CHAPTER 2

Patient Engagement Interventions to Enhance Medication Safety in Long-Term Care: A Systematic Review

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Abstract: The aim of this systematic review was to investigate the effectiveness of patient engagement interventions tested in randomized controlled trials (RCT) to enhance medication safety in long-term care. Searches for relevant studies were conducted in the databases Medline, CINAHL, and CENTRAL, and RCTs published between January 2011 and December 2021 that tested patient engagement interventions in long-term care, and measured medication safety. Eligibility and quality were determined independently by two researchers, and effects on medication safety were analysed descriptively. Out of 850 screened records, five studies reporting patient engagement interventions were included and classified as involvement (n = 3) and partnership/shared leadership (n = 2). The studies were heterogeneous regarding sample size, patient characteristics and outcome measures, and all had methodological quality limitations. The interventions were complex with multiple components. Three RCTs reported statistically significant effects of patient engagement interventions on medication safety, when compared to control arms. In conclusion, the limited body of evidence suggests that engaging patients in their own medication care may improve medication safety. Future research is needed to guide the practice field and stakeholders, and should include effect studies with a

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high degree of patient engagement. The research community should find consensus in medication safety outcome measurements.

Keywords: long-term care, medication safety, patient engagement, randomized controlled trials, systematic review

Increasing patient engagement has been recommended to improve medication safety (Donaldson et al., 2017; WHO, 2016). Improving medication safety is particularly challenging in long-term care. By long-term care, we mean settings that provide care over an extended period, usually for a chronic condition or disability, requiring periodic, intermittent, or continuous care (e.g., nursing homes, assisted living facilities, home healthcare). Patients in these settings are often old, have multiple chronic diseases, polypharmacy, and complex medication regimens, which make them especially vulnerable to drug-related problems (Assiri et al., 2018; Insani et al., 2021; Morin et al., 2016; Plácido et al., 2020). A major weakness of many of the improvement initiatives is that the service users are too often passive recipients of medicines, and are not informed and empowered to participate in making the medication management process safer (Donaldson et al., 2017; Lee et al., 2018; WHO, 2016). The perspective of the patient is particularly relevant, because there is a positive connection between recognizing the importance of taking a medicine, using it safely, and engaging in administration (Lee et al., 2018). Adopting a person-centred approach, that includes the patient`s beliefs, preferences, goals, and barriers to taking medication, also provides better clinical outcomes (Kangovi et al., 2014).

Patient engagement can be described as patients and healthcare professionals working in active partnership to improve health and healthcare (Carman et al., 2013). To elucidate the concept in relation to medication safety, the framework developed by Carman and co-workers is useful (Carman et al., 2013; NHS England, 2016). The framework is multidimensional, including the engagement of patients, families, their representatives, and healthcare professionals as active partners on multiple safety levels (i.e., own care, service provider, or system). Furthermore, the framework describes the continuum of engagement with increased levels

of power and engagement from information (power lies with the health-care professional, service provider or system), to involvement (patients have an active role, but no power), to partnership/shared leadership (patients share power) (Carman et al., 2013; NHS England, 2016).

Reviewing interventions can aid in designing more efficient patient engagement interventions, and guide decision makers in choosing approaches to improve medication safety. Two previous systematic reviews have been published describing the impact of patient engagement on patient and medication safety (Kim et al., 2018; Newman et al., 2021). The systematic review by Newman et al. (2021), including 26 studies with various designs and mainly from inpatient settings, reports four common factors that positively affect the success of patient engagement interventions in enhancing patient safety during direct care: 1) patient-professional collaboration; 2) pragmatic and user-friendly interventions; 3) proactive promotion of confidence and safety; and 4) organizational sponsorship or a culture of patient engagement. This narrative systematic review does not specify outcomes for medication safety issues (Newman, 2021). A systematic review of 19 studies with mixed designs (Kim et al., 2018), found that key themes for patient engagement strategies affecting medication safety involve patient education and medication reconciliation. Among the studies using intervention and control groups (n = 11), 55% (n = 6) improved at least one medication safety outcome with significant effect estimates. This systematic review includes studies of both inpatient and outpatient settings, and across populations, that is without age limits. (Kim et al., 2018)

A high prevalence of drug-related problems among patients in long-term care highlights the need for a review of interventions that improve medication safety in this context, where patient engagement interventions can play an important role. However, evidence of the effectiveness of patient engagement interventions is mixed, and, notably, existing reviews of such interventions are not based on randomized controlled trials (RCT) in long-term care settings.

