A systematic review of older patients' experiences and perceptions of communication about managing medication across transitions of care

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ABSTRACT

Background

Communication about managing medications may be difficult when older people move across transitions of care. Communication breakdowns may result in medication discrepancies or incidents.

Objective

The aim of this systematic review was to explore older patients' experiences and perceptions of communication about managing medications across transitions of care.

Design

A systematic review

Methods

A comprehensive review was conducted of qualitative, quantitative and mixed method studies using CINAHL Complete, MEDLINE, Embase and PsycINFO, Web of Science, INFORMIT and Scopus. These databases were searched from inception to 14.12.2018. Key article cross-checking and hand searching of reference lists of included papers were also undertaken. Inclusion criteria: studies of the medication management perspectives of people aged 65 or older who transferred between care settings. These settings comprised patients' homes, residential aged care and acute and subacute care. Only English language studies were included. Comments, case reports, systematic reviews, letters, editorials were excluded. Thematic analysis was undertaken by synthesising qualitative data, whereas quantitative data were summarised descriptively. Methodological quality was assessed with the Mixed Methods Appraisal Tool.

Results

The final review comprised 33 studies: 12 qualitative, 17 quantitative and 4 mixed methods studies. Twenty studies addressed the link between communication and medication discrepancies; ten studies identified facilitators of self-care through older patient engagement; 18 studies included older patients' experiences with health professionals about their medication regimen; and, 13 studies included strategies for communication about medications with older patients. Poor communication between primary and secondary care settings was reported as a reason for medication discrepancy before discharge. Older patients expected ongoing and

tailored communication with providers and timely, accurate and written information about their medications before discharge or available for the post-discharge period.

Conclusions

Communication about medications was often found to be ineffective. Most emphasis was placed on older patients' perspectives at discharge and in the post-discharge period. There was little exploration of older patients' views of communication about medication management on admission, during hospitalisation, or transfer between settings.

Keywords

Communication; Medication management; Transitions of care; Older patients; Patient experience; Systematic review

1. Introduction

Transitions of care involve movements of patients between health care settings, within different levels of care, and introduce comprise different health professionals managing their care[1]. Older people are likely to experience multiple chronic conditions, sudden health status changes, and problems relating to their medication management. Care transition pathways of older patients can vary in nature, and include transfers from home-to-hospital, hospital-to-home, different settings of care within one hospital, or movements between different hospitals, home-to-skilled care facilities, skilled care facilities-to-home, and home-hospital-skilled care facilities[1].

Older patients are at increased risk of experiencing medication discrepancies across transitions of care because of possible breakdowns in communication about managing their medications [2-5]. Medication discrepancies are any inconsistencies between medications as patients move between different environments. These medication discrepancies are often poorly communicated or inadequately documented in patients' medical records. There could be unintentional and intentional medication discrepancies. Unintentional discrepancies stem from unplanned medication changes, whereas intentional medication discrepancies happen where health professionals make the changes to the medication regimens depending on alterations in patients' clinical manifestations.[6] Medication discrepancies can involve omission of medication, additional medication, or change in dose, route or administration of a medication [7, 8]. An incomplete or inaccurate medication history at any point during a patient's care can lead to medication discrepancies[9-12]. Patients who move between transitions of care can experience medication errors. Medication errors are defined as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer[13]. Medication discrepancies and medication errors can lead to adverse drug events, which are adverse events that result in patient harm[15]. Past research has shown medication discrepancies are more prevalent during hospital admission and discharge because of poor communication and inadequate information transfer [14-18]. Previous studies have also shown that the lack of information conveyed about medication changes was also common when patients moved from the emergency department to medical wards [19-21].

Patients with polypharmacy and multimorbidities are likely to experience problems associated with medication management during care transitions. These problems can involve patients not receiving needed medication or taking unnecessary medication, improper

administration of medication, overuse or underuse of medication and the use of medication for an excessive or insufficient duration[22]. Miscommunication between patients and health professionals, as well as amongst health professionals of different disciplines is the primary reason for medication management problems across care transitions[3, 5]. Within the context of busy work environments in which health professionals work, such as pharmacists, physicians and nurses inappropriate reporting and poor communication about medications are likely to happen[23]. Poor communication about medications is particularly of concern at the time of admission to and discharge from hospital, which can lead to increased readmissions, adverse drug events[5] and medication errors[24, 25]. Precise, clear and comprehensive communication of new prescribed, ceased or changed medications during hospitalization or on patients' transfer between environments requires interdisciplinary collaboration between pharmacists, physicians, and nurses in hospitals and also primary health care providers[26]. Particularly, pharmacists play an integral role in communicating medication knowledge during patients' transitions of care by conducting medication reviews and medication reconciliation, providing patient-centred education, resolving many medication discrepancies with doctors, organising telephone follow-ups with patients or primary care providers upon discharge[27-29].

Communication is a cyclical process of sending, receiving, and obtaining feedback in a timely and accurate manner, and also understanding what information is being conveyed between individuals[30, 31]. Communication can fail in high-task situations during patient transfer and at critical junctures, when health professionals are under stress or interrupted during an episode of communication. This communication failure can compromise the completeness and accuracy of information being transferred[31]. Previous studies also reported different barriers to patients undertaking medication communication with health care providers, such as the presence of unpredictable discharges[32], chaotic and busy patient admissions[33], lack of availability of medication information at admissions[34, 35], and lack of explanation of new medications by health care providers[32]. We defined communication about medication as the exchange and understanding of information between older people, their families and health care team members by verbal, non-verbal, electronic and written means. Medication management refers to activities relating to making decisions to prescribe medications, administrating medications, reviewing and recording medication orders, issuing, distributing and storing medications, as well as provision and transfer of information about medications. The patient is the focus of these medication management activities, especially when they are self-medicating[36]. Communication about medications is important because it affects patient satisfaction and adherence with medication instructions, making them feel more valued,

supported, and respected. Effective communication enables patients to take a more active role in managing their medications [31].

In the era of digitalization, health care systems have involved shifting from paper to electronic health record processes to facilitate timely sharing of high-quality information across transition of care[37]. However, use of electronic processes can have unintended consequences in managing medications, leading to medication discrepancies and medication errors, which ultimately produce patient harm as a result of system or user-related factors[38]. Medications that need to be prescribed may be missing in electronic admission reports and discharge summaries, incorrect medications may be supplied through electronic dispensing areas, and incorrect medications may be selected and supplied to patients when discharged home[38]. Particularly, differences in the vendor systems that do not communicate with each other can lead to a lack of shared information when patients are transferred between different hospitals. Electronic systems may cause a communication failure of the about reconciling the medication regimen or checking the indication for newly prescribed medications [1, 39].

There have been no systematic reviews exploring older patients' own experiences and perceptions of communication about managing medications across transitions of care. Previous systematic reviews have examined interventions designed to improve transitional care of older patients mainly at the point of discharge [40, 41] or transfer between acute and subacute settings [42]. Other reviews have examined the application of transitional care models to specific patient groups such as older patients with heart disease or stroke [43-45]. In some reviews, focus has been placed on strategies promoting safe transitions for older people across settings [40, 41]. One systematic review has examined interventions focused on managing medication on admission and discharge [46]. Most emphasis has been placed on the classification of medication discrepancies that occur across transitions of care without considering older patients' perspectives about communication processes involved [47-49].

In view of the value of patient-centred care [50], it is important to consider the perspectives of older patients relating to communication about medication management at transitions of care. Therefore, the aim of this systematic review was to examine older patients' experiences and perceptions of communication about managing medications across transitions of care.

2. Methods

2.1. Design

A systematic review of qualitative, quantitative and mixed method studies was conducted. The protocol of this systematic literature review was registered in PROSPERO

(CRD42018094287). The Mixed Methods Appraisal tool was used to appraise the methodological quality of different study designs. The PRISMA statement guided conduct of the systematic review [51].

