Impact of Artificial Intelligence assisted Drug Therapy Optimization on Drug related problems Amongst Elderly Patients: A Systematic Review

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Method Article

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Abstract

DRPs are associated with higher healthcare costs and hospital admissions, longer hospital stays, lower quality of life and higher mortality. Therefore, special considerations must be made when prescribing and using medicines in older patients, such as avoiding inappropriate medicines, monitoring side effects, avoiding drug-drug interactions, and assessing adherence and patient participation.

In recent years, there has been increasing interest in the use of clinical decision support systems to support prescribing. Computerised interventions have been reported to be more effective than traditional educational interventions delivered by prescribers or those where a pharmacist reviewed the medication. This review critically appraises studies looking at artificial intelligence-assisted optimisation of drug therapy in hospitalized elderly patients.

Following the PRISMA guidelines, we will conduct a systematic review that includes three databases: PubMed, Google Scholar and Scopus. The proposed review will include randomized, non-randomized, and cohort studies. Study types such as literature reviews, letters to the editor, pilot studies and short communications will be excluded from the review. We will summarise the available evidence on the effectiveness of computer-assisted interventions in identifying DRPs in hospitalised older patients, and the frequency, nature, and acceptance rate of computer-assisted recommendations.

Introduction

Review question

Is the artificial intelligence assisted drug therapy optimization software better in identification of drug related problems amongst the hospitalized elderly patients?

Searches
The review will be carried-out based on the guidelines of systematic review using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to identify the relevant articles. A literature search will be performed using the scientific data sources included PubMed, Scopus, and Google Scholar. The search period includes the peer-reviewed full-text articles published in the English language between January 2012 to December 2022 will be searched (10 years). The key search terms that would be used are “Drug therapy optimization”, “Artificial intelligence”, “Computerized intervention”, “electronic prescribing”, “computerized physician order entry systems”, “clinical decision support systems”, “CDSS”, “CPOE”, “Drug Related Problems”, “Medication Related Problems”, “Treatment Related Problems”, “DRP”, “Clinical Pharmacist”, “Elderly”, and “Aged”.

**Search strategy**

**PubMed**


**Google Scholar**

“CDSS”|“Computerized interventions”|“CPOE”|“Medical order entry systems”|“Physician order entry system” “Treatment related problems”| “Medication related problems”| “DRPs”| “Inappropriate Prescribing” “Older adults”|“Elderly”|“Geriatrics”
Scopus

TITLE-ABS-KEY ( ( "medical order entry system*" OR "Electronic Prescribing" OR "Medical Informatics Applications" OR "decision support systems, clinical" OR "CDSS" OR "Computerized Provider Order Entry" OR "CPOE" OR "Computerized interventions" OR "medication alert system*" OR "decision support*" OR "medical record system*" OR "Decision Support Techniques" OR "decision making, computer assisted" OR "Computer-Assisted Decision Making" ) AND ( "Medication Review" OR "Drug related problems" OR "Medication related problems" OR "Treatment related problems" OR "DRP" OR "DRPs" OR "Potentially Inappropriate Medication List" OR "inappropriate medication*" OR "pim list*" OR "medication appropriateness*" OR "appropriateness of prescription*" OR "Inappropriate polypharmacy" OR "Inappropriate Prescribing" OR "inappropriate prescri*" OR "Over Prescribing" ) AND ( "Aged" OR "Older adults" OR "Geriatrics" OR "geriatrics" OR "Geriatric" OR "Older" ) ) AND ( LIMIT-TO ( PUBYEAR , 2022 ) OR LIMIT-TO ( PUBYEAR , 2021 ) OR LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) OR LIMIT-TO ( PUBYEAR , 2017 ) OR LIMIT-TO ( PUBYEAR , 2016 ) OR LIMIT-TO ( PUBYEAR , 2015 ) OR LIMIT-TO ( PUBYEAR , 2014 ) OR LIMIT-TO ( PUBYEAR , 2013 ) OR LIMIT-TO ( PUBYEAR , 2012 ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) )

Types of study to be included

The proposed review will include randomized controlled trials, non-randomized controlled studies, prospective cohort studies. The study types such as, literature reviews, letter to editors, pilot studies, and short communications would be excluded from the review.

Condition or domain being studied

The domain being studied in this review would be assessing the computerized interventions such as electronic prescribing, computerized physician order entry (CPOE) systems, clinical decision support (CDS) systems involved in improving the appropriateness of prescribing, reduce prescribing errors, aid in prevention of adverse drug events amongst hospitalized elderly patients.

Participants/population

Studies either prospective, randomized, or non-randomized in nature that evaluating the impact of computerized interventions in identifying the drug related problems as their one of the objectives with elderly population age greater than equal to 65 years in hospital settings. Any studies which were conducted else where such as out-patient department without involvement of the electronic interventions,
and not assessing drug related problems as their objective would be excluded from the study. In addition, studies published in other languages apart from English, and studies which were review in nature such as, literature review, letter to the editor, pilot studies, and short communications are not considered for the review.

Intervention(s), exposure(s)

Computerized interventions such as electronic prescribing, computerized physician order entry (CPOE) systems, clinical decision support (CDS) systems.

Comparator(s)/control

In this review is not concerned with having or not having a comparator/control group, as this review's major focus is to identify the frequency of DRPs identified via the computerized intervention rather than comparing with any control group. As mentioned, this review might also consider randomized controlled studies with control group as clinical pharmacist versus the computerized intervention in the DRP identification.

Context

Studies involving computerized interventions performed at hospital settings which were conducted across the globe would be considered for the review.

Main outcome(s)

To summarise the available evidence on the effectiveness of computer-assisted interventions in identifying DRPs in hospitalised older patients, and the frequency, nature, and acceptance rate of computer-assisted recommendations.

Additional outcome(s)

None

Data extraction (selection and coding)
The retrieved studies were imported into Rayyan software for screening. The screening of the title and abstract of each article, and the potentially eligible full-texts of relevant abstracts would be obtained and screened to identify articles based on the above-mentioned inclusion criteria by three independent reviewers. From each study the following data will be extracted, author name(s), publication year, country, study design, sample size, mean age (in years), intervention, primary outcome, secondary outcome, primary and secondary outcome results, type of DRPs, and acceptance rate. Any conflicts on inclusion will be resolved through consensus by the reviewers.

**Risk of bias (quality) assessment**

Risk of bias and quality assessment of the selected studies will be performed by using the Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields and a 14-item measurement tool used to assess the methodological quality of studies in a systematic review. Three independent reviewers will assess the risk of bias and quality of the included studies and any discrepancies will be resolved through consensus by all the project reviewers.

**Troubleshooting**

**Time Taken**

**Anticipated Results**

**References**

