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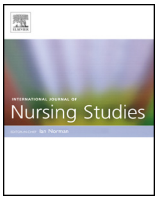

Patient engagement in admission and discharge medication communication: A systematic mixed studies review

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ABSTRACT

Objectives: To synthesise peer-reviewed research evidence concerning patients' perceptions of how they engage in admission and discharge medication communication, and barriers and enablers to engagement in medication admission and discharge communication.

Design: A systematic mixed studies review.

Data sources: Two search strategies were undertaken including a bibliographic database search, followed by citation tracking. Fifteen studies were included in this review.

Review methods: Study selection and quality appraisal were undertaken independently by two reviewers. One reviewer extracted data and synthesised findings, with input from team members to check the accuracy or confirm/question findings.

Results: Three themes were found during data synthesis. In the first theme 'desiring and enacting a range of levels of engagement', patients displayed medication communication by taking responsibility for sharing accurate medication information, and by seeking out different choices during communication. The second theme 'enabling patients' medication communication' uncovered various strategies to promote patients' medication communication, including informing and empowering patients, and encouraging family involvement. The final theme, 'barriers to undertaking medication communication' included challenges enacting two-way information sharing and patients' preference.

Conclusions: Patients view patient engagement in admission and discharge medication communication as two-way accurate information-sharing; however, they sometimes experience challenges undertaking this role or prefer a passive role in information-sharing. Various strategies inform and empower patients to engage in medication communication, however, further investigation is needed of patients' experiences and acceptability of these strategies, and of further strategies that empower patients. Enabling health care professionals' communication skills may promote a patient-centred approach to medication communication, and could enable patient engagement in medication communication.

What is already known about the topic?

- Hospital admission and discharge are risky transitions of care because of the frequency of medication errors.
- Patient engagement in medication communication is internationally advocated as an approach to improve medication safety.
- Patients' perceptions of the process of engaging in admission and discharge medication communication, and the acceptability of engaging patients in admission and discharge medication communication is poorly understood.

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What this paper adds

- Patient engagement in admission and discharge medication communication is enacted through patients taking some responsibility to ensure accurate information-sharing.
- A range of strategies have been explored which inform or empower patients, such as patient involvement in health care professionals' assessments, providing patients with discharge medication summaries and encouraging patients to communicate their understanding of medication. However, a more in-depth understanding of patients' experience and acceptability of these strategies is required.
- A patient-centred approach to communication underpins the success of patient engagement in medication communication.

1. Introduction

The burden of unsafe medication practices is now recognised by the World Health Organisation, which is highlighted in the recently launched Global Patient Safety Challenge: "Medication Without Harm" (World Health Organisation, 2017). More than 40% of medication errors occur at hospital transitions of care (World Health Organisation, 2017). Some medication errors result from inadequate medication reconciliation, the process of; 1) Collecting patients' medication history; 2) Health care professionals checking medications and doses are appropriate; and 3) Reconciling medications by documenting changes in medication orders (Institute for Healthcare Improvement, 2008). Effective transitions of care are described as the safe and timely movement of patients from one level of care to another, such as from acute to subacute care, or from one type of setting to another, such as from hospital to home (Naylor, 2000). Hospital admission and discharge occur daily in hospitals worldwide and are some of the riskiest transitions of care (Sullivan et al., 2005). For example, in Australia over the time period from 2015 to 2016, there were 10.6 million episodes of patient care, including the total hospital stay from admission to discharge, transfer or death (Australian Institute of Health and Welfare, 2017). At every one of these transitions of care, medications should be reconciled, and patients should be encouraged to communicate about medications in this process (World Health Organisation, 2016). Health care professionals most often engage with patients about their medications on admission by collecting a medication history, and upon discharge by ensuring patients can manage their medications after discharge (Garfield et al., 2016). Thus, transitions of care provide opportunities for patients to communicate for medication safety.

2. Background

There is international recognition that patients should be given the opportunity to be engaged in their care to improve hospital safety (Longtin et al., 2010) because they can identify and communicate risks and contribute to solutions. For instance, the WHO's strategy "Medication without harm" advocates for patients to enhance medication safety by undertaking medication communication with health care professionals, especially during medication reconciliation at transitions of care (World Health Organisation, 2007,2017).

In previous systematic reviews, patients' medication communication behaviours were explored, revealing patients want to share their beliefs, experiences, and preferences during medication communication encounters with health care professionals (Stevenson et al., 2004). However, in many cases, providing information was one-way from health care professionals to patients, and health care professionals sometimes dominated conversations (Stevenson et al., 2004). In Willeboordse et al.'s (2014) review, the focus of the review was on the process of completing medication reviews with patients and limited studies were conducted in hospital, highlighting that medication communication at a transitions of hospital care has not been explored. Their review identified that patients provided information such as actual medication use, knowledge about medications and medication adherence (Willeboordse et al., 2014).

A concept analysis provides further details on the process of medication communication, inclusive of patient involvement, and reports six defining attributes in communication encounters including; 1) Determining who is speaking in the communication encounter and encouraging patient and family involvement; 2) Identifying silent patients and families during communication encounters and addressing reasons for silence; 3) Determining what is being said to bring about patient-centred communication and informing patients about their medications; 4) Determining aspects of patient care to be prioritised in relation to the medication regimen and taking patients' preferences into account; 5) Determining body language during communication encounters that is inviting; and 6) Using simple, lay language during communication (Manias, 2010).

In turn, researchers have found positive outcomes from patient involvement in medication communication, such as patients and their families becoming engaged in their care (Higgins et al., 2016; Manias, 2010). Patient communication during medication reviews has resulted in new information being added to patient medical records, identification of patient-reported medication-related problems and patient satisfaction with the medication review process (Willeboordse et al., 2014). Interventional strategies can be used to encourage patient communication in an effort to achieve a state of patient engagement. A recent systematic review found that patient engagement strategies, such as patient education or medication reconciliation interventions, improved medication safety outcomes like decreased medication errors (Kim et al., 2017), suggesting more interventions have been trialed since Stevenson et al.'s (2004) review. In Kim et al.'s (2017) review the authors refined the 'Ladder of Patient and Family Engagement' to help categorise patient engagement from 'informing' to more 'engaging' behaviours, as shown in Table 1 (Kim et al., 2017). This ladder is based on a framework developed by the Healthcare Information and Management Systems Society (2014) and can be used to examine how patients undertake medication communication, as well as to categorise strategies that encourage patients' medication communication.

Given that patients' medication communication can improve medication safety outcomes, further exploration of how patients can achieve these outcomes is warranted. What is lacking is a current understanding of patient perceptions of how they undertake medication communication, especially at hospital transitions of care, where medication errors are likely to occur. While Kim et al.'s (2017) review provided outcome evidence for patients' medication communication, the process from the patient's perspective was not their aim. Further, since previous reviews have been published, there have been ongoing calls for patient engagement in care, and new interventions have been tested to encourage patients' medication communication. There is little value in promoting active patient engagement, if we do not understand patients' views on how they undertake medication communication, acceptable strategies to enable their medication communication and barriers to patients' medication communication.

This systematic mixed studies review aimed to synthesise the peer-reviewed research evidence concerning patient engagement in admission and discharge medication communication.

Table 1
Ladder of Patient and Family Engagement.

	Level of patient and family engagement	Brief description
Degrees of engaging	Level 5: Integrate	Patients and family participate as full members of the team to influence healthcare in and out of the healthcare setting
	Level 4: Partner	Patients become collaborators in their medication care, they make medication decisions and their involvement impacts care
	Level 3: Empower	Patients are given skills and tools to encourage their medication communication with health care professionals
Informing	Level 2: Inform about engagement	Patients are encouraged to communicate about medications with their health care team by asking questions and being informed
	Level 1: Inform about health care	Patients may receive information about their medications, but do not become involved

Note. Adapted from: "Evaluation of patient and family engagement strategies to improve medication safety," by J. M. Kim, C. Suarez-Cuervo, Z. Berger, J. Lee, J. Gayleard, C. Rosenberg, N. Nagy, K. Weeks, S. Dy, 2017, *The Patient*, 11, p. 196.