The aim of this chapter is to report a systematic review investigating the effectiveness of patient engagement interventions tested in RCT to enhance medication safety in long-term care.

Methods

Study Design

The review was carried out according to the Cochrane collaboration methodology (Higgins et al., 2021), and the findings were reported according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement (Moher et al., 2009).

Data Sources and Search Strategy

Initial electronic and manual searches were performed to identify key terms, and the search strategy was determined after discussion in the research group, and after consultations with a librarian. Searches were performed by one researcher (RMO) on Medline, CINAHL and Cochrane central register of controlled trials (CENTRAL). In addition, manual searches in the reference lists of included studies were conducted to expand the search coverage. The PICO elements (population, intervention, comparator, outcome) were used to formulate the review question and set the inclusion criteria (see Table 1). In addition, only original studies with an RCT design (including cluster and stepped RCTs) were to be included. Search dates were limited to studies published from January 2011 to December 2021, and the studies must be published in English, Norwegian, Swedish or Danish. The Boolean operators "or" and "and" were used to combine search terms (Table 1).

Screening and Study Selection

The reference management software, EndNote™ 20.3, was used for bibliographic management of the search results. The study selection process was conducted in three stages. Firstly, after removal of duplicates, one researcher (RMO) undertook an initial screening of titles and abstracts and excluded articles that were not relevant according to PICO and inclusion criteria. Secondly, two researchers (RMO and HS) independently read and screened the full text of all potentially eligible articles. Thirdly, the same two researchers conducted a manual search of the reference lists of all the included studies to retrieve additional relevant articles. In case of disagreements between

Table 1. The PICO Elements of the Study, Including Search Terms

Element acronyms	Descriptor	Determinants	Search terms
P	Population	Adult (≥18 years old) medication users in long-term care settings, i.e., home healthcare, sheltered housing, residential facilities	community health services (MeSH) or residential facilities (MeSH) or long-term care (MeSH) or home healthcare (MeSH)
I	Intervention	Patient engagement interventions, i.e., interventions that encourage active participation or promote partnerships or shared leadership between patients and their health professionals. To be included, studies had to report patient engagement interventions at the "safety of own care" level (Carman et al., 2013; NHS England, 2016).	patient-centered care (MeSH) or shared decision making (MeSH) or patient decision making (MeSH) or empowerment (MeSH) or self-management or "patient participation" or "patient involvement" or "patient engagement" or "patient activation" or "patient empowerment" or "patient partnership"
C	Comparison	No specific criteria for the comparison	No search terms included
O	Outcome	Medication safety, i.e., medication errors, adverse drug events, medication list accuracy, inappropriate medication use, medication adherence or compliance, perceptions of medication safety, and knowledge of medications related to safety and side effects. To be included, studies had to report at least one outcome specifically related to medication safety	medication errors (MeSH) or adverse drug events (MeSH) or medication compliance (MeSH) or "adverse drug reaction*" or "inappropriate medication" or "adverse drug effect*" or "medication safety" or "drug safety" or "non-compliance" or "non-adherence"

researchers on eligibility, a third researcher (LA) read the article in full text, and consensus on inclusion was reached by discussion.

Data Extraction and Knowledge Synthesis

Data from all eligible articles were extracted into a pre-set form, that included: publication details; study design; study setting; and characteristics of study population (P); interventions (I); comparisons/controls (C); outcome measurements; and results of patient engagement interventions

on medication safety (O). The initial data extraction was performed by one researcher (RMO). Then, another researcher (HS) independently reviewed the extracted data for accuracy. Finally, both researchers discussed the evidence and summarized the findings according to study characteristics. Due to considerable heterogeneity of the included studies with respect to the study population, patient engagement interventions, medication safety measures and outcomes, a meta-analysis could not be carried out. Data from included studies were synthesized and analysed by using the framework of Carman et al. (2013; NHS England, 2016), focusing on a knowledge synthesis of the nature and content of the patient engagement interventions, and their impact on medication safety. Furthermore, the interventions were classified according to the framework. Results are presented narratively.