2.2. Search Methods

A comprehensive search was undertaken of electronic bibliographic databases from the date of their inception to 14.12.2018. Identified keywords were used as search terms for all included databases. Keywords used as search terms related to: transitions of care (e.g. transition point*, transfer, continuity of care, handoff), medication management (e.g. medication reconciliation, medication error), communication (e.g. conversation, consultation), older patients (aged, elderly, geriatric, older people, older adults) and care settings (e.g. hospitals, wards, care settings). MeSH, EMTREE and CINAHL Headings were utilized as predefined terms when performing the search in the databases. We also performed a free-text search after determining alternative terms for the identified key concepts. Each group of keywords was searched individually, and then combined. A search was conducted separately for each of the following databases: CINAHL Complete, MEDLINE, Embase, PsycINFO, Web of Science and INFORMIT. Key article cross-checking was conducted, and the reference lists of the most cited identified articles were assessed in Scopus to locate additional relevant articles. For the reference list search of most cited articles, the titles of papers in their reference lists were examined, and the abstracts of these papers were checked against inclusion and exclusion criteria. The inclusion criteria for the systematic review were used as the threshold for making decisions about the possible of papers in the reference lists. Hand searching was undertaken of reference lists of included articles and of relevant journals.

The overall objective was to explore older patients' experiences and perceptions of communication about managing medications across transitions of care. Therefore, inclusion criteria comprised empirical studies that were conducted using any research designs investigating communicating about managing medications across transitions of care. Research needed to focus on older people's perceptions or experiences to be included. Older people comprised individuals aged 65 years and older who were situated in any care settings, such as acute care hospitals, geriatric rehabilitation, residential aged care as well as home settings. Exclusion criteria involved the papers not written in English as well as reviews, letters, commentaries, case reports, editorials and conference abstracts. In this context, communication involved the exchange of information about medications that occurred between older patients and other individuals by verbal, non-verbal, electronic and written means. All types of research

designs were eligible for inclusion. Comments, letters, editorials conference abstracts, case reports and studies not in English were excluded.

2.3. Search Outcomes

In all, 1352 titles were identified through database searching and the final review comprised 33 studies. Results of the searches and screening are shown in a PRISMA flow diagram (**Figure 1**).

2.4. Quality appraisal

The Mixed Methods Appraisal Tool (MMAT) was utilised to appraise the methodological quality of included studies. Three methodological domains were considered: qualitative, quantitative (randomised, non-randomised, descriptive) and mixed methods studies. Included papers were assessed at the study level using the MMAT depending on their research designs, comprising qualitative, randomized, non-randomized, quantitative descriptive and mixed methods designs. Every study was evaluated according to five different questions relating to research design quality. Two investigators assessed the included papers independently according to the MMAT, any discrepancies were discussed, and consensus was reached. None of the papers were excluded from data synthesis because of the score they obtained in the MMAT. Information obtained from the MMAT assessment helped the authors make judgments about studies' methodological quality. Finally, studies were assigned an overall quality score ranging from (0/5) to (5/5) based on methodological quality criteria [52]. No studies were excluded because of the quality score. MMAT findings identified that 23 studies had a score of 5/5, 5 studies had a score of 4/5, one study received score of 3/5, 2 studies had a score of 2/5, and 2 papers obtained a score of 1/5. Characteristics of all studies are provided in **Table 1**.

2.5. Data Abstraction

One reviewer undertook the database searches. Search terms and the approach used for the database searches were independently checked by two university librarians. Titles and abstracts of articles were reviewed independently by two reviewers against the inclusion and exclusion criteria to identify potentially relevant articles. In order to facilitate article screening, Rayyan Qatar Computing Research Institute (QCRI) software was utilised. Relevant systematic reviews were checked to ensure if there were further missed papers related to this review. After independent abstract review, discrepancies were resolved by consensus. Full texts of articles were sourced and reviewed for inclusion by the same two independent reviewers. Included papers were imported into EndNote, version X8.

Extraction of data from included studies, such as sample descriptions and relevant findings, was undertaken by one reviewer using a piloted extraction form. The key data extracted were examined by a second reviewer to ensure accuracy, and discrepancies were resolved by negotiation.

Table 1 Characteristics of included studies

Author, year, country	Study Purpose	Methodology/Data collection	Sample Size	Setting/ Direction of Transfer	Key Findings	Quality Assessment Scores
Allen, et al. (2018)[53], Australia	Describing patients' cares' experiences of transitions of care across subacute, acute and community settings.	Qualitative Descriptive Study Data collection: Semi-structured interviews.	13 Patients 7 Carers	Metropolitan public health-care network Transition from hospital to home	Patients valued the information about their discharge medications by hospital pharmacist. Patients sought for information about medication changes and the reason for those changes. Some patients perceived that hospital doctors decided discharge medications without understanding medications prescribed by other medical doctors. Older patient sought for reassurance, supportive relationship with cares and family members across transitions of care.	5/5
Chiu, et al. (2018)[54], Hong Kong	Determining whether pharmacist medication review could decrease inappropriate medications and hospital readmissions among older inpatients.	Non-randomised controlled trial Data Collection: Medication appropriateness assessed by Medication Appropriateness Index. Unscheduled revisit to hospitals.	212 patients 104 control 108 intervention	Geriatric unit of a local hospital. From the admission to the discharge.	A pharmacist-led medication review reduced the number of inappropriate medications and unintended readmissions. Inappropriate medication use was lower in intervention group (28.0% vs 56.4%; t-test=result not stated, P<0.001). Hospital readmission was lower in the intervention group (13.2% vs 29.1%, t-test=result not stated, P<0.001).	4/5
Gadbois, et al. (2018)[55], USA	Understanding the experiences of patients who transferred from hospitals to skilled nursing facilities by obtaining insights from patients, facility staff.	Qualitative Study Data Collection: Interviews with patients, staff and hospital staff.	138 hospital and skilled nursing facility staff, 98 patients or/and their family members.	Hospital, Skilled Nursing Facility Staff Discharge from hospital to skilled nursing facility	Medication errors were associated with rushed transition from hospital to skilled nursing facility. Inaccurate information transfer between hospital and nursing facility led to patient dissatisfaction with medication reconciliation.	5/5

Barnett, et al. (2017)[56], UK	Investigating the effect of the pharmacy *integrated medicines management service* on the rate of preventable medicines-related readmission within 30 days of discharge.	Retrospective Clinical Audit Data Collection: Retrospective data collection, Collection of 30-Day readmission data using the hospital admissions programme. Review of electronic discharge summaries.	744 patients	District general hospital. On admission, during hospital stay and post-discharge follow up.	Pharmacy *integrated medicines management service* team in hospital was effective in reducing preventable medicines-related readmission in older patients.	2/5
Jeffs, et al. (2017)[57], Canada	Exploring older patients', perceptions with the information exchange during transitioning from acute care hospital to rehabilitation hospital.	An exploratory qualitative study Data Collection: Semi-structured face to face interviews and observations.	13 patients	2 acute care hospitals and 1 rehabilitation hospital. Transition from acute care hospital to rehabilitation hospital.	Information exchange between provider and older patients had more paternalistic nature instead of collaborative. Older patients experienced difficulties in absorbing information at transition points due to the pace and a number of the interactions with different health care providers during transitions. In spite of expectations, many patients had little to no information about their transition plan including their medications.	5/5
McAiney, et al. (2017)[58], Canada	Describing *intensive geriatric service workers'* role and influence of this coaching service on older patients, caregivers and the broader health system.	A mixed method study Data Collection: Interviews with patients and caregivers. Chart audits, monitoring achievement of care goals.	49 patients and 25 caregivers. 19 key stakeholders	Hospital Transition across continuum of care from admission to discharge.	The intensive geriatric service worker facilitated the patient-provider communication and increased older patients' adherence to medication treatment. 66.2% of older patients were *extremely* satisfied with the intensive geriatric service, while 33.8% was satisfied.	5/5