3. Materials and methods

3.1. Design

A mixed studies review was undertaken using Pluye and Hong's (2013) systematic and integrative methodology, where diverse study designs were viewed as producing findings that can address the same research questions and be easily synthesised (Hong and Pluye, 2013; Sandelowski et al., 2006). We followed the seven mixed studies review steps; (1) formulate a review question; (2) define eligibility criteria; (3) identify sources of information; (4) identify potentially relevant studies; (5) select relevant studies; (6) appraise the quality of studies; (7) extract data; and (8) synthesize included studies (Hong and Pluye, 2013). The protocol for this review is published on the PROSPERO register (CRD42018089826). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Checklist was used for reporting this systematic review.

1 Formulate the research question

Specific research questions were developed after identifying the problem (see Supplementary File 1) and included:

- 'What are adult patients' perceptions of how they undertake admission and discharge medication communication with health care professionals?'
- 'What do adult patients perceive as barriers to engagement in admission and discharge medication communication with health care professionals?'
- 'What do patients perceive as enablers to engagement in admission and discharge medication communication with health care professionals?'.

2 Define eligibility criteria

The inclusion and exclusion criteria are provided in Supplementary File 2.

3 Identify sources of information

The sources of information included a bibliographic database search followed by citation tracking. First, a systematic search of computerised bibliographic databases was undertaken, with health librarian assistance. Since patient engagement in medication communication is interdisciplinary in nature, databases linked to medicine, nursing and pharmacy were targeted, including Medline (EBSCOhost), Embase, CINAHL (EBSCOhost), PsycINFO and CENTRAL Cochrane Library. Second, all articles meeting the inclusion criteria had their reference lists manually searched by the lead author, and were also searched in the Scopus database to identify additional eligible articles. This process was reported in the PRISMA flow diagram (Fig. 1).

4 Identify potential relevant studies

Key concepts were identified like hospital, patients, medications and information-sharing. As per Supplementary File 3, search terms were mapped to concepts for each database. Articles were exported into a reference manager software, and duplicates were removed.

5 Select relevant articles

Two reviewers independently screened titles and abstracts of the articles against inclusion and exclusion criteria. Articles where the reviewers had selected to 'include' or where there was a disagreement of whether to include or exclude, were retrieved in full text. Two reviewers independently judged these full-text articles against eligibility criteria. A third reviewer was available to judge any discrepancies.

6 Appraise the quality of studies

Two reviewers appraised the quality of articles, using the mixed-methods appraisal tool. This tool can assess the quality of qualitative, quantitative and mixed-methods research and produces a final score that ranges from zero to four (Pluye et al., 2009). Two reviewers independently assessed the quality of articles using the mixed-methods appraisal tool and met to discuss their findings, and a third reviewer was available to judge any discrepancies. Studies were not excluded if they were of low quality, following mixed-methods appraisal tool developers' recommendations (Pluye et al., 2011).

7 Data extraction

One reviewer extracted data from included articles independently, and a second reviewer checked data tables for accuracy and completeness. A third reviewer resolved any discrepancies. Data were extracted without interpretation, allowing readers to understand the primary study authors' context and findings (Whittemore and Knafl, 2005). For intervention studies, only findings related to the research questions posed were extracted.

3.2. Data synthesis

The research synthesis approach was interpretive (Sandelowski et al., 2012). An aggregation approach to synthesis was undertaken where the research team searched for repetition of findings across studies that supported the research questions

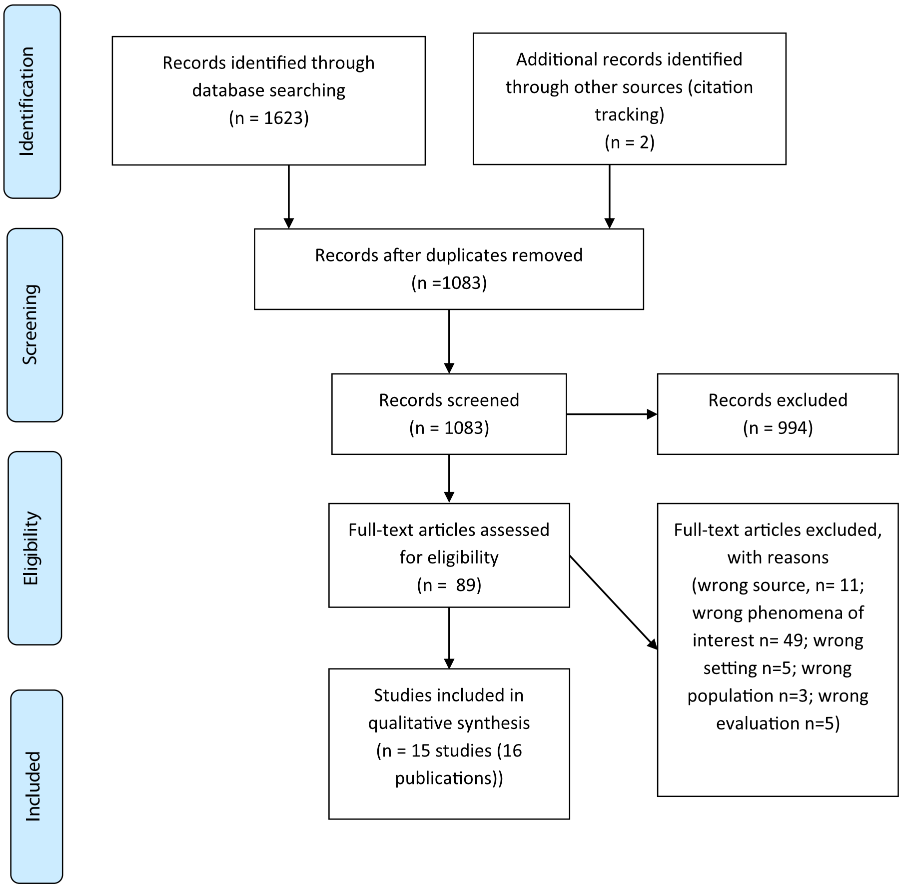

Fig. 1. Search outcome.

(Sandelowski et al., 2012). Thematic synthesis guided the aggregation approach and followed Thomas and Harden's (2008) description. The included articles were uploaded into NVivo 11 (QSR International Pty Ltd., 2014) for data management purposes. Line by line coding occurred, where each sentence in 'findings' or 'results' sections was identified with labels that described the topic of the sentence. Undertaking this process allowed diverse data sources from qualitative and quantitative findings to be transformed into comparable findings, as both data sources became 'words' (Sandelowski et al., 2012). The labels created were grouped into subthemes based on labels that 'belonged' together, meaning the labels supported the same research question and a pattern between labels was identified. These subthemes were investigated to determine if certain subthemes belonged together to form higher order themes, which was informed by the' Ladder of Patient and Family Engagement'. The whole process was iterative, with the reviewer constantly referring to original articles and the 'Ladder of Patient and Family Engagement'. Even though one reviewer undertook analysis, team members were presented findings at each step of analysis to help question or confirm emerging findings. A meta-analysis was not undertaken due to the heterogeneity in outcomes measured, and the focus of this review being exploring patient perceptions. The credibility of our research team's data interpretations was maintained by documenting ideas and thoughts during analysis, and regular team discussions about outputs of synthesis, which was enhanced by having health care professionals in the target area of the study evaluate interpretations (Sandelowski and Barroso, 2006).

4. Results

In all, 15 studies were included (in one study the same sample was reported in two published papers) (Eassey, 2016, 2017)) (Fig. 1). Five studies were non-interventional in nature (Bagge et al., 2014; Eassey, 2016, 2017; Halapy and Kertland, 2012; Knight et al., 2013; Manias et al., 2015), while the remaining studies were interventional (Borgsteede et al., 2011; Cawthon et al., 2012; Jahn et al., 2014; Lee et al., 2015; Lingaratnam et al., 2012; Mortimer et al., 2011; Newnham et al., 2015; Werumeus Buning et al., 2016).