Quality Appraisal of Studies

To assess the quality of the included studies, we adapted the Cochrane collaboration tool for assessing risk of bias in randomized trials (RoB). The RoB tool includes seven domains: random sequence generation; allocation concealment; blinding of participants and personnel; blinding of outcome assessment; incomplete outcome data; selective reporting; and other sources of bias (Higgins et al., 2011). Based on the answers provided within the tool, RCTs were rated as "low", "high" or "unclear" risk of bias. We defined an RCT as having a high risk of bias if there was a high risk of bias in four or more dimensions.

Excluded Studies

A total of 60 studies were excluded after a full-text assessment of eligibility. These studies were excluded because of: study design (n = 27, e.g., non-randomized trial, pre-post design); study setting (n = 23, e.g., hospital context, general practice, pharmacies); not a patient engagement intervention (n = 3); not presenting medication safety outcomes (n = 4); or poor study quality (n = 3, with a high risk of bias in ≥4 dimensions).

Results

An adapted PRISMA flow diagram in Figure 1 shows the information through the different phases of the review. The search strategy identified 850 studies, of which 170 were duplicates. After screening titles and abstracts for relevance, 65 studies were identified requiring full-text review for eligibility. Following review, a total of five studies were included for analysis and form the basis of the findings.

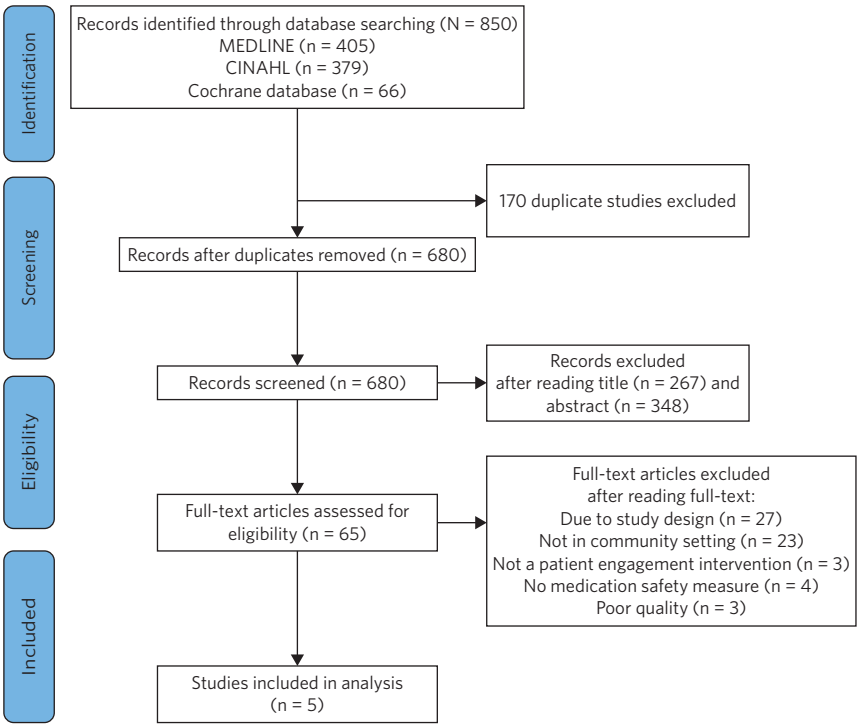

Figure 1. Study Flow Diagram

Characteristics of Studies

An overview of the characteristics of the included studies and the participants is shown in Table 2. All had a two-armed RCT study design. The follow-up of the intervention ranged from 3 to 12 months. Two of the studies were undertaken in China, two in the USA, and one in Australia.

Table 2. Characteristics of the Included Studies and Participants

Study reference	Country	Setting	N	Overall attrition (%)	Mean age (years)[a]	Condition[b]
Goeman et al., 2013	Australia	Community	124	10 (8.1)	67.7	Asthma
Graumlich et al., 2016	USA	Outpatient primary care clinics	674	118 (17.5)	63.7	Type II diabetes mellitus
Heisler et al., 2014	USA	Community health center	188	12 (6.4)	51.5	Type II diabetes mellitus
Sit et al., 2016	China	Ambulatory rehabilitation and home	210	35 (16.7)	69.3	Stroke
Wang et al., 2021	China	Community health service center	120	16 (13.3)	73.3	Cardiovascular disease

[a]Mean age of study participants at baseline in intervention and comparison groups combined.
[b]Health condition of study participants that was an inclusion criterion.