Bayliss, et al. (2016)[59], USA	Developing a quality care assessment measure for patient with multiple chronic conditions.	Qualitative study Data collection: Focus groups following interactive webinar based on Delphi Method.	10 patients aged 70–87 with three to six chronic conditions. 17 experts in clinical geriatrics and multiple chronic condition research, health policy.	Research department within an integrated delivery system.	Older patients reported optimized patient-clinician communication and written communication of treatment plan as a measure for high-quality multiple chronic condition care. Older patients endorsed the use of electronic medical record for information transfer between providers as an indicator of high-quality multiple chronic condition care.	5/5
Eyler, et al. (2016)[60], USA	Evaluating the impact of the pharmacist-led motivational interviewing on post-discharge medication adherence of older patients with pneumonia.	Prospective-randomised control study Data Collection: Controlled survey and follow-up phone interviews.	30 patients; 16 intervention 14 control	Tertiary medical centre. Discharged from medical centre to long-term care facilities, short term rehabilitation or nursing facilities.	Pharmacist-led motivational interviewing had potential to increase patient antibiotic adherence. Antibiotic adherence rate was 87 % in intervention vs 64% in control group. Older patients were every satisfied with pharmacist interactions about their antibiotic regimens during discharge.	5/5
O'Kula, et al. (2016)[61], USA	Comparing care transition outcomes between older people with English speaking and non-English speaking background.	A controlled trial Data Collection: Post-discharge interviews with patients	117 patients 63 English Speaking 16 English-Spanish Bilingual	A single tertiary care centre. Transitions between acute and outpatient care.	Quality of care transitions communication was lower for older non-English speaking, bilingual patients than only English-speaking participants. Hospital readmission within 30 days of discharge was lower in English-speaking older patients (19% vs 13.6 %, chi-square test =result not stated, P=0.56).	2/5
Rustad, et al. (2016)[62], Sweden	Exploring experiences of older patients of	A descriptive, explorative qualitative design.	14 patients	Local Hospital Home-hospital-home.	Older patients found care transition as complex and challenging process.	5/5

	care transition from hospital to municipal health care services.	Data Collection: Semi-structured interviews.			Older patients expressed their confusion about medication information transferred between hospital and municipal health care settings.	
Wong, et al. (2016)[63], Canada	Examining older patients' experience of hospital discharge from their perspectives.	A qualitative study. Data Collection: Interviews with patients and focus group.	8 Patients	A Central Teaching Clinic Transfer from hospital to home.	Patients expressed their uncertainty of discharge plans including providers' explanations about medications before discharge.	5/5
Bagge, et al. (2014)[64], New Zealand	Exploring the way in which older patients, aged 75 and over, manage their medication changes at home following hospital discharge.	Qualitative Study Data collection: Semi-structured interviews.	40 patients	Hospital Discharge from the hospital to home.	Half of the older patients were unaware of the details and reasons for medication changes. Older patients were not willing to ask questions about their medications. Majority of older patients trusted the expertise of doctors; therefore, they accepted their decisions about medications without questioning them. Some older patients were extremely confused about their medications.	5/5
Hvidt, et al. (2014)[65], Denmark	Investigating the ability of older patients' to recall discharge instructions.	Quantitative Descriptive Data collection: A cross-sectional questionnaire study with patients discharged from a university hospital.	102 patients: 40 patients in older group (Age≥65), 62 patients in younger group (Age<65).	Quick Diagnostic Unit in a university hospital. Discharge from hospital to home.	Recall of correct medication information was higher in the younger patients compared with older patients (Odds ratio 4.20, 95% CI 1.50-11.90, P=0.016). Older patients were less aware of their comprehensive deficits compared to younger patients (Odds ratio 0.94, 95% CI 0.90-0.98. P=0.001).	5/5
Lindquist, et al. (2014)[66], USA	Determining the ways of older patients' dosing their regular medications in the home.	Qualitative study Data Collection: Interviews with patients. Recording of patients' home medication	200 seniors	Hospital. Patients recruited at hospital, interviewed at their homes.	Unnecessary complexity of medication regimens was prominent problem among older people. Misunderstanding medication instructions was one reasons behind medication regimen over-complexity. Older people changed their lifestyle to accommodate the medication changes.	5/5

		regimen details *(name, dose and frequency).*				
Blennerhassett, et al. (2011)[67], Australia	Examining management of medications by older people with non-English speaking background after discharge.	A qualitative study Data Collection: Interviews with patients. Focus group discussions with hospital clinicians, pharmacist and community nurses.	18 patients 12 ward pharmacists 8 community nurses	Hospital Transfer from hospital to the community	Patients lacked knowledge about medication and changes. Interpreter services were not used routinely. For the older patients with non-English speaking background, there was lack of available translated educational materials. Medication changes and different brand names were contributors to medication mismanagement in older patients.	5/5
Knight, et al. (2011)[68], UK	Explore experience of older peoples and their careers at discharge in regard to managing medication and organization.	Qualitative Study Data Collection: Semi-structured interviews. Review of patient medication diaries	7 patients and 12 carers.	Hospital Discharge home form hospitals.	Patients' satisfaction with the information provided about medication was varied. Inadequate explanation about medication at discharge. The communication between hospital and GPs and community pharmacists was poor.	5/5
Arora, et al. (2010)[69], USA	Reporting older patients' post-discharge problems and identifying patients' perceptions of communication between their primary care physicians and hospital physicians.	Prospective mixed methods study Data collection: Interviews with older patients and surveys with primary care physicians.	40 Patients	Single academic medical centre From admission to discharge (nursing home, rehabilitation or homes)	Patients, whose primary physicians were not aware of hospitalizations, were more likely to report post-discharge issues including medication problems (67% vs. 33%, Fisher's exact test = result not stated, P<0.05). Older patients reported their confusion due to post-discharge medication problems. Primary care physicians' awareness of their patients' discharge and hospitalizations was important to follow up appointments and medications. Patients' perception of good communication between primary care physicians and hospital physicians was far from the reality.	4/5

Mesteig, et al. (2010)[70], Norway	Describing unwanted adverse events by the ambulatory team among older patients discharged from a geriatric evaluation and management unit (GEMU).	A prospective observational study Data Collection: Collection of baseline characteristics from hospital record, observations.	118 patients	15-bed geriatric evaluation and management unit. Discharged from the GEMU to their homes.	Approximately 60% of frail elderly patients experienced unwanted incidents during transition from hospital to home and following 4 weeks. Majority of unwanted effects were associated with information exchange, medication regimens and disagreements between services. .	5/5
Dedhia, et al. (2009)[71], USA	Testing the feasibility and effectiveness of a discharge planning and quality improvement intervention on care transitions of older patients.	Quasi-experimental pre–post study design. Data collection: The data were collected via validated data collection instruments during hospitalization, within 1 week of discharge, and approximately 30 days after discharge.	238 patients for pre-intervention stage, 185 patients for the post-intervention period.	Three distinct hospital types including an academic, community-based teaching hospital, not-for-profit community hospital. Discharge from general medicine ward to home.	Quality intervention including physician-pharmacist collaborative medication reconciliation, scheduled discharge meeting, multidisciplinary team collaboration, and providing patient with simple medication instructions upon discharge admission resulted in successful transition in older patients (87% vs 78%; OR=2.33, 95% CI=1.34–4.05) and reduced the readmission rates. (14% vs 22%; OR=0.55, 95% CI= 0.32–0.94).	4/5
Del Sindaco, et al. (2007)[72], Italy	Determining influence of a disease management program on older patients. Program included discharge planning, therapy	Randomised Controlled Trial Data Collection: Review of discharge & visit summary. Medical record review. Periodical phone calls. 2 year follow up patients' outcomes.	173 patients, 86 Intervention and 87 usual care.	2 hospital heart failure clinics. Hybrid Intervention: combining hospital clinic-based and home-based care.	Length of hospital stay was reduced (9.5 vs 12.5 days, t-test =result not stated, P=0.0025). Mortality for heart failure (24.4% versus 28.7%, relative risk reduction 0.15, 95% CI -0.39-0.48, P>0.05). Significant improvements seen in functional status, quality of life and b-blocker prescription rate. Readmission and death risks were reduced (36% vs 26.2).	5/5