4.1. Quality appraisal

Studies using qualitative methods had mixed-methods appraisal tool scores that ranged from 2 to 4. Studies could be improved by providing more information about how findings related to the context (Knight et al., 2013; Lee et al., 2015), and descriptions of methods of collecting observational data (Lee et al., 2015).

For the quality appraisal of quantitative studies, mixed-methods appraisal tool scores ranged from 1.5 to 4. Some randomised control trials did not meet all methodological quality criteria because of incomplete outcome data and high withdrawals or drop-outs (Jack et al., 2009; Jahn et al., 2014). Other studies met all quality criteria (Cawthon et al., 2012; Mortimer et al., 2011) or lost points for reported recruitment strategies (Lingaratnam et al., 2012) and reported response rate (Eassey, 2016, 2017; Kramer et al., 2007; Lingaratnam et al., 2012). Two studies did not undergo quality appraisal because they were pilot studies (Newnham et al., 2015; Werumeus Buning et al., 2016).

Table 2
Data extraction.

Non-interventional studies				
Author, year, country	Methodology/ methods setting/context, medication communication	Sample (sample size, age, males, patient characteristics related to medications)	Main findings	Quality score[d]
Bagge et al. (2014), New Zealand	*Methodology/methods:* Qualitative, semi-structured interviews *Setting/context:* Two internal medicine wards at 1x hospital *Medication communication:* Discharge	*Sample size:* 40 participants *Age (median):* Males 82 (75–89), females 86 (75–91) *Males:* n = 19 (47.5%) *Patient characteristics related to medications:* Based on medical notes, the median number of medicines taken by participants was 9 (range: 4–17) on admission and 10 (range: 4–20) on discharge. Based on participant interview, medicines not listed on discharge summaries were also taken, which increased the median number of medicines to 13 (range: 6–21). Participants took 28 regular non-prescription medicines (not usually recorded on admission to this hospital). The median number of changes per person was four (range: 1–11), mostly due to the addition of a new medicine	Themes: Trusting doctors Reluctance to question hospital staff Unaware of medicine changes Concerns about medicine changes	4
Eassey (2016), Australia	*Methodology/methods:* Cross-sectional study, online survey *Setting/context:* Consumers in the community *Medication communication:* Discharge	*Sample size:* 506 participants *Age (median):* 64 years *Males*: n = 311 (61.5%) *Patient characteristics related to medications:* Most participants took 5 medications before visiting the hospital and were discharged with 5 medications. 75.7% had no support taking their medications, while 18.2% had family support	Extent to which patients felt in control of their medications: control (n = 451), no control (n = 55) Active role in decisions regarding medications: active role (n = 326), no role (n = 180) Confusion of medication instructions given at discharge: confusing (n = 32), not confusing (n = 253) The risk of experiencing a medication-related problem was higher for participants with low health literacy, poorer health status, those who reported medication cost as a problem The odds of reporting a medication-related problem were higher for participants who had less control over their medications, participants who described not having an active role with their medications	2.5
Eassey (2017), Australia	*Methodology/methods:* Cross-sectional study, online survey *Setting/context:* Consumers in the community *Medication communication:* Discharge	*Sample size:* 506 participants *Age (mean):* 64 years (±8.2 years) *Males*: n = 311 (61.5%) *Patient characteristics related to medications:* 34% (n = 174) of participants reported experiencing a medication reported problem within 1-4 months of hospital discharge	Themes: Types of medication-related problems and patient experiences Patient engagement and medication management	2.5
Halapy and Kertland (2012), Canada	*Methodology/methods:* Qualitative, structured interviews *Setting/context:* A variety of medical and surgical units, and ambulatory care clinics, at 1x academic tertiary care hospital *Medication communication:* Admission	*Sample size:* 25 participants *Age (mean):* 65 (range 30–80) *Males:* n = 13 *Patient characteristics related to medications:* Not provided	Themes of patient responses: Ownership of health and medication knowledge Identified consequences of incomplete or inaccurate information Patient-specific strategies to improve medication histories: Bringing a medication list/vials most common Suggestions for system-level facilitators to improve the accuracy of medication histories: Reinforce importance of medication knowledge Use of computerised records Simplification of medication names	4
Knight et al. (2013), UK	*Methodology/methods:* Qualitative, semi-structured interviews and medication diary	*Sample size:* 19 participants (12 were family carers) *Age(median):* 84 years (range 75–100)[a]	Medication diaries revealed medication regimes were complex. Many strategies were used to	3

Table 2 (*Continued*)

Non-interventional studies				
Author, year, country	Methodology/ methods setting/context, medication communication	Sample (sample size, age, males, patient characteristics related to medications)	Main findings	Quality score[d]
	Setting/context: N/A *Medication communication:* Discharge	*Males:* n = 5[a] *Patient characteristics related to medications:* Median of 7 medications were taken per person (range 5–15). 17/19 participants had experienced medication changes while in hospital	manage medications like dosage administration aids, lists, and other visual reminders. Carers undertook responsibility for medication administration. Six participants described taking medications differently to the way they were prescribed[a] Five participants had a positive experience of the discharge process, the remaining participants had a negative or mixed experience[a] Five themes were evident in connection with medication and the discharge procedure[a]: Discharge in general Obtaining medication for discharge Information regarding discharge medication Medication lists Communication about medication in hospital and following discharge	
Manias et al. (2015), Australia	*Methodology/methods:* Qualitative descriptive study, individual interviews with patients[a] *Setting/context:* Emergency department and medical units, at 2x Australian hospitals (1x metropolitan, public teaching hospital, 1x outer-metropolitan, community, public teaching hospital) *Medication communication:* Admission	*Sample size:* 10 participants *Age (mean)*: 65.1 years (SD 15.2 years) *Males*: n = 5 *Patient characteristics related to medications:* Not provided	Four themes[a]: Contextual environment of care Competing responsibilities of care Awareness of responsibility for safety Interdisciplinary communication	4
Interventional studies				
Borgsteede et al. (2011), Netherlands	*Methodology/methods:* Post-intervention qualitative evaluation, semi-structured interviews *Setting/context:* A 550-bed general teaching hospital pulmonology (intervention ward), internal medicine and cardiology ward (usual care) *Medication communication:* Discharge	*Sample size:* 31 participants *Age:* Intervention group: <50 years n = 3, 50–70 years n = 4, >70 years n = 3; usual care: <50 years n = 4, 50–70 years n = 6, >70 years n = 11 *Males:* n = 16 (51.6%) *Patient characteristics related to medications:* Participants discharged with at least one chronically prescribed drug	Important issues in information about medication at discharge: Basic information (i.e. name of drug, indication and use) Information about side effects Alternatives Problems with medication Combining written and oral information Patient satisfaction: all patients were generally satisfied with the information provided, however some preferred more. Patients who received counselling were more satisfied than those that did not	4
Cawthon et al. (2012)[b], USA	*Methodology/data collection method used for synthesis:* Randomized control trial, post-intervention evaluation using telephone surveys 2-months after the trial *Setting/context:* 2 academic medical centres *Medication communication:* Discharge	*Total sample size:* 862 participants. Intervention (n = 430) and control group (n = 432) *Survey participants:* 125 from the intervention group *Age (median):* 63 years (IQR 54–73) *Male:* n = 69 (55.2%) *Patient characteristics related to medications:* Number of preadmission medications n = 9 (5–12%), medication understanding n = 2.50 (2.25–2.75)	The components of the intervention that received the most favourable responses were speaking to the pharmacist n = 91 (72.8% rated as very helpful), receiving an illustrated medication schedule n = 87 (69.6%) Patients with marginal or inadequate health literacy were significantly more likely than patients with adequate health literacy to report various components of the intervention were very helpful After meeting the pharmacist, patients were 'much' more comfortable talking to their doctor about what new medicines were for n = 66 (53.7%) and dealing with side effects of medicines n = 65 (53.3%)	4