The sample sizes ranged from 120 to 674 (in total: 1,316; mean sample size: 263), randomized to intervention or control groups. Loss to follow-up was 191 participants (14.5%), and varied from 10 to 118 participants. The average age of the study participants at baseline was 65.1, and ranged from 51.5 (Heisler et al., 2014) to 73.3 years (Wang et al., 2021). Health conditions among study participants included diabetes (in two studies), asthma, stroke and cardiovascular disease.

Characteristics of Patient Engagement Interventions

The characteristics of the patient engagement interventions is shown in Table 3. The interventions were complex and included several components, which can be classified differently according to the engagement continuum (cf. Carman et al., 2013; NHS England, 2016).

Involvement. Patient engagement at the involvement level (Corman et al., 2013; NHS England, 2016) means that the patients were asked about their perspectives on medication safety in the context of their own care, and that communication between them and the healthcare professionals

Table 3. Characteristics of Patient Engagement Interventions and Synthesis of Intervention Effects on Medication Safety

	Aim of study	Intervention (I)	Control (C)	Outcome measurements[b]	Medication safety results
Goeman et al., 2013	To improve the asthma control and adherence to asthma preventer medication of older people using the patient asthma concerns tool (PACT) to identify and address unmet needs and patient concerns.	INVOLVEMENT[a] Person-centred face-to-face education sessions (60 min.) provided by asthma educators. The sessions addressed issues raised by the participants' responses to the PACT and according to a self-management checklist. In addition, inhaler device technique was taught according to a checklist. Follow-up: 3 and 12 months.	Passive education provided by an "Asthma in the Over 50s" brochure & device technique brochure & device collection (15 minutes).	1° Asthma Control Questionnaire, including lung function (ACQ7); adherence monitored by tracking device. 2° Asthma exacerbations measured by beta2 agonist and oral corticosteroid use; written asthma action plan ownership.	Adherence rate was significantly higher in I vs C group at 3 months (11.2% vs. 6.1%, respectively). Group difference was not significant at 12 months ($p = 0.17$). Only the intervention group achieved the goal of 80% adherence at 3 months, which continued to improve and was maintained at 12 months.
Graumlich et al., 2016	To test, among adult patients with type II diabetes mellitus, the effectiveness of a medication-planning tool (Medtable™) implemented via an electronic medical record to improve patients' medication knowledge, adherence, and glycemic control compared to usual care.	INVOLVEMENT[a] The Medtable: A structured tool implemented within the EMR that aimed to organize collaborative, patient/provider interactions for medication review, reconciliation, and education. Medtable includes searchable libraries of medication administration instructions in direct, actionable language, timelines that support text, and familiar icons that represent key daily events. Follow-up: 3, 6 and 12 months (only measure of HbA1c at 12 months)	Usual care	1° Knowledge of medicines questionnaire (6 items); patient-demonstrated medication knowledge of the medication regimen, measured by patients demonstrating filling a pillbox. 2° Medication adherence, measured by patient medication adherence questionnaire (PMAQ); satisfaction with information about medicines (5 items from the satisfaction with information about medicine scales (SIMS)).	Significant effect on patients' knowledge about the indications for medicines (aOR = 2.45, $p<.0001$ at 3 months; aOR = 2.53, $p<.0001$ at 6 months), and significant effect on patients' satisfaction with the information about their medication regimens (all adjusted *p* values for group were less than 0.0161 at 3 and 6 month). No significant effects on other outcomes between I and C group.

(*Continued*)

Table 3. (*Continued*)