	optimisation, improved communication.					
Flacker, et al. (2007)[73], USA	Examining older patients' recall of communication of discharge instructions occurred between themselves and hospital staff before discharge.	Quantitative descriptive study Data collection: A cross-sectional telephone survey of older inpatients.	269 patients aged 70 years and older and their families were interviewed.	953-bed teaching hospital Transfer is from hospital to home.	Older patients who remembered receiving medication instructions were more likely to adhere to taking their medications. Discharge instructions by hospital staff enabled patients to take more active role in their self-care after discharge. 86.4% of older patients who recalled receiving discharge medications reported they took them correctly, while 9.1% of these patients stated that they did not take their medications correctly.	5/5
Spinewine, et al. (2007)[74], Belgium	Evaluating the influence of pharmaceutical care on appropriateness of prescribing.	Randomised controlled trial. Data Collection: Medical record review and an interview with each patient or career to identify demographic characteristics, clinical status, and medications.	203 patients	Acute Geriatric Evaluation and Management [20] unit at tertiary hospital. Admission to acute GEM unit, hospital stay, discharge.	Pharmaceutical care reduced misuse, overuse, and unnecessary medication use in older patient. Providing older patients with pharmaceutical care via written and oral therapeutic information at acute GEM unit improved appropriate medication use in older patients during hospital stay and after discharge.	5/5
Lopez Cabezas, et al. (2006)[75], Italy	Examining the efficacy of educational intervention conducted by a pharmacist in patients with heart failure.	A randomised, prospective, open clinical trial Data Collection: Collection of patients' sociodemographic	134 patients, 70 (52.2%) intervention, 64 (47.8%) control	Local hospital. Study conducted during hospital stays, at point of discharge and during patients' follow up hospital visits.	The patients received active education program had less re-admissions than the patients in the control group (9 vs 26 readmissions after 2 months intervention (Cox's proportional hazard ratio HR 0.56, 95% CI 0.32-0.97, P<0.05).	5/5

		and clinical variables.				
Shen, et al. (2006)[76], Australia	Assessing the impact of a nurse-initiated medication education program for older patients in terms of increased medication knowledge and adherence following discharge.	Non-randomised Control Study Data Collection: Interviews and satisfaction survey.	86 patients	Teaching hospital. Discharge from hospital to home.	Nursing-staff-conducted medication education program improved older patients' medication knowledge. 78% of patients expressed usefulness of education program. Before education program, medication knowledge of older patients indicated that they knew 50% of brand names, dosage and times, 55% of purpose of medications, and 15% of major side effects. Relevant figures at follow-up home visits significantly increased to 90%, 85%, and 25%, respectively (*P* .05).	4/5
Enguidanos, et al. (2005)[77], USA	Identifying medication documentation issues at the point of discharge of older patients.	Quantitative Descriptive study design. Data collection: Surveys with patients and physicians. Review of medication charts.	A random sample of 104 patients, 50 primary care and outpatient physicians	A large managed care medical centre At the discharge point of the hospital	89% of participated patients reported high levels of satisfaction with communication about discharge medications, however there was a discrepancy between discharge orders and older patients' medication reports in terms of the numbers of medications. Of 104 chart reviews, 56% of medical charts had missing entries, mainly in the indication section and 23% had medical terminology.	3/5
Coleman, et al. (2004)[78], USA	Testing whether a patient-centred intervention designed for promotion cross-site communication encouraged older patients to play a more active role in	Quasi-experimental design Data collection: The use of data obtained from the participating health system's administrative data files.	158 Intervention patients vs. 1,235 Control patients form health delivery system's administrative records.	A large integrated delivery system Discharge from acute care facility to home.	Hospitalized patients who received interventions were almost half as likely to return to the hospital. 75% of older patients who received interventions of medication-self management reported confidence in managing their own medications. 87% of intervention patients understood the reason why they took each medication and 94% of them reported that they understood the route of each medication.	4/5

	their care and transition.					
Sexton, et al. (1999)[79], UK	Investigating the accuracy of documentation of medication-information on discharge and the communication methods used.	Qualitative Study Data Collection: Medical record review. Interview with patients. Surveys with GPs.	56 patients	General hospital. Discharges home from the acute geriatric unit.	Historic poor standards of seamless pharmaceutical care and record keeping by health care professionals. Medication inadequacies were one of the biggest issues for older patients. 57% of patients had medication related problems after discharge.	5/5
Clare, et al. (1998)[80], Australia	Identifying satisfaction with discharge planning identified by older patients, caregivers, health professionals and identifying older patients' and carers' knowledge of medications and recovery needs.	A mixed method study Data Collection: Interviews and questionnaire	67 patients	Hospital Transfer form hospital to nursing service	71 % of elderly expressed their satisfaction with their discharge as they felt involved in decision-making process in discharge plan. 91% of older patients reported daily medication intake. Of those patients, only 52% patients received written information.	5/5
Leduc, et al. (1998)[81], Canada	Examining the extent to which older patients discharged to the community from an acute-care hospital used the healthcare	Quantitative Descriptive Analysis Data Collection: Interviews, Chart reviews	212 patients	A general and teaching hospital Discharge from acute geriatric ward to community	Communication and coordination between community and hospital increased older patient adherence to prescribed services two times.	5/5

	services prescribed for them at discharge.					
Rich, et al. (1996)[82], USA	Prospectively assessing medication compliance of older patients with congestive heart failure after intervention of patient education.	A randomised controlled study Data Collection: Collection of the number of medications at the discharge.	156 patients; 80 intervention, 76 control	Tertiary hospital At the time of discharge and post-discharge period	Compliance rates in intervention was remarkably high, achieved by 85% in intervention vs 69.7% in the control group. Readmissions per patient were decreased by 32%, the length of hospital stay was reduced by 31%.	5/5
Burns, et al. (1992)[83], UK	Evaluating the effects of communication between hospital and general practitioners about medication therapy of older patients.	Prospective Cross-Sectional Study Data Collection: Home visits; post-discharge drug therapy was assessed the ones that were prescribed during discharge.	56 Patient	Hospital Discharged form Geriatric Unit to home or nursing home	27% of patients had new medications issued after discharge. There was lack of continuity of medication in older patients.	1/5
Cochrane, et al. (1992)[84], UK	To ascertain changes in drug treatment of elderly patients after discharge from hospital and to determine areas of communication which may	Quantitative study Data collection: Structured verbal questionnaire.	50 patients discharged from five geriatric wards.	A district health authority Discharge from geriatric ward to home.	There was a need for close communication and collaboration between hospital and community care professionals to prevent medication mistakes in older patients. Older patients were not communicated with about their medication changes during their hospital stay. The lack of continuity was identified in older patients' medications between the ones provided on discharge and the ones taken by patients during post-discharge period.	5/5

	need improvement.					
German, et al. (1982)[85], USA	Investigating whether communicating with older patients about drug regimen at discharge leads to increased patient knowledge at the post-discharge period and comparing the improvement of medication knowledge by age groups.	Quantitative descriptive study Data collection: Structured phone survey with discharged patients. Review of patients' drug regimens from medical records.	545 patients	Hospital Discharge from hospital to home.	Adherence to prescribed medications was found higher in older (age≥65) than the younger patients (Age<65).	1/5

2.6. Synthesis

Two investigators were involved with synthesizing the themes and subthemes from the papers. Regular discussions were conducted with the other investigators, which enabling agreement on the nature and content of themes and subthemes. A six-step thematic analysis approach was used [86]. The first step involved familiarisation of qualitative data, where extracted data from the results sections of studies were read and reread to search for meanings and patterns. Initial ideas were noted to develop comprehensive understandings of the content. The second step related to generation of initial codes. Preliminary codes were developed, which identified relevant features of the data across the whole data set. The third step involved searching for themes, where different codes were sorted into potential themes. All data relevant to each potential theme were gathered. The fourth step included reviewing themes to determine which ones were to be combined, separated, refined or discarded. A thematic map was created at this step. In the fifth step, themes and subthemes were defined and named. The sixth step involved generation of the findings, where concise names and definitions for each theme were produced. Key findings of included studies were incorporated into identified themes, and examples from studies were used to illustrate the themes generated.