Jack et al. (2009), USA	*Methodology/data collection method used for synthesis:* Randomised-control trial, self-reported preparedness for discharge and evaluation of intervention components *Setting/context:* 1x medical teaching service; a large, urban, safety-net hospital with an ethnically diverse patient population *Medication communication:* Admission and discharge	*Total sample size:* 749 participants. Intervention (n = 373) and control group (n = 376) *Survey participants:* Intervention (n = 308) and control group (n = 307) *Age (mean):* Intervention (n = 50.1 (SD = 15.1)) and control group (n = 49.6 (SD = 15.3)) *Males:* Intervention (n = 195 (SD = 52)) and control group (n = 176 (SD = 47)) *Patient characteristics related to medications:* 65% of intervention participants who completed medication review had at least 1 medication problem and 103 (53%) that needed corrective action by the pharmacist	Participants who responded as ‘very well’ or ‘well’ on a 5-point Likert scale to the question ‘How well were your questions answered before you left the hospital?’: Intervention group = 129 (77%) and control group = 108 (62%) Participants who responded as ‘very well’ or ‘well’ on a 5-point Likert scale to the question ‘How well did you understand how to take your medications after leaving the hospital?’: Intervention group = 264 (89%) and control group = 233 (83%) **How useful was the after-hospital care plan booklet?** Extremely useful 46 (17%), Very useful 92 (34%), Moderately useful 50 (19%), A little bit useful 40 (15%), Not at all useful 10 (3.7%) **What was the most helpful part of the after-hospital care plan?** Reengineered discharge medication schedule 51 (19%), followed by Appointment page 41 (15%) How helpful was the reengineered discharge medication calendar? Extremely helpful 26 (17%), Very helpful 46 (30%), Moderately helpful 15 (9.7%), A little bit helpful 10 (6.5%), Not at all helpful 4 (2.6%)	3.5
Jahn et al. (2014), Germany	*Methodology/data collection method used for synthesis:* Cluster-randomized clinical trial, post-intervention evaluation surveys of cognitive barriers *Setting/context:* 18 oncology wards from 2 university hospitals in Saxony-Anhalt and Bavaria *Medication communication:* Discharge (intervention starts prior to the day of discharge)	*Total sample:* Intervention (n = 128) and control groups (n = 135). *Survey participants:* pre-intervention (n = 81) and post-intervention (n = 69) *Age (mean):* Intervention group 57.75 years (SD 11.97), control group 55.9 years (SD 12.62) *Male:* intervention group n = 59 (57.8%), control group n = 60 (57.1%) *Patient characteristics related to medications:* Most frequent number of medication taken: intervention group 3 medications (59.4%), control group 1 medication (51.4%)	Compared with usual care, the ‘Self Care Improvement through oncology Nursing’ program, reduced cognitive barriers (such as the perception that patients cannot speak up and report pain to health care professionals) in cancer pain more effectively. Mean difference in scores between groups was −0.49 points (95% CI–0.87 to −0.12; P = 0.02)	2
Kramer et al. (2007), USA	*Methodology/data collection method used for synthesis:* Pre- and post-implementation study, telephone satisfaction survey *Setting/context:* 1 × 48-bed adult general medical unit, at 1x hospital (760 beds) *Medication communication:* Admission and discharge	*Total sample size:* 283 participants, pre-intervention (n = 147) and post-intervention (n = 136). *Survey participants:* pre-intervention (n = 92) and post-intervention (n = 68). *Age (mean):* Pre-intervention (64.4, (SD = 16)) and post-intervention (65.7 (SD = 17.6)) *Males:* Pre-intervention (50%) and post-intervention (51%) *Patient characteristics related to medications:* Number of prescription medications pre-intervention (mean = 4.9, (SD = 3.5)) and post-intervention (mean = 6.2 (SD = 4.3)), number of non-prescription medications pre-intervention (mean = 1, (SD = 1.6)) and post-intervention (mean = 2 (SD = 1.9)), total number of herbal supplements pre-intervention (mean = 0.1, (SD = 0.34)) and post-intervention (mean = 0.1 (SD = 0.6))	Patients had no additional questions regarding medications when asked during telephone interviews Patients were satisfied with the information they received (Five-point Likert scale used (1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree)): When I was discharged from the hospital, I was given clear instructions about which medications I was supposed to continue taking at home pre-implementation mean = 4.35 (SD = 1.06), post-implementation mean = 4.78 (SD = 0.45), p = 0.007 Overall, I feel like I understand my medicines pre-implementation mean = 4.22 (SD = 0.99), post-implementation mean = 4.68 (SD = 0.53), p = 0.001	3
Lee et al. (2015), UK	*Methodology/methods:* Case study, interviews with patient representatives, interviews with patients (pre-and-post e-prescribing), observations *Setting/context:* 1x renal ward, at 1x large urban hospital. Patient representatives were from 13 patient organisations (i.e. “Diabetes UK”, British Heart Foundation)	*Sample size:* Patient representatives (*n* = 10), inpatients on a renal ward (*n* = 11 pre-implementation; *n* = 11[c] post-implementation) *Age (median):* Not provided *Males:* Not provided *Patient characteristics related to medications:* Not provided	Themes: Perceived benefits of ePrescribing Medication awareness and patient communication Medicines reconciliation and discharge Quality of care and safety	2

Table 2 (*Continued*)

Non-interventional studies

Author, year, country	Methodology/ methods setting/context, medication communication	Sample (sample size, age, males, patient characteristics related to medications)	Main findings	Quality score[d]
	Medication communication: Admission and discharge			
Lingaratnam et al. (2012), Australia	*Methodology/data collection method used for synthesis:* Prospective controlled before and after study, pre-implementation: telephone patient surveys, post-implementation: patient opinion surveys of satisfaction and accounts of empowerment or improved engagement with medicines information *Setting/context:* Test ward was surgical ward, and control ward was specialist medical oncology ward *Medication communication:* Admission and discharge	*Sample size:* Pre-implementation 30 patients (18 intervention ward, 12 control ward), Post-implementation 30 patients (17 intervention ward, 13 control ward) *Age:* Not provided *Males:* Not provided *Patient characteristics related to medications:* Pre-implementation 83% of participants took more than 2 regular medications. Average of 5 medications per person. Post-implementation 73% of participants took more than 2 regular medications. Average of 5 medications per person	In the design phase, based on patient and health care professional feedback many key priority areas were identified which helped develop the intervention Patients can be categorised into 3 groups, based on perceptions of coping and managing medications at home: Patients who were confident with managing their medications and perceived themselves as coping well: pre-implementation n = 11 (35%), post-implementation n = 14 (45%) Patients who desired more participation in coping strategies, regardless of their level of confidence: pre-implementation n = 15 (50%), post-implementation n = 12 (40%) Patients who were reluctant to participate: pre-implementation n = 4 (15%), post-implementation n = 4 (15%) 2/5 patients completed the brochure easily because they were very familiar with their medicines, but did not see benefit from the patient information materials	1.5
Mortimer et al. (2011), Australia	*Methodology/data collection method used for synthesis:* Prospective non-randomized control trial, post-intervention evaluation using self-completed patient surveys *Setting/context:* Hospital emergency department, which includes six assessment rooms, one triage room, and 12 beds: one trauma, two resuscitation, three acute beds and a six-bed observation unit *Medication communication:* Admission	*Total sample size:* Intervention (n = 101) and control group (n = 98) *Survey participants:* 41 intervention group participants *Age (mean):* Intervention group 77.0 years, control group 77.6 years *Males:* Intervention group 45%, control group 48% *Patient characteristics related to medications:* Not reported	Survey responses: I am totally satisfied with my visit from the pharmacist in the Emergency Department: strongly agree n = 33 (80.5%), agree n = 8(19.5%, neutral n = 0 (0.0%), disagree n = 0 (0.0%), strongly disagree n = 0 (0.0%) This pharmacist assessed me and my understanding of my current medication very thoroughly: strongly agree n = 28 (68.3), agree = 10 (24.4%), neutral n = 2 (4.9%), disagree n = 1 (2.4%), strongly disagree n = 0 (0.0%) The pharmacist was interested in me as a person, not just my illness: strongly agree n = 26(65%), agree n = 13 (32.5%), neutral n = 1 (2.5%), disagree n = 0 (0.0%), strongly disagree n = 0 (0.0%) I wish it had been possible to spend a little more time with the Pharmacist: strongly agree n = 12(30%), agree n = 14 (35%), neutral n = 8 (20.0%), disagree n = 6(15%), strongly disagree n = 0 (0.0%) I would find it difficult to tell this pharmacist about some private things: strongly agree n = 0 (0.0%), agree n = 2 (5.0%), neutral n = 3(7.5%), disagree n = 26(65.0%), strongly disagree n = 9 (22.5%) I understand my current medication much better after seeing this pharmacist: strongly agree n = 19 (46.3%), agree n = 16 (39.0%), neutral n = 6 (14.6%), disagree n = 0 (0.0%), strongly disagree n = 0 (0.0%)	4

