cai et al., 2022,p.2947).

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