Findings from quantitative studies were reworded as textual information, which was read and reread to determine how it could be incorporated into themes and subthemes obtained from qualitative studies. This textual information was aggregated with qualitative findings using descriptive synthesis. Mixed methods studies were analysed using the approaches already explained for qualitative and quantitative data respectively. Findings from quantitative and mixed method studies were analysed following the six-step process. MMAT results of studies were checked simultaneously while conducting the six-step thematic analysis to identify any methodological deficiencies.

3. Results

A total of 33 studies were included in this review. The earliest identified study was published in 1979. There was only one study published between 1980 and 1990. Six studies were published from 1990 to 2000. While 10 studies were published out between 2000 and 2010, 16 studies were published from 2010 to 2019. The total sample size of older patients included in studies was 4525 patients. For qualitative studies, sample sizes ranged from 7 to 200 patients while for quantitative studies, sample sizes ranged from 30 to 744 patients. For mixed methods studies, sample sizes ranged from 47 to 60 patients. Twenty-eight studies were

conducted in acute care hospital settings, 5 were undertaken at subacute settings, and only one study was conducted at residential aged care facility. Most studies were conducted in either the United States (10) or the United Kingdom (5). There were 12 qualitative studies, comprising 8 semi-structured interviews studies, one narrative interviewing study, 2 observational studies and three focus group studies. Most interview studies were conducted with older patients at acute hospital settings. Of these studies, only 2 studies adopted the concept of data triangulation combining interviews with focus group discussions [63] or observations [57]. Seventeen studies were quantitative in design, including 4 survey studies, 2 retrospective audit reviews, 5 randomised controlled trials, one structured verbal questionnaire study, 2 quasi-experimental studies, and 4 non-randomised controlled studies. Controlled trials were conducted in different countries including USA, Belgium, Australia, Italy and Hong Kong and most of them were undertaken at acute care hospital settings [60, 61, 74-76, 82]. There were also 4 mixed methods studies. Of these, 2 studies used a combination of surveys and interviews. One study combined chart audits and interviews, whereas the other study integrated observational data with quantitative findings.

There were 4 major themes identified: links between communication and medication discrepancies; engagement with older patients to enable self-care; older patients' experiences with health professionals about their medication regimen; and strategies for communication about medications with older patients. Themes and subthemes with examples of representative quotes by older patients are shown in **Table 2**. A thematic map comprising the themes and subthemes is shown in **Table 3**.

Medication discrepancies that resulted from communication breakdowns between hospital and community settings were an ongoing problem that were addressed by older patients receiving simple, written and verbal medication information before discharge. Patients' attitudes towards their involvement in self-medication management and their ability to make decisions about their medications were identified mostly in interview studies undertaken at acute hospital settings. Older patients' values about patient-provider relationships and trust in providers' knowledge influenced the degree of their involvement. Survey and interview studies reported that patient satisfaction with the amount and quality of information received before discharge was closely associated with patients' post-discharge medication adherence. Only two studies conducted in Australia (an interview study) and USA (an intervention study) addressed the relationship between quality of communication and language barriers of patients [61, 67]. The interview study conducted with older patients from three different non-English language backgrounds revealed detailed knowledge about medication

mismanagement experienced after discharge [67]. Intervention studies conducted with different professional groups such as nurses, physicians and pharmacists showed that medication education provided to older patient at hospital settings improved medication knowledge and medication management after discharge and also reduced medication-related readmissions [54, 71, 72, 76].

Table 2 Themes, Subthemes & Representative Quotes

THEMES AND SUBTHEMES	REPRESENTATIVE QUOTE EXAMPLES BY PATIENTS
1. MEDICATION DISCREPANCIES ARE LINKED TO COMMUNICATION • MEDICATION COMMUNICATION BETWEEN HOSPITALS AND THE COMMUNITY • TAILORED COMMUNICATION TO FACILITATE OLDER PATIENTS' UNDERSTANDING • ACCURACY OF MEDICATION DOCUMENTATION	*''When I usually have lab work done I have prescription signed.. maybe they changed the way of doing it. Now the pharmacy called me. But I'm supposed to have a note or something''*Arora (2010, p. 388) *"I wouldn't have taken it in any way. You really do only sort of half listen because it seems, you know, it seems that you don't know the language."* Bagge (2014, p. 794) *"Well they say very little, they just say you're on this and this and this, do you understand and they're keen to get off"* Knight (2011, p. 286) *''I had problems getting my medications because they tell me that the medication was so high, but anyway, I didn't get some of my medications.''* Arora (2010, p. 388) "Major category was those who had problems getting medication or therapy. For example*, 'one of (the patients) treatment meds...was very hard to find and it delayed us giving her her meds."* Arora (2010, p. 387) *"... well they do give you a thing from the hospital to give to your doctor just saying you're home and then on that, with that should be all the drugs. So then you've got to make sure that the surgery puts the drugs onto the record…it's even more daunting and then I mean you have to juggle with the chemist and the repeat prescriptions and goodness knows what"* Knight (2011, p. 286) *''I needed a copy of his discharge papers from the hospital for insurance purposes..They didn't give me a discharge paper.''* Arora (2010 p. 388) *"I think the take-home message is get [discharge instructions] written down. Because I didn't know all this; I'm guessing he took out the information and read it. So anything that's written is super useful."* Wong (2016, p.100)
2. ENABLING SELF-CARE THROUGH OLDER PATIENT ENGAGEMENT • PATIENT SELF-MANAGEMENT OF MEDICATIONS • INVOLVEMENT WITH OLDER PATIENTS IN DECISION MAKING	*"You don't have any decision in your own healthcare at all. I think that's terrible!"* Arora (2010 p. 389) "*Patient said she did not really have an opportunity to talk to the hospital staff about her medicine changes but she was not concerned by that because she would not have known what to discuss with them."* Bagge (2014, p. 794) "*I've been receiving a new kind of tablet since I was in hospital. I don't know if it is because of directions from the hospital, I just take them and keep quiet."* Rustad (2016, p.774) *"I think that because I would ask if I had to, if I wasn't happy, I would take it upon myself to ask. I think you have to be prepared to do that. I mean I would, but not everybody would. I mean I work with the doctors"* Knight (2011, p. 286)

3. OLDER PATIENTS' EXPERIENCES WITH HEALTH PROFESSIONALS ABOUT THEIR MEDICATION REGIMEN

- OLDER PATIENTS' SATISFACTION WITH MEDICATION RELATED SERVICES
- INFORMATION EXCHANGE ABOUT MEDICATIONS
- EFFECTS OF PATIENT DEMOGRAPHIC CHARACTERISTICS ON PATIENT EXPERIENCES

"I think to myself 'they know what they're doing,' and just leave it to them, that's what I'm here for." Bagge (2014, p. 796).

"Because he is a specialist advising, I'm taking their advice, I'm not going to argue with them about it." Bagge (2014, p. 795).

"I wouldn't even [know] how to say 'why am I taking these pills?', because I might be disregarding their, you know, position, or something. No, I just do as I'm told." Bagge *(2014, p. 795).*

"They only answered the questions I put to them."," a change in my symptoms were not adequately explained" Clare (1998, p.11)

"You don't know what the hell to do, do you?'Sadly, this patient added, 'I was quietly confident of all my medication before, but since coming out of hospital I'm totally lost" Knight (2011, p. 288)

"I've carried on with the insulin dose that my specialist prescribed, not what the hospital prescribed. I didn 't see the specialist while I was in hospital as he was away." Blennerhassett *(2011, p.34)*

"One patient took three different opioids and crushed morphine sulfate slow-release tablets because, I thought I could see the tablet whole in my stool" Blennerhassett (2011, p.34).