Newnham et al. (2015), Australia	*Methodology/methods:* Descriptive pilot study, questionnaire *Setting/context:* 1x acute general medical ward, at the 1x metropolitan teaching hospital *Medication communication:* Discharge	*Sample size:* 20 participants *Age(mean):* 70.2 years (range 22.9–91.3 years) *Males:* n = 13 *Patient characteristics related to medications:* Not provided	All patients remembered receiving the video and watched it at least once. 90% watched the Care Transfer Video with family Some patients needed assistance from family to watch the video N = 18 or 90% recalled their medications had been changed in hospital, of these 61% recorded specific drug change. N = 9 (45%) stated their family had a greater understanding of their medication changes All patients were extremely or moderately satisfied with their Care Transfer Video and extremely or very likely to recommend Care Transfer Video to other patients leaving hospital. Patients (n = 10, 50%) commented that Care Transfer Video was 'very helpful' and a 'good idea', which should be made available for all patients and provided them with more information than a paper discharge summary	N/A
Werumeus Buning et al. (2016), Netherlands	*Methodology/methods:* Proof of interventional concept study, questionnaires *Setting/context:* 1 × 340 bed tertiary hospital *Medication communication:* Admission	*Sample size:* 17 participants *Inclusion/exclusion criteria:* Patients were 18 years or older, scheduled for elective surgery *Age(mean):* 52 years (range 27–72) *Males:* n = 10 (59%) *Patient characteristics related to medications:* Mean of 3.4 medications per participant	The tool was useable and acceptable, but not viewed as a tool patients would continue to use after discharge Patients reported the tool is feasible to keep up to date medication list and improve their knowledge There were technical difficulties with the application	N/A

In some intervention studies, other methods for evaluation were used, however, we extracted data related to measures of patients' perceptions of patient engagement.

[a] Family/carer/health care professional data reported together in primary study, and patient data unable to be extracted separately for purposes of data extraction table. However, the description of findings presented in a way that allowed patients' perceptions to be extracted for synthesis purposes.

[b] Some data extracted and reviewed for this study came from a linked study: Schnipper et al. (2010).

[c] 12 interviews post-implementation reported in abstract.

[d] The maximum quality score is four.

In nine quantitative studies, patient experience and satisfaction survey data collection addressed the research questions posed in our review (Cawthon et al., 2012; Eassey, 2016, 2017; Jack et al., 2009; Jahn et al., 2014; Kramer et al., 2007; Lingaratnam et al., 2012; Mortimer et al., 2011; Newnham et al., 2015; Werumeus Buning et al., 2016). In three studies, valid and reliable instruments were used (Jahn et al., 2014; Mortimer et al., 2011; Werumeus Buning et al., 2016), however in one study it was adapted without testing (Mortimer et al., 2011), and in one study different measurements were combined into one survey with varying validity and reliability (Eassey, 2016, 2017). Validity and reliability measures were not evident in the remaining studies.

4.2. Summary of studies

Because interventional and noninterventional research had different purposes, and participants' responses in applied research are influenced by interventions, we have presented the 'summary of the studies' in two groups to ensure studies are not decontextualised for the reader. A summary of the studies is provided in Table 2.

Two non-interventional studies were conducted in Australia (Eassey, 2016, 2017; Manias et al., 2015), and one in each of United Kingdom (Knight et al., 2013), New Zealand (Bagge et al., 2014), and Canada (Halapy and Kertland, 2012). Four researcher teams conducted interviews (Bagge et al., 2014; Halapy and Kertland, 2012; Knight et al., 2013; Manias et al., 2015), while one team used online surveys (Eassey, 2016, 2017). The median sample size for non-interventional studies was 25 (interquartile range 259), the median number of males in the sample was 13 (interquartile range 160), and the grand mean for age was 73.8 years old. Patients took 5–13 medications per day in studies reporting medication regimens (Bagge et al., 2014; Eassey, 2016, 2017; Knight et al., 2013). Patients' discharge medication communication was explored in four studies (Bagge et al., 2014; Eassey, 2016, 2017; Knight et al., 2013; Manias et al., 2015), and patients' admission medication communication was explored in two studies (Halapy and Kertland, 2012; Manias et al., 2015). Researchers tended to explore patients' perceptions of medication communication with a range of health care professionals, such as pharmacists, nurses, and physicians. Three samples were reflecting on their hospital experience while in the community (Bagge et al., 2014; Eassey, 2016, 2017; Knight et al., 2013), while two samples were inpatients (Halapy and Kertland, 2012; Manias et al., 2015).

Interventional studies included randomised control trials (Cawthon et al., 2012; Jack et al., 2009; Jahn et al., 2014), a non-randomised prospective trial (Mortimer et al., 2011), pre-post designs (Kramer et al., 2007; Lee et al., 2015; Lingaratnam et al., 2012), post evaluation design (Borgsteede et al., 2011) and pilot studies (Newnham et al., 2015; Werumeus Buning et al., 2016). Pilot studies were conducted at one hospital with no comparison group (Newnham et al., 2015; Werumeus Buning et al., 2016). Other interventional research had a comparison group and was conducted in Australia (Lingaratnam et al., 2012; Mortimer et al., 2011), Europe (Netherlands and Germany) (Borgsteede et al., 2011; Jahn et al., 2014), United Kingdom (Lee et al., 2015), or United States of America (Cawthon et al., 2012; Jack et al., 2009; Kramer et al., 2007). The median sample size was 50.5 (interquartile range 124), which was not based on total sample size but survey participants (See Table 2), and the median number of males in the total sample was 80.5 (interquartile range 123); two studies did not report the number of males/females in their study (Lee et al., 2015; Lingaratnam et al., 2012). The grand mean age of participants was 62.0 years old for studies that reported age, and excluded Borgsteede et al. (2011) as age was reported categorically. For studies that reported patients' medication regimens, daily medications prescribed ranged from one (Borgsteede et al., 2011) to nine per day (Cawthon et al., 2012).

Four interventions targeted discharge medication communication (Borgsteede et al., 2011; Cawthon et al., 2012; Jahn et al., 2014; Newnham et al., 2015), two targeted admission medication communication (Mortimer et al., 2011; Werumeus Buning et al., 2016) and four targeted both (Jack et al., 2009; Kramer et al., 2007; Lee et al., 2015; Lingaratnam et al., 2012). Health care professionals delivering the intervention included pharmacists, nurses, pharmacy technicians, and interdisciplinary teams. Medical practitioners were involved during interventions but did not explicitly deliver interventions to engage with patients. Five interventional studies aimed to improve medication reconciliation (Borgsteede et al., 2011; Cawthon et al., 2012; Kramer et al., 2007; Lingaratnam et al., 2012; Mortimer et al., 2011). Common intervention components delivered by health care professionals included pharmacist counselling on discharge, providing patients with printed medication lists, and telephone calls to patients after hospital discharge (See Table 3). Intervention components delivered after hospital discharge were not explored in-depth as it was beyond the scope of this review.

4.3. Data synthesis

There were three themes found, including 'Desiring and undertaking a range of levels of engagement' 'Enabling patients' medication communication' and 'Barriers to undertaking medication communication' (Table 4). Subthemes were labelled based on the 'Ladder of Patient and Family Engagement'.