	Aim of study	Intervention (I)	Control (C)	Outcome measurements[b]	Medication safety results
Heisler et al., 2014	To compare outcomes between community health worker use of a tailored, interactive, Web-based, tablet computer–delivered tool (iDecide) and use of print educational materials.	INVOLVEMENT[a] I1) An initial one-on-one, face-to-face session (2 hours) with a CHW and a copy of the printed materials to take home. The CHW used iDecide (a tailored, interactive, Web-based, tablet computer-delivered tool), which includes diabetes information; description of antihyperglycemic medications and their relevant harms, costs, and inconvenience; interactive demonstration of HbA1c control on risk for complications by using tailored risk estimation. CHW used a motivational interview–based approach in the session. I2) like I1, but the session lasted 1.5 hours and they received printed material instead of iDecide. The printed material included information on diabetes, medication effect on HbA1c, administration methods, costs, medication adverse effects, risks for diabetes complications. Follow-up: 3 months	I1 compared with I2	1º Knowledge about antihyperglycemic medications; medication decisional conflict, measured by medication decisional conflict ccale; satisfaction with clarity of medication information; satisfaction with helpfulness of medication information. 2º Diabetes care self-efficacy; Medication adherence, measured by Morisky medication adherence scale (MMAS).	For I1 there were significantly greater improvements in satisfaction with medication information between I and C groups (clarity, p = 0.028; helpfulness, p = 0.007). No other significant differences between the groups were found.

Sit et al., 2016	To examine the effects of the empowerment intervention on stroke patients' self-efficacy, self-management behaviour, and functional recovery.	PARTNERSHIP[a] The HEISS: *Part 1*, 6-weekly group sessions with nurse facilitator (in parallel with usual care), including personal goal setting and action planning, and self-efficacy activities provided through mastery, verbal persuasion, vicarious experience, and physiological feedback. Participants were given a personal stroke self-management workbook to guide their implementation at home. *Part 2*, home-based implementation (during 5 weeks) with biweekly telephone follow-up calls to encourage and commend participants on their actions for positive changes and to provide problem-solving skills to overcome any perceived barriers that participants encountered. Follow-up: 1 week, 3 and 6 months	Usual care	Chinese self-management behaviour questionnaire, including medication adherence (4 items); Barthel index (BI); Chinese Lawton instrumental activities of daily living (IADL).	No significant difference between I group and C group.

(*Continued*)

Table 3. (*Continued*)

	Aim of study	Intervention (I)	Control (C)	Outcome measurements[b]	Medication safety results
Wang et al., 2021	To assess the feasibility of a patient engagement and medication safety management (PE-MSM) program on medication errors, self-efficacy for appropriate medication and activation among older patients suffering cardiovascular disease in Chinese communities.	PARTNERSHIP[a] The PE-MSM program: 12 weekly one-on-one interventions (30–60 min.) by researchers, pharmacists, doctors, and nurses. Auxiliary tools: the "Instruction Manual of Patient Participating in Safety Medication", the check inventory for medication, the list of medication, the intelligent reminder box, the medication monitoring record form, and the flow chart of patients engaged in medication safety management Follow-up: Immediately postintervention, and at 3 and 6 months	Patients received medication safety education (by the community healthcare staff and researchers), i.e., medication information consultation and telephone follow-up services one-on-one.	Medication error questionnaire (MEQ); self-efficacy for appropriate medication use scale (SEAMS); patient activation measure (PAM).	The I group achieved significant lower incidence of medication errors ($p<.001$), higher self-efficacy for appropriate medication use ($p<.001$) and higher patient activation levels ($P<.001$) – both at 1 month and 3 months.

Abbreviations: ACQ7, asthma control questionnaire; aOR, adjusted odds ratio; CHW, community health worker; EMR, electronic medical record; IADL, Chinese Lawton instrumental activities of daily living; MEQ, medication error questionnaire; MMAS, Morisky medication adherence scale; PACT, patient asthma concerns tool; PAM, patient activation measure; PE-MSM, patient engagement and medication safety management; PMAQ, patient medication adherence questionnaire; SEAMS, self-efficacy for appropriate medication use scale; SIMS, satisfaction with information about medicines scales

[a]Level of patient engagement intervention (cf. Carman et al., 2013; NHS England, 2016)

[b]Primary (1°) and secondary (2°) outcomes are specified, if defined by the study authors