"She's really helped me to make sure I take my medications and vitamins and that I eat the amountthat I'm supposed to. That has really helped me a lot. I've got more energy and feel much better than I did last winter." McAiney (2017, p.157)

"If they'd have given me a ton of them [medicines], I would still have taken them because they know better than I do" Bagge (2014, p. 794)

"I'm sure [the pharmacist] explained [the medications] to me, but… I remember nothing…" Wong *(2016, p.100)*

4. STRATEGIES IN COMMUNICATING ABOUT MEDICATIONS WITH OLDER PATIENTS

- INDIVIDUALISED DISCHARGE SUMMARIES
- PHARMACISTS' INTERVENTIONS AND RECOMMENDATIONS ON MEDICATION APPROPRIATENESS
- IMPROVING MEDICATION KNOWLEDGE IN OLDER PATIENTS THROUGH MEDICATION EDUCATION

"When we saw our GP yesterday, she described in great detail exactly the significance and the severity of a bug in the blood if it was coming from the bladder. So, we got more out or our GP in 5 minutes than we got out of the doctors in the hospital in 8 days" Allen (2018, p.523)

"All participants valued medication education from the ward and community pharmacists including education regarding dose administration containers, explanation of discharge medication regimes and consideration of unwanted side- effects" Allen (2018, p.523)

Theme 1. Medication discrepancies are linked to communication

Twenty studies addressed the theme of medication discrepancies being linked to communication [55-57, 59, 61-64, 67-70, 77-81, 83-85]. There were 3 subthemes relating to this theme: communicating about medication between hospital and the community, tailored communication to facilitate older patients' understanding, and accuracy of medication documentation.

Timely and appropriate communication about medications between the hospital and the community was a key factor in preventing medication discrepancies. Communication breakdowns occurred at the time of discharge from hospital to the community or in the early post-discharge period (from 5 to 30 days after discharge) [55, 56, 63, 67, 69-71, 79, 83, 84, 87]. Older patients reported having difficulties in understanding medication changes after discharge [63, 64, 68, 69]. In a qualitative study of changed medication regimens, most older patients had continued taking discontinued medications after returning home due to lack of communication at the time of discharge [84].

Patients described experiencing medication discrepancies including wrong frequency, incorrect time, dosage or missed prescription regime following discharge from hospital because of poor communication and lack of clear and adequate information about their medications [68, 70]. In some quantitative studies, interventions that focused on communication with patients, primary care physicians (PCPs) and community pharmacists after patients' discharge improved the discharge experience and enabled patients to manage their medications properly at home, leading to reduced medication-related hospitalisation rates [56, 78].

Older patients expected that communication should occur between primary care physicians and inpatient physicians [69]. Likewise, older patients who frequently visited different PCPs reported that the PCPs lacked knowledge about their discharge medication changes. PCPs sometimes continued hospital-ceased medications or discontinued newly-prescribed hospital medications [67]. Older patients stated that they expected effective and prompt communication between health professionals located in primary and secondary care settings comprising hospital providers, their PCPs and community pharmacists [68]. They also expected that hospital pharmacists would provide them with a concise and clear list of prescribed medications and explanations about their purpose [55, 68].

Patients' understanding of medication information was enhanced through tailored communication that considered older patients' physical, cognitive, and emotional states and their preferences. These preferences included frequent conversations with health professionals

and clearly written instructions of their current treatment plan and provision of discharge summaries. In a qualitative study, older patients with multiple chronic conditions reported wanting timely and tailored communication [59]. Patients found it useful to receive written instructions about medication before discharge [80]. Older patients believed their knowledge could be improved by health professionals providing them with plain-language discharge summaries. They also reported the need for health professionals' awareness of their mental state when providing information about new medications as patients may not remember discharge explanations [63]. When older patients experienced close and ongoing communication with health professionals, they were more likely to correctly identify the purpose of their medications and to adhere to their medication regimens [85].

Older patients reported lack of accuracy, completeness and clarity of medication documentation. This resulted in unwanted medication incidents, confusion about medication information, and concerns about medication changes, particularly when they were discharged from hospital to the community. Mesteig, et al. (2010)[70] reported that almost 60% of frail, older patients experienced unwanted medication incidents during their transition to home and within the first month after discharge. While 32% of the most common, unwanted incidents were caused by mistakes made during medication administration, 25% of incidents related to poor information exchange between a geriatric evaluation and management unit and primary health care staff. Older patients found the care transition from hospital to a community care setting to be a challenging and complex experience, since they were unsure or unaware of what medication information was sent by the hospital, and what had been received by the community care setting [62]. In another study, patients stated that they were not satisfied with the information they received at discharge, with only 40% reporting that the information was easy to comprehend [77]. Discharge summaries were hard to understand because of extensive use of medical abbreviations and jargon. Patient concern about the lack of clarity about changes made to their medications increased their reliance on family members [64].

Theme 2. Enabling self-care through older patient engagement

Eleven studies identified the theme of enabling self-care through older patient engagement [53, 57, 58, 62, 64, 67-69, 73, 78, 80]. There were 2 subthemes for this theme: patient self-management of medications, and involvement with older patients in decision making.

Older patients viewed caring relationships with health professionals, and appropriate communication of medication information as key components of self-care management. Having information about the reasons why and how medications were to be taken was important for older patients' understanding and self-care after discharge [73, 78]. Older patients

valued caring relationships with health professionals in their care transitions because such relationships supported their self-confidence in being independent at home. In contrast, negative experiences resulted from health professionals' failure to listen to patients' concerns at discharge and from health professionals making decisions about discharge medications without understanding what medications were prescribed by doctors outside the hospital [53].

Some older patients reported no concerns with resuming their previous medication-taking routines after discharge, whereas others expressed concerns about being able to adopt new routines after medication changes [64, 67]. Patients identified strategies that helped them to obtain more information themselves at discharge, including taking responsibility to communicate with health professionals about preparing self-generated medication lists [62, 68]. McAiney, et al. (2017)[58] described a new health provider role – intensive geriatric service workers – who were community support providers addressing communication gaps and promoting effective self-management for older patients discharged to the community from acute care. Patients who received support from these workers demonstrated improved self-management in adhering to treatment recommendations.

There were conflicting findings in regard to older patients' participation in decision making with medication-related communication. Patients were sometimes reluctant to ask questions about their medications during their hospital stay and were concerned about not knowing what to ask in relation to their medication changes [64]. Similarly, some patients did not wish to be engaged in discussions with health professionals as they believed that the health care team members knew what they were doing [57]. In contrast, some patients reported that interventions including home visits from transition coaches, follow-up visits by physicians and follow-up phone-calls enabled them to take a more active role in their own care across settings, which increased their understanding of medication regimens and enhanced their confidence in self-management. They reported that active participation increased their understanding of how to take their medications and recognise side effects [78]. In regard to self-care learning, some patients were more engaged in asking questions of nurses when they gave insulin injections, whereas others preferred consulting with their PCPs after discharge to learn the reasons for insulin changes, and monitoring and interpreting blood glucose levels [53].

Theme 3. Older patients' experiences with health professionals about their medication regimen

Eighteen studies addressed the theme of older patients' experiences in communicating with health professionals about their medication regimen [53, 55, 57-59, 61, 63, 64, 66-69, 75-77, 80, 81, 85]. There were 3 subthemes for this theme: older patients' satisfaction with medication-related

services, information exchange about medications, and the effects of patient demographic characteristics on patients' experiences of communication.

Older patients' satisfaction with medication-related services influenced their adherence to their medication regimen. Patients who received information about their medication therapy through active telephone follow-up and home visits after discharge reported higher satisfaction with the care received, and showed greater adherence with prescribed medications compared to patients who did not receive information on medications and follow-up phone calls [75]. Older patients were highly satisfied with the existence of a service addressing challenges during their movements across transitions of care since it promoted self-management, independence and medication adherence [58].

Effective information exchange about medication regimens was viewed as an essential requirement by older patients. Older patients felt disappointed if they received inadequate explanation about discharge medications, particularly if their medications were changed [55]. In addition, not knowing the purpose of a medication and not receiving a written guide about discharge medications made patients feel vulnerable and helpless [68]. A survey of 67 older patients revealed they valued receiving instructions and discussing their medications with their doctors; however, only 52% received written information and 46% said no discussion occurred [80]. Similarly, in an interview study conducted with 40 older patients, 29 patients stated health professionals did not talk to them about medication changes before discharge. Similarly, a study involving interviews and observations demonstrated older patients' dissatisfaction with receiving "*tidbits of information*" to "*no information*" or "*leaving without a follow-up plan*" when they were being transferred [57]. Some patients attributed this situation to the busyness of physicians [64] and busyness of health professionals of various disciplines during the patients' discharge period [80].