4.3.1. Desiring and enacting a range of levels of engagement

Patients' perceptions of undertaking medication communication were taking more responsibility for providing high-quality information (consistent with 'informing' levels of engagement on the 'Ladder of Patient and Family Engagement'). When considering patients' role in medication communication along the 'Ladder of Patient and Family Engagement', it was evident that patients desired elements of the 'partner' level (Level 4 of the Ladder of Patient and Family Engagement).

4.3.1.1. Increasing responsibility by 'informing'. Patients viewed their role in admission and discharge medication communication as showing responsibility for medications during hospitalisation and once patients returned home (Halapy and Kertland, 2012; Knight et al., 2013; Manias et al., 2015). Participants who reported less control over their medications, and who were described as not having an active role with medications, had higher odds of reporting a medication-related problem after hospital discharge (Eassey, 2016). To enact this responsibility, patients informed health care professionals about their medications to ensure the accuracy of medications charted on admission, which was perceived to enhance health care professionals' ability to assess future changes in medications, evaluate medication effectiveness and avoid medication interactions (Halapy and Kertland, 2012). Patients identified that their role was to bring a list of medications to the hospital to inform both admission and discharge medication communication, allowing them to more easily provide (Halapy and Kertland, 2012) and receive accurate medication histories (Knight et al., 2013). At discharge, patients described a variety of roles in medication communication including asking questions about medications (Bagge et al., 2014) such as new or changed medications (Knight et al., 2013), sharing medication issues (Manias et al., 2015), identifying medication errors (Knight et al., 2013), suggesting patients undertake informing behaviours to ensure accuracy of discharge information.

Table 3
Intervention components.

Interventional study references	Borgsteede et al. (2011)	Cawthon et al. (2012)	Jack et al. (2009)	Jahn et al. (2014)	Kramer et al. (2007)	Lee et al. (2015)	Lingaratnam et al. (2012)	Mortimer et al. (2011)	Newnham et al. (2015)	Werumeus Buning et al. (2016)
Components of intervention delivered by health care professional										
Assessment of patient understanding of pre-admission medications		√								
Assessment of patient understanding of plan after discharge		√	√						√	
Deliver intervention to participants with risk factors					√		√			
Discharge summary sent to physician accepting care of the patient after hospital discharge			√						√	
Health care professional confirms medication history with a second source and then prescribes medications		√			√			√		
Health care professional training		√			√		√			
Medication report developed for a health care professional					√					
Nurse counselling and education				√			√			
Nurse explains/reviews/instructs patient about medication discharge plan			√		√					
Participation in audio-visual discharge summary									√	
Pharmacist counselling on admission		√								
Pharmacist counselling on discharge	√	√			√		√		√	
Pharmacist obtains medication history from the patient		√			√			√		
Phone call post-hospital discharge by nurse, pharmacist or study investigator		√	√	√			√			
Printed medication list provided to the patient	√	√	√		√		√			
Printed medication instructions provided to the patient	√				√					
Technology used to enhance information flow about medications between health care professionals					√	√				
Patient engagement encouraged in interventions										
Ask questions	√			√	√		√		√	
Communicate medication history orally	√	√			√			√		
Communicate medication history using tools							√			√
Communicate to show understanding of medications		√	√	√					√	
Complete discharge checklist (patient-led)				√						
Confirm medication history								√		
Educated to monitor medication in hospital and voice concerns							√			
Educated to report pain				√						
Learn to use self-management tools		√		√			√			
Participation in audio-visual discharge summary									√	

Table 4
Results of data synthesis.

Theme	Sub-theme	Example from the primary study
Desiring and undertaking a range of levels of engagement	Increasing responsibility by ‘informing’	“They agreed that it is important to accurately communicate medication information to health care professionals so that they (the patients) can receive maximal benefit from health care visits.” Halapy and Kertland (2012).
	Desires to ‘partner’	“The consumer should have the right to have some input into the medications they are prescribed. In my case my doctor prescribed a certain strength blood pressure medication that caused bad headaches for me . . . we worked out a compromise of taking a lower dose one day and the stronger one on the alternative day . . . (67-year-old, female),” Eassey (2017)
Enabling patients’ medication communication	‘Informing’ strategies	“Patients (n = 1–, 50%) commented that CareTV was ‘very helpful’ and a ‘good idea’, which should be made available for all patients and provided them with more information than a paper discharge summary.” Newnham et al. (2015).
	‘Empowering’ strategies	“Patients often reported that the My Medication Application is a feasible tool to keep their medication list up to date and improve their medication knowledge” Werumeus Buning et al. (2016).
	Involving families enables patient engagement	“Ten participants said they could not understand parts of the summary such as the medical language and abbreviations. Three participants said they had relied on a family member explaining the information to them.” Bagge et al. (2014)
Barriers to undertaking medication communication	Barriers to ‘informing’	“Patients were unwilling to initiate conversation and it was up to health professionals to be proactive” Manias et al. (2015)
	Wanting to be ‘informed’, not ‘engaged’	“Information about possible side effects is for some patients fearsome, and for that reason, they preferred not to be informed: I don’t like to read [information about] medicines, because one reads so many things that are not good that it’s better not to take the medicines. The doctor also said, ‘better don’t read that’. (female, 86 years old, internal medicine, without intervention)” Borgsteede et al. (2011)

4.3.1.2. Desires to ‘partner’. Patients desired communication encounters with health care professionals where there were elements of partnership (Eassey, 2017; Halapy and Kertland, 2012; Knight et al., 2013). Patients wanted to discuss their medication options (Borgsteede et al., 2011; Eassey, 2017) with health care professionals and negotiate their medication plans (Eassey, 2017), such as choosing alternative medications or ceasing medications (Borgsteede et al., 2011). Patients who had no role in decision-making about their discharge medications reported more medication-related problems, such as missing medications, problems getting scripts filled or unwanted effects from medications (Eassey, 2016).

4.3.2. Enabling patient engagement in medication communication

Strategies to enable patients’ medication communication ranged from ‘informing’ strategies (Level 2 of the Ladder of Patient and Family Engagement) to ‘empowering’ strategies (Level 3 of the Ladder of Patient and Family Engagement). ‘Informing’ and ‘empowering’ strategies (Table 3) encouraged patients’ medication communication including patients asking questions, sharing medication history, and showing understanding. Families’ ‘informing’ behaviours were encouraged and facilitated patients’ medication communication.

4.3.2.1. Informing’ strategies. Pharmacists' assessment of patients' current medication practices was a strategy to encourage patients to ‘inform’ health care professionals (Cawthon et al., 2012; Kramer et al., 2007; Mortimer et al., 2011) about their current medications, allergies, adverse drug reactions, medications changed or ceased, adherence to medications, and medication needs (Cawthon et al., 2012; Mortimer et al., 2011). In medication assessments during medication reconciliation, patients perceived pharmacists assessed their understanding of current medications thoroughly (Mortimer et al., 2011). Patients described talking with pharmacists about their medications at discharge was helpful and perceived they were able to discuss many aspects of their medications with pharmacists, such as indications, side effects, and anticipated problems (Cawthon et al., 2012).

‘Informing’ patients encouraged them to ask questions. Audio-visual discharge summaries were scripted to promote patient questions (Newnham et al., 2015) and one-on-one counselling sessions all invited patients to ask questions (Borgsteede et al., 2011; Kramer et al., 2007). It was shown that when patients were provided the opportunity to ask questions, they were satisfied (Borgsteede et al., 2011), and had no additional questions (Kramer et al., 2007).