was two-way. Although patients have an active role at this level, the strategies are led by healthcare professionals. Three studies were classified on the involvement level (Goeman et al., 2013; Graumlich et al., 2016; Heisler et al., 2014), and all of them included one-to-one, face-to-face interactions between patients and healthcare professionals. In two of them, these sessions were supported by digital tools tailored to promote patient knowledge and facilitate medication planning for patients with type II diabetes mellitus, and varying health literacy skills in the USA. The tool Medtable used in Graumlich et al. (2016) was implemented within the EMR. The patient medication list was loaded into Medtable, and the technical language was customized so as to be appropriate for patients with low health literacy. During the clinic visit, the patient and nurse jointly reconciled the medication list, and the nurse added or deleted information in the EMR to obtain an accurate and current medication list. The nurses used teach-back techniques while discussing with the patient how to take the medicine. Finally, the patient and nurse worked together to create a medication plan, of which the patient received a paper copy. The tool iDecide evaluated by Heisler et al. (2014), was used on an iPad delivered to the participants in their homes. During the session, the healthcare professional used motivational interviewing, reviewed the content, and showed the patient how to use the program. The healthcare professional and the patient discussed the patient's diabetes, reviewed the medication regimen, discussed the need for medication changes or set goals for medication adherence, and identified any questions and concerns to raise at their next clinic visit. Finally, the patient set goals and received a printed summary.

The third RCT on the involvement level (Goeman et al., 2016) used the questionnaire, patient asthma concerns tool (PACT), as a tailored educational intervention to improve asthma-related health literacy, and address concerns and unmet needs among older patients in Australia. Instructions were given by asthma educators and addressed issues raised by the participants' responses to the PACT, and according to a self-management checklist. In addition, an inhaler device technique was taught according to a checklist.

Partnership or Shared Leadership. On the partnership/shared leadership level, communication is two-way, and patients and healthcare professionals share power and work together to improve medication safety (Corman et al., 2013; NHS England, 2016). Two of the RCTs included patient engagement intervention at this level (Sit et al., 2016; Wang et al., 2021). Both were conducted in China and used person-centred approaches to improve patient knowledge, facilitate patient communication, and empower patients to develop self-management skills. While the study of Wang et al. (2021) kept medication safety as the primary focus, both in relation to strategies and outcome measurements, the study of Sit et al. (2016) held medication safety to be implicit in an intervention targeted at stroke patients' self-efficacy, self-management behaviour, and functional recovery. Both RCTs included face-to-face interactions between patients and healthcare professionals. However, in Wang et al. (2021) these were one-to-one and 12 weekly, while in Sit et al. (2016) the interactions were group-based and 6 weekly. The PE-MSM program evaluated by Wang et al. (2021) was performed gradually with a focus on stimulating and maintaining the behaviour of the participants. A range of auxiliary tools were included, such as a check inventory for medication, the list of medications, the intelligent reminder box, and a medication monitoring record form. The HEISS intervention reported by Sit et al. (2016) included personal goal setting and action planning, and self-efficacy activities during the group sessions. In the last part of the intervention period, biweekly telephone follow-up calls were conducted in order to encourage actions for positive changes, and to provide problem-solving skills.

Effect on Medication Safety

An overview of the medication safety measurements used and the interventions' effects on medication safety are shown in Table 3. The most used measure for medication safety was medication adherence, found in four of the RCTs (80%). Three used self-reported measurements (questionnaires), and one study used an objective measurement. Other medication safety measurements were self-reported or demonstrated

medication knowledge (Sit et al., 2016; Heisler et al., 2014), self-reported medication errors (Wang et al., 2021), and self-reported satisfaction with information on medication information (Sit et al., 2016; Heisler et al., 2014). Heisler et al. (2014) also disclosed self-reported medication decisional conflicts, and Wang et al. (2021) reported self-efficacy for appropriate medication use.

Three of the included RCTs reported a statistically significant effect of patient engagement interventions on medication safety (Goeman et al., 2013; Graumlich et al., 2016; Wang et al., 2021). For details on outcome measurement results, see Table 3. The target of the interventions were behaviour and knowledge, and the components in these studies were education, motivational interviews, questionnaires to identify patient concerns and unmet needs, and a digital medication-planning tool.

Risk of Bias and Quality of Studies

The overall quality of evidence in this systematic review is illustrated in Figure 2. In total, a low RoB was observed in 54% of the dimensions, and across all studies in reporting bias and selection bias by random sequence generation. A high or unclear RoB was observed in 23% of the dimensions.