Patients' demographic characteristics were associated with their communication experiences about their medication regimens [57, 65, 66]. A cross-sectional questionnaire study of hospitalised patients (N=102) showed that compared with younger patients (<65 years old), older patients reported more difficulties in remembering correct medication instructions (78% versus 54.3%, respectively) (P=0.02), which led to the need for different communication strategies with older patients before discharge [65]. An interview study and a controlled trial reported the effects of language barriers on patients' medication experiences [61, 67]. Patients from non-English speaking backgrounds expressed more difficulties in taking new medications after being discharged. Some patients were confused by brand names. Similarly, older patients who

had language barriers reported poorer communication in comparison with English-speaking patients [61]. Along with language problems, some patients said they needed opportunities to ask questions of health professionals to clarify concerns caused by hearing loss or slurring of speech [80].

Theme 4. Communication strategies to enable older patients' medication knowledge

Thirteen studies addressed the theme of communication strategies to enable older patients' medication knowledge [53, 54, 56, 60, 63, 67, 71, 72, 74, 76, 80, 82, 85]. There were three subthemes for this theme: individualised discharge summaries, pharmacists' interventions and improvements in older patients' medication knowledge through medication education.

Individualised discharge summaries involved medication instructions in simple language and clear information about follow-up care for older patients. Older patients emphasised the need to be given medication instructions written in plain language [63, 71]. They believed having clearly written plain language discharge summaries enabled better management of their condition [63]. They also valued information from the ward pharmacist about the purpose and the nature of their discharge medication [53]. Patients stated that they valued clarification and information from PCPs about their discharge summaries and appreciated having their questions answered [53]. In one discharge planning intervention, older patients were given written discharge instructions including medication information with larger-than-normal font type and using simple language. Information was presented with straightforward explanations about how, when and why to take medications along with contact information of hospital health professionals in the event that patients had additional inquiries after discharge. Implementation of the intervention contributed to the reduction of older patients' readmission rates (14% in the intervention group vs 22% in the control group, OR=0.55, 95%, CI=0.32–0.94) and improved quality of transition from hospital to home, with a higher proportion of patients feeling better as a result of hospitalisation and a greater number of patients having successful transitions to home [71].

Pharmacist interventions improved outcomes for older patients. Older patients believed that recommendations made by pharmacists on admission and at discharge were useful in decreasing unintended medication discrepancies caused by improper dosages or omissions of medications, and also reduced inappropriate prescriptions [54]. In an interview study, older patients identified useful strategies for improving outcomes, which included providing verbal and written information for medications, liaising with the community pharmacists for dose administration aids, and checking understanding about brand and generic name differences [67].

Additionally, older patients from non-English speaking backgrounds suggested that community pharmacists who spoke their language were helpful in enabling them to better manage their medications. In an intervention study, an Integrated Medicine Management Service program was introduced as a solution to reduce medication-related readmissions through direct patient consultations, and follow-up discussions with patients' community pharmacists and PCPs [56].

Medication education by health professionals was related to improvements in older patients' medication knowledge. Older patients valued medication education from both community and hospital pharmacists and their PCPs, particularly education about dose administration aids, discharge medication regimens and unwanted side effects. Patients with diabetes highlighted the importance of education and recommendations from their PCPs about how to monitor and interpret blood glucose levels after discharge [53]. A prospective cohort study showed that 98% of older patients were satisfied with a pharmacist-led program, which was associated with a significant reduction in inappropriate medication use and medication-related problems via medication reviews, reconciliation and counselling on admission and discharge [54]. An educational program consisting of hospital and primary care providers' collaboration with older patients with heart failure was effective in reducing deaths, hospital readmission rates and length of hospital stay. This program focused on physicians providing follow up telephone calls with patients about their medication regiment and home visits. [72]. After implementation of a nursing-initiated medication education program for older patients aimed at improving medication knowledge prior to discharge, 78% of patients felt satisfied with the program as it helped them to recall medication details such as names, dosages or times of administration [76].

Table 3 Thematic Map for Included Studies

Study (first author/ Year/Country)	Medication discrepancies are linked to communication			Enabling self-care through older patient engagement		Older patients' experiences with health professionals about their medication regimen			Strategies in communicating about medications with older patients		
	Communication between hospitals and the community	Tailored communi-cation	Accuracy of medication documentation	Patient self-management of medications	Decision-making involvement with older patients	Satisfaction with medication related services	Information exchange about medications	Effects of patient demographic characteristics	Individualised discharge summaries	Pharmacists' interventions	Medication education
Allen et al., 2018, Australia				*	*	*	*		*		*
Arora et al. (2010), United States	*			*	*						
Bagge et al. (2014), New Zealand			*		*		*				
Bayliss, et al. (2016), USA		*	*			*					
Cochrane et al. (1992), UK	*						*				*
Coleman et al. (2004), USA				*	*		*				*
Dedhia et al., (2009), USA	*								*		
Enguidanos et al., (2005), USA			*				*				
Flacker et al. (2007), USA				*			*				
German et al. (1982), USA		*					*				*
Hvidt et al. (2014), Denmark								*			
Jeffs et al. (2017), Canada					*		*	*			
Lindquist et al. (2014), USA							*	*			
López et al. (2006), Italy						*				*	*
McAiney et al. (2017), Canada				*		*					
Mesteig et al. (2010), Norway	*						*				

Rustad et al. (2016), Sweden				*	*		*				
Shen et al. (2006), Australia						*					*
Spinewine et al (2007), Belgium							*			*	*
Wong et al. (2016), Canada	*	*	*						*		
O'Kula et al. (2016), USA								*			
Leduc et al. (1998), Canada	*					*					
Clare et al. (1998), Australia		*				*	*				
Rich et al. (1996), USA											*
Burns et al. (1992), Scotland	*									*	*
Barnett et al. (2017), UK	*						*			*	*
Blennerhassett et al. (2011), Australia	*			*			*				*
Eyler et al. (2016), USA						*				*	
Chiu et al. (2018), Hong Kong						*	*			*	*
Sexton et al. (1999), UK	*		*				*				
Knight et al. (2011), UK	*		*	*	*	*	*				
Gadbois et al. (2018), USA	*		*				*				
Sindaco et al. (2007), Italy											*

4. Discussion

The review provides a comprehensive examination of the perspectives of older patients in relation to communication about medications across transitions of care. Communication breakdowns were associated with medication discrepancies, specifically at the time of older patients' hospital discharge to the community. Older patients were frustrated with the lack of appropriate communication about their medications, especially when their medications were changed, or new medications were prescribed. There were differences between older patients' expectations of how medication communication should occur and what they experienced when they moved between different care settings. Older patients expected to receive information about changed medications before discharge and anticipated comprehensive communication between their PCPs and hospital providers, this did not always occur. For older patients, communication strategies that contributed to enhanced medication management comprised receiving written information about medications and medication education before discharge.

Older patients thought effective communication should occur between health professionals situated in hospitals and those in community settings, however these expectations were often not met. Similarly, older patients expected their PCPs to be well informed about their updated medications, and they also expected them to communicate regularly with their medical specialists; this communication did not always occur [88].

Different insights into decision-making roles played by patients were identified. Some older patients were actively engaged in communicating with hospital staff about how to use post-discharge medications, while others experienced difficulties in asking questions. There were missed opportunities for health care providers in involving older patients in medication decision making [50]. The systematic review identified there were missed opportunities where health professionals could impact on improving communication about medications with older patients across transitions of care. There were opportunities for nurses or pharmacists to explain to older patients how medication changes were likely to affect therapeutic and unwanted effects. However, these interactions were rarely observed to occur [50]. Pharmacy staff tended to want to communicate with older patients on the day of admission when they were likely to be experiencing confusion, tiredness or affected by their state of illness. Alternatively, trying to communicate at discharge was also likely cause issues when patients were wanting to go home. There were missed opportunities for pharmacists to communicate *during* the patients' stay[57]. There were also missed opportunities with doctors who made decisions about discharge

medications without listening to patients' accounts of their symptoms or family members' concerns. Missed opportunities were also sometimes patient-related where patients thought that they should have asked physicians more questions but they did not know what to ask[53]. Lack of patient interest in being involved in the decision-making process could also be related to their experiences with paternalism in the health care system [89]. A paternalistic environment may result in health professionals not listening to older patients, health professionals not giving patients an opportunity to ask questions, and a failure to acknowledge variations in patients' health literacy, which affects their ability to comprehend medication information.