Patients expected health care professionals to ‘inform’ them, which enabled their management of medications. Patients wanted explanations about their medications from health care professionals (Borgsteede et al., 2011), including what to expect from medications so they could monitor them independently at home (Borgsteede et al., 2011; Manias et al., 2015). Having information about medication changes that occurred during hospitalisation, enabled patients to participate in care, and to take ownership of their healthcare (Halapy and Kertland, 2012). In some studies, patients were ‘informed’ on discharge about their medications, usually with a printed medication list (Borgsteede et al., 2011; Jack et al., 2009; Kramer et al., 2007) (Lingaratnam et al., 2012). For example, an individualised after-hospital care plan was provided by a nurse discharge advocate, which included a colour-coded medication list appropriate for those with low health literacy (Jack et al., 2009); patients perceived this list was useful and helpful, with the medication schedule identified as the most helpful part of the after-hospital care plan (Jack et al., 2009). In another study, patients engaged in an audio-visual discharge summary, which was filmed in the hospital and involved scripts that explicitly outlined how health care professionals should encourage patient and family medication communication during filming. The audiovisual discharge summary could be re-watched at home by patients and was perceived by patients as helpful, a good idea, and more valuable than paper discharge tools (Newnham et al., 2015). All patients reported that they watched the audio-visual summary at least once post-discharge, and patients perceived that this facilitated their memory of medication changes in the hospital. It was evident that patients desired verbal communication to support discharge information tools. In one study, patients reported that information and directions were clear when a ‘patient discharge medication profile’ printed in lay language, was used by nurses to instruct patients on discharge (Kramer et al., 2007). On the other hand, when printed information at discharge was used in place of face-to-face communication, 10/40 participants reported difficulty in interpreting medication information post-discharge (Bagge et al., 2014).

4.3.2.2. Empowering' strategies. Patients were 'empowered' by being provided with tools on admission to create updated medication lists, including brochures and applications, promoting their medication communication. In one study, patients were given consumer-developed brochures where patients listed their medications, which was later handed to the nurse; there were mixed patient views on the benefits of these brochures (Lingaratnam et al., 2012). In a pilot study, patients used an application to scan medications or manually enter them; this admission medication information was then communicated by email to the hospital pharmacist on hospital admission (Werumeus Buning et al., 2016). The application was perceived as user-friendly, feasible and it made patients feel involved. However, it was reported that the application was only useful during hospitalisation, and the patients did not intend to be hospitalised often (Werumeus Buning et al., 2016).

Another strategy that empowered patients, was encouraging patients to communicate their understanding of medication information received during discharge preparation interactions. In two studies, teach back methods were explicitly used (Jack et al., 2009; Schnipper et al., 2010). Teach-back actively invites the patient to repeat back key points from their interaction with health care providers, allowing the health care professional to identify the information they shared that needs to be repeated or clarified (Ha Dinh et al., 2016). There were no studies where patients' perceptions of teach-back were assessed, however, patients in an intervention group perceived their questions were more frequently answered 'well' using this approach than the control group, which was a statistically significant finding (Jack et al., 2009). Assessment of patient understanding of medication information allowed nurses (Jahn et al., 2014), and pharmacists (Kramer et al., 2007) to tailor and provide further information if required.

In two studies patients were trained to address patient barriers that entrenched patient passivity (Jahn et al., 2014; Lingaratnam et al., 2012). For instance, patients' lack of awareness about medication errors was identified as a barrier, thus Lingaratnam et al. (2012) implemented a brochure on hospital admission to raise patient awareness about the reality of medication errors in hospital, encouraging patients to speak up for their safety and voice any concerns. Although these researchers did not report uptake of these behaviours, they showed the number of patients reporting confidence in their medications had increased but this level of confidence was not statistically significant (Lingaratnam et al., 2012). Jahn et al.'s (2014) education modules provided information on analgesia and encouraged patients to speak up about their pain. The researchers demonstrated that their intervention reduced cognitive barriers related to patients' beliefs about pain medication such as reluctance to communicate pain to the health care provider, as it was 'annoying' or 'complaining'. Like 'informing' strategies, 'empowering' strategies also enabled patients to ask questions, through use of brochures (Lingaratnam et al., 2012) and patient-led discharge checklists (Jahn et al., 2014).

4.3.2.3. Involving families enables patient engagement. Patients perceived that families facilitated information-sharing with health care professionals. Patients reported that families helped them provide admission medication information to health care professionals (Halapy and Kertland, 2012), noticed changes and missing medications at discharge (Knight et al., 2013), and helped patients to interpret discharge summaries (Bagge et al., 2014). Patients without a family or friend to help them take medications were at higher risk of medication-related problems (Eassey, 2017). During medication counselling sessions patients were encouraged to seek family support to manage their medications and family were encouraged to participate in the counselling sessions, such as asking questions, which was rated as helpful by most patients (Cawthon et al., 2012). Additionally, families participated in audio-visual discharge summaries, where health care professionals encouraged families to ask questions. Some patients reported sharing their audio-visual discharge summary with families once home from the hospital (Newnham et al., 2015).

4.3.3. Barriers to undertaking medication communication

There were barriers to patients enacting medication communication with health care professionals. Patients shared factors that hindered their ability to 'inform' and be 'informed' by health care professionals. In addition, patients' preferences varied, with some patients desiring Level 1 of the Ladder of Patient and Family Engagement.

4.3.3.1. Barriers to 'informing'. Providing accurate information to health care professionals could be a barrier for patients. Some patients reported hesitancy to initiate communication and sometimes needed prompting by health care professionals to provide accurate information (Manias et al., 2015). Even patients who felt confident were unable to recall all information about their medications (Halapy and Kertland, 2012; Lingaratnam et al., 2012), with patients suggesting that medications needed easier names to remember (Halapy and Kertland, 2012).

Contextual pressures may have influenced two-way communication between patients and health care professionals. For instance, admission to the emergency department was viewed as busy and chaotic, and medication communication was not viewed as a priority (Manias et al., 2015). Discharge was viewed as unpredictable, and some patients experienced a lack of reply by health care professionals when they or their families actively tried to obtain explanations of new medications and associated risks (Knight et al., 2013). Patients desired more time spent communicating about medications on admission, throughout the hospital stay, and at discharge (Borgsteede et al., 2011; Knight et al., 2013; Mortimer et al., 2011). When health care professionals did not interact or one-way information giving occurred, patients felt a lack of consideration, which led to confusion on discharge (Manias et al., 2015). For patients, it was important that the information they contributed was listened to, understood by health care professionals (Borgsteede et al., 2011; Manias et al., 2015) and taken seriously (Borgsteede et al., 2011; Eassey, 2017). In one study where an aged care pharmacist performed medication reconciliation on admission, pharmacists communicated with patients about their medication history and confirmed information with them. Patients reported feeling that the pharmacists knew what they were thinking (Mortimer et al., 2011) and pharmacists were interested in them as a person during medication reconciliations, not just the illness (Mortimer et al., 2011). On the other hand, in a renal setting where e-prescribing was introduced, patients were frustrated at hospital discharge because the information they provided to health care professionals on admission was not present in discharge plans (Lee et al., 2015).

4.3.3.2. Wanting to be 'informed', not 'engaged'. Patient preference towards participation in medication communication was an influencing factor (Eassey, 2017; Lingaratnam et al., 2012). Patients' preferences for level of engagement were influenced by many factors such as coping mechanisms, confidence, stress, feeling overwhelmed (Lingaratnam et al., 2012), fear of giving wrong information, health literacy (Cawthon et al., 2012), mental health issues and cognitive impairments (Eassey, 2017). Preferences for passive engagement were sometimes driven by patients' desire for no further information. They feared to hear about medication side effects or believed their medication management was sufficient because they felt well and thought their medications were working (Borgsteede et al., 2011).

Hierarchical views made patients reluctant to communicate their medication needs to health care professionals, such as perceptions that they had to be a 'good patient', had less knowledge than health care professionals (Jahn et al., 2014; Manias et al., 2015), and there was no role for patients in medication communication (Eassey, 2017; Lingaratnam et al., 2012). Some older patients who took many medications on admission and discharge, trusted health care professionals' knowledge, were not confident in their knowledge and followed orders without question. These patients viewed participation as confrontational (Bagge et al., 2014).