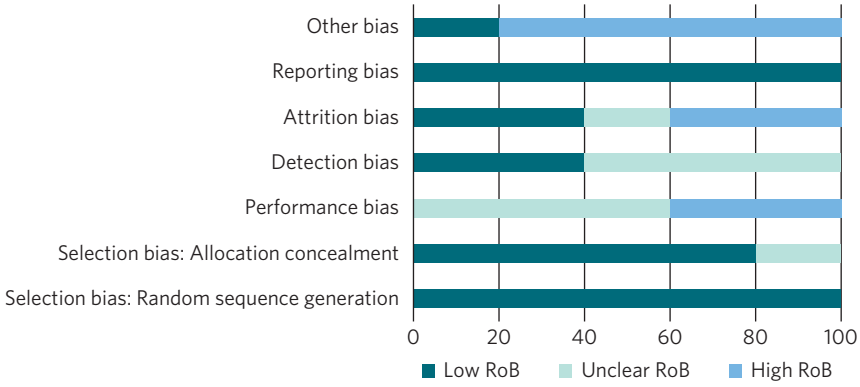

Figure 2. Cumulative Risk of Bias (RoB) in the Five Included Studies, Given in Percentage

The RoB analysis shows a high risk of other bias in four of the included studies (Figure 3). This was mainly due to small sample size or unbalanced groups of study subjects in the interventions groups versus control groups, in relation to characteristics at baseline, which would likely affect the study outcome. Performance bias was considered a high risk in two studies, since neither participants nor study personnel were blinded, and unclear RoB was considered when only personnel were blinded (n = 2). Differential attrition >9% combined with overall attrition above 10% were observed in two studies and considered a high RoB, while differential attrition of 8.7% was observed in one study and considered unclear. No information on blinding of outcome assessments in the studies was considered as unclear detection bias (n = 3).