Older patients found particular communication strategies effective to support medication use across transitions of care. These strategies included receipt of written guides about discharge medications, plain language medication lists and clear explanations about medication changes. Explicit information justifying medication modifications to primary care providers has been found useful in simplifying complex medication regimens [90]. Interventions that involved patient-centred consultations, medication reconciliation on admission and discharge, post-discharge referrals to the community pharmacist or primary care for medication review or post-discharge phone follow-up have been shown to be effective strategies for reducing medication-related readmissions in older people [56]. Investigators of two intervention studies claimed that they implemented patient-centered interventions. However, there was insufficient clarification about how patients were involved in consultations or whether or not patients were at the center of the decision-making process[56, 78]. Only one intervention study used a pharmacist-led motivational interviewing method as an example of patient-centred approach. This study emphasised that patient-centeredness can be achieved through counselling patients to explore their understanding of prescribed medications, their motivations and confidence to complete the medications as well as their perceived barriers to medication adherence[60]. The term of patient-centeredness is becoming extensively used, but inadequately understood in the context of care transition of older patients. Patient-centeredness was sometimes conceived as sharing all decisions and information with patients. However, it sould involves encouraging patients to have opportunities to express their views and preferences about medication decisions [91].

It is of value to relate the findings of this systematic review to theoretical insights of medication management relating to transitions of care. The Partnership Model advocates the need for continuous and accurate transfer of medication information across settings and between different episodes of care, in preventing medication errors [92]. The Medication Communication Model suggests that the actual words used by health professionals such as

459 "we" rather than just "I" and "you" can facilitate inclusive and open communication, which
460 provides the patient with opportunities to express concerns and needs about their medications
461 [93]. Therefore, partnerships amongst patients and health professionals can be maintained by
462 open communication where all knowledge about medications are shared between individuals.
463 It may help to facilitate patient-centered, shared decision making, which in turn improves
464 medication safety in practice[92, 94]. None of the papers used a conceptual framework to provide
465 theoretical underpinnings regarding the phenomenon of interest [95]. The use of conceptual
466 frameworks can help to ensure interventions contain particular components that then contribute
467 implementation of successful interventions in relation to medication communication. For
468 example, the use of the Shared Decision-making Model can help to elucidate understandings
469 about interactions between pharmacists, physicians or nurses and patients and the ways in
470 which decisions are made[94]. Models can also be used to consider situational factors such as
471 time constraints and environmental issues in the decision-making process[94]. For instance, the
472 Shared Decision Making Model (SDM)[96] provides practical tools by recognizing the time that
473 patients might need to study the new information about different options of medications and
474 treatments. It also provides patient with interactive and patient-specific decision aids so that
475 they can discuss their preferences with other people, including family members and friends at
476 different times and different places, before arriving at final decisions with health care
477 providers[96].

478 *4.1. Methodological Limitations of Included Studies*
479
480 Few qualitative papers comprehensively examined the patients' medication
481 communication experiences with all health professional disciplines, but most focused on a
482 single group, such as pharmacists or nurses, or they were conducted at single
483 sites. Some interventions involved older patients with specific health conditions, such as heart
484 failure or pneumonia. There was insufficient use of qualitative observational designs, which
485 provides insight into what happens in actual settings. Of 12 qualitative studies, only one
486 included patients from non-English speaking backgrounds. Intervention studies tended to focus
487 on the discharge or post-discharge period, whereas only one study involved a multidisciplinary
488 intervention comprising a patient-centred medication reconciliation program on admission and
489 at discharge. Most studies examining communication across transitions of care were conducted
490 in acute hospital settings, and rarely considered aged care facilities or used observational
491 designs. According to MMAT results, the qualitative papers lacked information about the
492 researchers' reflexivity in relation to the research process. For RCTs, the lack of clear

493 description of randomisation or blinding was the underlying reason for lower scores, whereas
494 for other quantitative studies, low scores were associated with insufficient explanations about
495 the sampling strategy.

496 *4.2. Limitations of the Systematic Review*
497
498 There are some limitations associated with the systematic review. Studies that were not
499 in the English language were excluded. It was sometimes difficult to extract specific
500 information about older patients' perspectives on medication-related communication across
501 transitions of care from studies that investigated a range of issues about transitions of care.
502 Retrieved quantitative studies were very heterogenous in terms of aims, methodologies and
503 outcome variables. It was therefore impossible to consider data pooling using meta-analysis.

504 *4.3. Implication for Practice and Future Research*
505
506 During management of medications, pharmacists and other health professionals need to
507 use this activity as an opportunity to inform older patients about pending and existing changes
508 to their medications. At key communication processes, such as ward rounds, bedside handovers
509 and informal discussions with older patients, health professionals need to act as their advocates,
510 asking them if they have any concerns about changes made to their medications, planning for
511 transfers to other clinical settings and organising medication plans of care for discharge home.
512 In health professionals acting as patients' advocates, there will be greater likelihood that
513 patients will be able to be actively involved in making decisions about their medications and
514 in speaking up if they have concerns. Pharmacists can also play a greater role in educating
515 older patients about medications through repetition of straightforward instructions at each
516 bedside visit, which contributes to patients' recall of fundamental medication knowledge.
517 Older patients are more likely to be receptive to developing a more comprehensive
518 understanding about their medications, which may encourage them to be more independent
519 after discharge.
520 Taking into account older patients' views is a helpful way of addressing their concerns
521 and promoting patient-centred care. This systematic review demonstrated that successful
522 implementation of effective, tailored communication about medications requires a
523 multidisciplinary approach with medical, pharmacist and nursing involvement, which leads to
524 improved patient satisfaction and reduced hospital readmission after discharge.
525 Multidisciplinary patient-centred medication education should be offered to older patients
526 across each care transition point, from admission to discharge in order to encourage older

patients' involvement. Health professionals should be aware that older patients' involvement in medication communication can be influenced by multiple factors during communication encounters. These factors include patients' health beliefs, health literacy, values, and perceptions of their own medical conditions, spatial factors of the care environment and providers' own attitudes towards older patients. In taking these factors into consideration, dedicated attention is needed in listening to older patients' concerns, asking questions to ensure their understanding of medications, and most importantly, adopting caring attitudes in establishing two-way communication.

Future studies could focus on examining the experiences of older patients who have language barriers and cognitive impairment. The conduct of observational studies should be considered to examine how environmental and sociocultural characteristics influence older patients' experiences of communication about medications across transitions of care [93]. Factors such as source of distractions, layouts of care settings and their impacts on the interactions between patient and health professionals can be better explored through observations. Environmental characteristics such as time of day, availability of health professionals in clinical settings would also be considered. Sociocultural characteristics could comprise older patients' beliefs and values about their relationships with health professionals, language spoken at home, coexisting health issues, their health literacy and knowledge about their medications, and ability to understand health professionals [93, 97]. Individual factors including moods, attitudes and manners during the communication events, workload and time management skills of health professionals can help to identify enriching information about how older patients' experiences can be facilitated and optimized.

5. Conclusions

Communication about managing medication across transitions of care can be challenging and sometimes overlooked, when older patients are treated for multiple health conditions by diverse health professionals across settings. The systematic review identified communication breakdowns between hospital and community settings led not only to medication discrepancies, they also hindered older patients' self-medication management after discharge. Older patients valued timely and tailored verbal and written communication and receiving education from diverse health professionals when they moved between settings. Transitions of care do not comprise linear trajectories of patients' movements, with a starting and finishing point. Instead, they are endless loops of movements, where older patients can backtrack and move forward in

different ways. Health professionals need to regularly consider older patients' views across transition of care, where often rapid and critical decisions are made about medications.

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Conflicts of interest

The authors have no conflict of interest to declare.

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