שם: היבה עקל

שם העבודה:

Impact of a Clinical Decision Support System on Safety of Medication Treatment in Hospitals: System Customization to Reduce Over Alerts and Mediating Role of Alert Fatigue on Prescription Errors.

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Abstract

Background:

Errors made while prescribing medication constitute the most common type of medication errors in hospitalized patients (7-15%) and result in significant morbidity, mortality and costs. However, many errors are preventable. Electronic prescriptions with computerized physician order entry systems (CPOE) and integrated computerized clinical decision support systems (CDSS providing online alerts) reduce prescription errors by approximately 50%. CDSS includes drug-allergy, dosing and renal adjustment, duplicate therapy and drug–drug interaction checking. However, the introduction of CDSS is often met by opposition due to the flood of alerts, and most prescribers eventually ignore even crucial alerts ("alert fatigue") .

Study aims:

The main purpose of this study is to examine the impact of multilevel factors affecting drug prescribing errors in inpatients, and how implementation and customization of CDSS affect the safety of medication treatment, with the purpose of reducing the number of alerts to minimize alert fatigue. Moreover, we aim to examine the mediating role of alert fatigue rate in the effect of CDSS implementation on drug prescribing errors.

Methods:

Medical records and CDSS alerts will be collected in newly written inpatient and discharge medication orders between January 1st, 2020, and December 31st, 2021. The effect of patient-related (e.g. age, sex, day of hospitalization the alert occurred, duration of hospitalization, number of drugs and number of diagnosis) and physician-related (e.g. Seniority, years in the profession) and alert related (e.g. Drug name, shift time, type of alert, physicians response) factors on alert fatigue and prescribing errors will be tested, developing a predictive models by applying machine learning techniques. Then, applying non-randomized crossover clinical trial design to control for potential

confounders, the effect of CDSS implementation on alert fatigue and prescription errors will be tested using mixed models statistical framework.

Finally, the mediating effect of alert fatigue in the effect of CDSS implementation on drug prescribing errors will be tested using multilevel lagged framework.

Currently, the knowledge about the optimal operation of CDSS is incomplete in the literature. Also, most of the research is focused on specific clinical environments or specific risk factors (e.g. risk drugs). The current study will shed a light on the interactive effects of multi-level factors modulating medication errors and alert fatigue rate applying predictive machine learning models. Also, we will develop customized CDSS reducing the impact of alert fatigue and as result minimizing medication error rate. Moreover, for the first time, the mediating role of alert fatigue in the modulation of medication errors will be formally tested. Our study will clarify the impact of such a CDSS on quality and safety in Israeli public hospitals environments. Study results will help us how to best use a CDSS to influence clinician behavior in order to provide high-quality care.