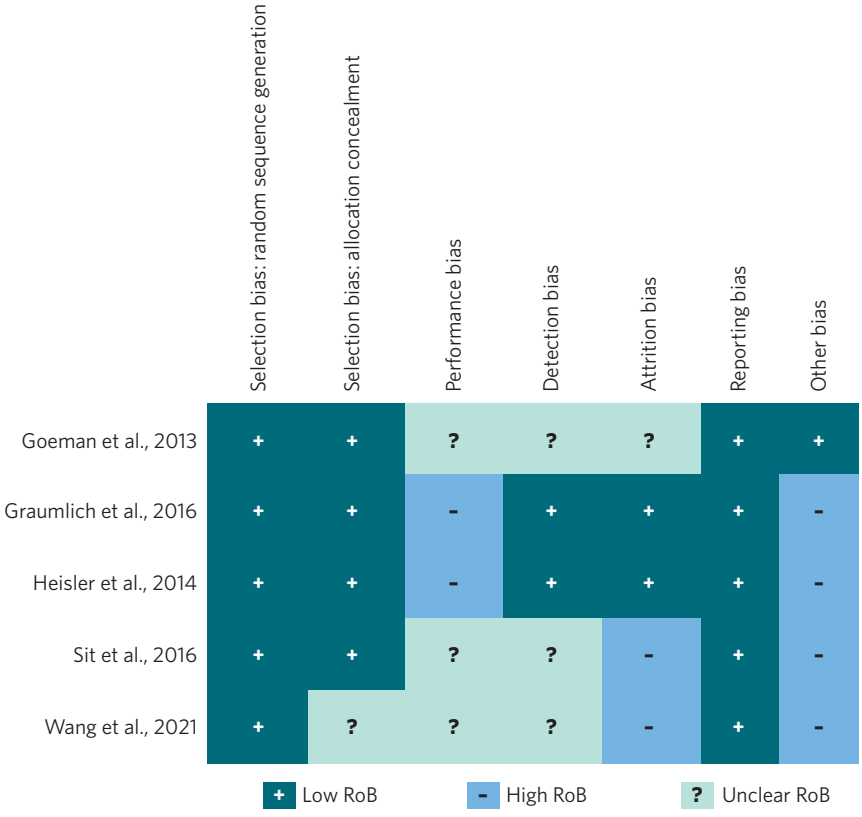

Figure 3. Risk of Bias (RoB) Analysis Results of the Included Studies

Discussion

This systematic review identified five RCTs describing patient engagement interventions that affect medication safety in long-term care. Involvement and partnership/shared leadership interventions were used in three and two studies, respectively, according to the framework for patient engagement in patient safety of own care (Corman et al., 2013; NHS England, 2016). Involvement characterization means that interventions entailed patients having an active role in medication safety measures, but power remains with the healthcare professional. Partnership or shared leadership interventions entailed patients sharing power with healthcare professionals. Patient engagement interventions reported statistically significant effects on medication safety in three of the studies (Goeman et al., 2013; Graumlich et al., 2016; Wang et al., 2021), within several outcome measures: medication adherence (Goeman et al., 2013); self-reported knowledge of medicines (Graumlich et al., 2016); medication errors (Wang et al., 2021); and self-efficacy for appropriate medication use (Wang et al., 2021). However, due to the limited evidence base in five studies, and their extensive heterogeneity in relation to intervention designs, population, settings, and outcome measures, we are not able to draw further conclusions on patient engagement effects on medication safety among patients in long-term care settings. Nor can we attribute changes in medication safety outcomes to a particular level of patient engagement (cf. the framework of Carman et al., 2013). We know from previous research that interventions to improve medication safety remain on a low level of patient engagement, typically involving informing patients about engagement, encouraging patients to engage, to ask questions, and communicate with their healthcare professionals (Kim et al., 2018). Other systematic reviews of patient engagement interventions affecting patient or medication safety are scarce and have not limited the setting to long-term care or to RCT study designs (Kim et al., 2018; Newman et al., 2021). Hence, they are not readily comparable. However, this study aligns with previous studies in describing heterogeneity between studies in for example, design, population, setting, outcome measurements, and quality (Kim et al., 2018; Newman et al., 2021).

A systematic review of interventions can guide decision makers and the practice field in choosing approaches to improve medication safety. Due to the evidence base of the five studies in this chapter, the implications for practice are limited. However, the result of this systematic review aligns with previous research describing the importance of including patients in their own care and management of medicines, and empowering patients may enhance medication safety (Lee et al., 2018, Kangovi et al., 2014, Kim et al., 2018). This study expands our knowledge of interventions to engage patients, and typically involve several behavioural or knowledge components. Examples were medicine reconciliation, medication review, medication information in written or digital formats, individual follow-up and/or counselling by healthcare professionals, and various eHealth components (e.g., digital tools to provide information or communicate with health providers). This result is partly in line with previous research. Kim et al. (2018) found in their review that key strategies for engaging patients in medication safety included education and medication reconciliation, often involving information technology or patient portal use.

In recent years, the global health community has focused on measures to increase patient engagement to ensure safe medicine practices, anchored by WHOs global patient safety challenge on medication safety (Donaldson et al., 2017; WHO, 2017). However, the results of this review show that effect studies testing patient engagement interventions in long-term care are limited, but achievable. Further research on patient engagement interventions in community settings are needed, and should include a greater amount of patient engagement, and patient-centred approaches to assess medication safety (Lee, 2018). Furthermore, there is a need for international consensus and guidelines for medication safety outcome measurements, which is necessary to perform meta-analyses and provide the practice field and stakeholders with reliable evidence and trustworthy effect estimates.

Strengths and Limitations

The strength of this chapter is the rigorous, systematic approach in reviewing studies, following the PRISMA 2020 statement for reporting (Moher et al., 2009). The method used to identify all relevant information was

comprehensive and feasible for the scope of the review. In addition, the eligibility screening, quality assessment, data extraction and knowledge synthesis were performed by researchers with professional healthcare education, as a registered nurse (first author) and a pharmacist (second author). This interdisciplinary approach with relevant areas of expertise, strengthens the study.

The main limitation of this systematic review is the small number of studies included, limiting the evidence base available to create new knowledge and draw conclusions. This could be due to the scope of the review and the selection criteria, and limitations used in the search process. For example, we selected patients in community settings, and the safety of their own level of care according to the patient engagement framework, including only RCTs. Furthermore, a more comprehensive search strategy including grey literature could have provided a larger evidence base. However, we strongly believe that the five included studies reveal a knowledge gap in the literature, and highlight the need to perform medication safety effect studies using patient engagement interventions with a high amount of engagement in community settings.

Conclusion

This chapter provides a systematic review of patient engagement interventions and how they affect medication safety among patients in long-term care. A limited body of evidence suggests that key strategies for patient engagement to ensure medication safety in long-term care should include several components to increase medication knowledge and change behaviour. A knowledge gap in the literature has been detected, and additional effect studies are needed. Preferably, future RCTs should include comparable medication safety outcomes, to guide the practice field and stakeholders utilizing reliable evidence.

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