5. Discussion

Patients' perceptions of undertaking admission and discharge medication communication were accurate information-sharing, which was seen to increase patients' sense of responsibility. Patients desired a higher level of engagement on the 'Ladder of Patient and Family Engagement', as they wanted to 'partner' with health care professionals by making medication choices. Enablers to patients' medication communication included 'informing' and 'empowering' strategies. 'Informing' strategies encouraged patients to share information during assessments and ask questions, and patients emphasised the importance of health care professionals providing information. 'Empowering' strategies included patient training to address barriers to communicating. We found that there were more positive and consistent views for 'informing' strategies to enable patient communication, while 'empowering' strategies had more mixed views or lacked evaluations that assessed patients' acceptability of these strategies, suggesting further research is required. Barriers to patients' medication communication included patients desiring more passive levels of communication, and some patients reported challenges in undertaking two-way information sharing with health care professionals.

In our review, patients' medication communication was two-way including sharing and seeking information. For instance, patients held positive views on strategies that 'informed' them of their discharge medications, and novel audio-visual approaches showed promise and should undergo further testing. However, patients in our review wanted 'informing' tools coupled with oral communication, and previous research shows giving patients both oral and written information facilitates identification of medication discrepancies (Green et al., 2010). Strategies that 'empowered' patients to provide medication lists on admission tended to have more mixed results in terms of patients' experiences, and may not be the best approach to 'empower' patients.

Like Kim et al.'s (2017) review, we found few engagement strategies above Level 3 of the 'Patient and Family Engagement Ladder', highlighting the need for further research on patients' perceptions of what Level 4 and 5 engagement entails. In our review, patients wanted to 'partner' by making choices, a feature of Level 4 of the 'Patient and Family Engagement Ladder'. Level 4 can be facilitated through patients collaborating on patient portals and partnering on the use of patient-generated data in electronic medical records (Kim et al., 2017). As electronic medical record use becomes more widespread, further research on how these electronic tools influence patient and family engagement is required (Manias et al., 2018). A recent observational study of electronic medical record use during medication reconciliation communication, conducted in a community-based setting and thus not included in this review, showed multitasking, such as individuals speaking with each other while health care professionals used the electronic medical records comprised a median of 47% (IQR 26%–70%) of medication reconciliation time. Conversely, focused health care professional-patient talk with no multitasking on electronic medical records or non-electronic medical records use occurred a median of 24% (IQR 0%–39%) of medication reconciliation time (Matta et al., 2018). Thus, the use of electronic medical records may introduce sources of additional errors, whereby health care professionals try to read and use electronic medical records while talking, also reducing person-centred communication with the patient. Thus, investigations of how to use electronic medical records to truly engage patients at Level 4 of the 'Patient and Family Engagement Ladder' is required to ensure they are truly collaborating and making choices.

In this review, patients commonly 'informed' health care professionals during their assessments, however, it was evident that no tools were provided to support patients' communication. Patient self-assessment tools could provide a formalised way for patients to highlight admission and discharge medication issues and needs, allowing patients to take more responsibility in the assessment process. For instance, recently the "Drug-Associated Risk Tool" was developed as a way for hospitalised patients to report any medication problems (Kaufmann et al., 2018). Patients completing the tool found it feasible, taking seven minutes to complete, and it was not viewed as 'bothersome' (Kaufmann et al., 2018). The use of tools during health care professionals' assessments could provide a way to move this strategy from 'informing' patients to 'empowering' them.

We conceptualised patients communicating their understanding of medication information as an 'empowering' strategy (Level 3 of 'Ladder of Patient and Family Engagement') because it promotes patient communication and has demonstrated effectiveness on patients' self-efficacy, knowledge, and adherence (Ha Dinh et al., 2016). Given patients report a lack of understanding of medication instructions once in the community (Mackridge et al., 2017), encouraging patient communication of medication understanding in the hospital is an important engagement strategy. Given the effectiveness of teach-back and evidence to suggest it is limited in practice, researchers are increasingly undertaking implementation research to embed teach-back practices in hospital systems (Klingbeil and Gibson, 2018). Like our review, other researchers have found few investigations of patients' perceptions of the teach-back approach (Centrella-Nigro and Alexander, 2017), and all studies that explicitly used teach-back were based in the United States of America (Bonetti et al., 2018), suggesting future research should investigate the effect of teach-back on patient experience in a variety of countries.

The relationship between themes was evident, with a patient-centred approach to medication communication desired by patients. For instance, we found that recognising the patients' preferences for level of engagement, encouraging family involvement, allowing patients to contribute to medication choices, and two-way communication are important considerations when enabling patients' mediation communication, which resonates with reviews of patient-centred care (Scholl et al., 2014; Sladdin et al., 2017). Lack of patient-centred communication training may present a barrier for effective medication communication with patients (McCarthy et al., 2008; Naughton, 2018), highlighting the importance of embedding this training for nurses, pharmacists, and physicians.

6. Limitations

This review contains limitations. First, we did not exclude studies with low quality, as they provided insight on the phenomenon of interest; instead, we reported quality scores, allowing readers to judge the quality of articles to ensure we are not over-stating findings. Qualitative studies may benefit from more in-depth contextual details, while quantitative studies had varied limitations across studies. Of note, pre- post-intervention designs tended to be of lower methodologic quality, suggesting future intervention studies undertake a more rigorous approach. Second, the mixed-methods appraisal tool used has initial validity and reliability, but that has been questioned (Souto et al., 2015). Third, our findings may be limited by only including patient viewpoints, however, there is extensive literature on healthcare professionals' role in medication safety enhancing our understanding of this phenomenon. Fourth, it is possible that studies could be missed, but using a systematic approach has ensured the most extensive search was undertaken. Finally, when deciding on articles to be included in the study, we contacted authors for interview guides and survey questions to help determine if studies met inclusion criteria.

Our team approach strengthens the review, as all members reviewed the protocol before commencement, and questioned and confirmed emerging findings. Further, our review team is multidisciplinary, including both nurses and pharmacists, providing different perspectives.

7. Recommendations

In practice, health care professionals may benefit from enabling both patients and families in medication communication, as families have a key role in informing health care professionals and supporting patients. Further, health care professional assessment of patients' medication history is an embedded practice that promotes patient communication (Willeboordse et al., 2014), thus health care professionals could seek ways to more formally enable patient communication, such as using self-assessment tools. Our review highlights the importance of health care professionals' communication skills to enable understanding of patients' preferences, and patient-centred communication such as two-way information sharing and providing choice. In our review, medical officers were not involved in the delivery of patient engagement intervention components, however, given an interdisciplinary approach to medication management is required, nurses, pharmacists, and physicians may all benefit from patient-centred communication skills training.

Future research may benefit from exploring patients' medication communication across different groups, such as patients with different levels of willingness for engagement and older populations with hierarchical views. This may yield important insights into different patient preferences for communication, and enable development of strategies to tailor engagement strategies to different groups. In our study, informing strategies like pharmacist assessment of current medications, information tools on discharge, and encouragement to ask questions, were more consistently viewed positively by patients, while empowering strategies such as patients creating medication lists of admission, patients showing understanding of medications, and patient training to address perceived barriers, tended to have more mixed views or lacked investigation of patients' experiences and acceptability of these strategies. We suggest that future research should investigate patients' perceptions of these enablers, for example using teach-back requires exploration for patients' acceptability. It may be that qualitative evaluation using interviews, like Borgsteede et al. (2011) and Lee et al. (2015), could provide appropriate patient experience data, as many studies explored patients' experiences using short surveys that did not always ask specifically about intervention components. Finally, more in-depth inquiries are required to provide a better understanding of Level 4 and 5 engagement strategies that are acceptable from the patient perceptive. Overall, patients seemed to value having choices, consistent with elements of Level 4, however it is unclear whether they want to engage consistently at this level or have this element underpin all levels of engagement.

8. Conclusions

Currently, engaging patients in their hospital care is internationally advocated; we conclude admission and discharge medication communication is an opportunity to actualise these international calls. Patients want to undertake medication communication with health care professionals. Strategies that enable patients' medication communication include both informing the patient, and encouraging the patient to inform health care professionals. Yet, the success of patient engagement in medication communication is underpinned by a patient-centred approach to care. Patients desire respectful communication and choice, and the level of engagement they desire could differ based on many factors. A patient-centred approach to care may be critical to achieving appropriate levels of engagement on the 'Ladder of Patient and Family Engagement'.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ijnurstu.2019.04.009.

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