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MEDICATION-RELATED PROBLEMS EXPERIENCED BY PATIENTS DURING TRANSITIONS TO ASSISTED LIVING

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science at Virginia Commonwealth University.

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List of Abbreviations

ADLs   activities of daily living

ALF   assisted living facility

ADE   adverse drug event or drug allergy

CTM   Care Transition Measure

DDI   drug interaction

ED   emergency department

IADLs   instrumental activities of daily living

LTC   long-term care

MAR   medication administration record

MISC   miscellaneous

MRP   medication-related problem

NA   non-adherence

NI   no indication recorded

OU   overuse

PIM   potentially inappropriate medication

PRN   as needed

STOPP   screening tool of older persons' potentially inappropriate prescriptions

TCC   Transitional Care Center

TCM   Transitional Care Model

UU   underuse

VA   Department of Veterans' Affairs

Abstract

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Medication reconciliation is a systematic and comprehensive review of

medication regimens during care transitions aiming to prevent adverse drug events.

Poorly executed transitions negatively impact patient welfare and cause financial

burden. Medication-related problems (MRPs) experienced during transitions to an

assisted living facility (ALF) were evaluated.

Data was collected from pharmacy records for transitions to an ALF over three

months, including demographics, medications, potentially inappropriate medications,

and MRPs. MRPs were categorized and summarized using descriptive statistics.

Forty-five patients (71% female) experienced 59 transitions. Average age was 85.6 years. Median length of stay away from the ALF was three days. There were averages of 18.3 pre-transition medications, 12.5 medications in the discharge orders and/or upon ALF admission, and 15.9 final medications. 979 MRPs were identified, mostly no indication documented, followed by underuse, overuse, and non-adherence.

Many of the identified MRPs are potentially preventable. Interventions are needed to reduce MRPs during ALF transitions.

CHAPTER 1

Background

Older adults commonly experience transitions in care within health care settings and between health care settings. The types of care transitions, barriers to effective transitions, assessments of transitions, and recommendations for improving transitions are discussed. The assisted living setting is one setting involved in care transitions of older adults. Less focus has been placed on studying this setting, most likely due to the variations in regulations between states and difficulty in obtaining data for research in this setting. Assisted living facilities are defined and the Virginia regulations are discussed, along with demographic information. Patients are prone to medication-related problems during care transitions; therefore, the classification and effect of medication-related problems are reviewed. Pharmaceutical care and medication reconciliation are discussed as ways to address medication-related problems. Studies from the literature are reviewed as well as the gaps in the literature regarding medication-related problems during transitions involving the assisted living setting.

I. Transitions

a. Types

Transitional care has been defined as a set of actions with the purpose of ensuring the coordination and continuity of care as patients experience transitions.[1] Care transitions may occur within a health care setting or between different health care settings. For example, patients may transition between units in the hospital as their condition changes. Additionally, transitions in care may include admission or discharge from a hospital and transfers to long-term care (LTC) or home care. Care transitions are common occurrences in the lives of older adults with both acute and chronic conditions, and involve the patients, caregivers, physicians, nurses, pharmacists, social workers, and other health care professionals.[2]

Transitions in care are very common in LTC settings, which include assisted living facilities, nursing homes, skilled nursing facilities, and hospice care. LTC settings provide comprehensive, longitudinal, patient-centered services, including formal and informal health and support services.[1] Within the LTC environment, transitions include transfers from home, emergency departments, and hospital settings.

The importance of care transitions are illustrated by the fact that more than 25% of nursing home residents receive care from an emergency department each year.[1] Patients are often admitted to the hospital for acute care and/or LTC settings for post-acute care. It has been noted that almost 5 million patients over 65 years of age experienced more than 15 million transitions during a two year period.[1] After discharge to the community, over 1.1 million of these patients experienced subsequent health care

use in hospital, emergency department, and institutional settings.[1] Prevalent issues with transitional care are suggested by the frequent subsequent use of health care in the older adult population, some of which is potentially preventable.

Ideally, transitions should involve a comprehensive care plan involving health care professionals who are available, experienced, and have access to relevant medical information.[1] A person-centered approach should be employed that takes into account the patient's goals, preferences, and clinical status.[1]

b. Barriers

The literature regarding care transitions for older adults primarily focuses on barrier identification or problems leading to patient risk and lack of safety.[3] However, there are many challenges to improving the quality of transitional care. Barriers to effective care transitions occur at three levels: the delivery system, the clinician, and the patient.[4] Institutions often function in isolation despite the fact that collaboration across health care institutions is central to effective care transitions.[5] Additionally, access to an electronic health information system is not available in all health delivery systems and available systems do not communicate with each other.[5]

Barriers for interprofessional teams involve communication gaps and lack of timely information.[3] Even when collaboration occurs, inaccurate or incomplete communication can result in medication discrepancies. These discrepancies include discontinuation of use; dose changes in existing medications caused by adverse drug events; drug omission; incorrect drug; prescribing errors; dispensing errors; unintentional non-adherence; incomplete, inaccurate, or illegible discharge instructions;

and duplicate therapy.[6] Underuse, misuse, and overuse of medications are problems that need to be addressed.

Medication errors, noncompliance issues, nursing home placement, increased caregiver burden, and increased health care costs have been identified as markers of poor transitions.[7] Poorly executed transitions in care may result in fragmentation of care, poor clinical outcomes, inappropriate use of emergency department services, and hospital readmission.[8] Improper transitions in care can lead to adverse events for patients.[9] Transitions at shift changes may cause a perpetuation of issues such as a failure to accurately diagnose an underlying medical illness as is illustrated in a case scenario by Beach et al.[10] Discontinuity of care may threaten the patient's safety and quality of patient care.[10]

c. Assessments

Assessment tools are instrumental in measuring the quality of transitional care. Coleman et al. designed and tested the Care Transition Measure (CTM) as a patient-centered measure of the quality of care delivered to older adults receiving care across multiple settings.[11] Participants included older adults recently discharged from the hospital that received subsequent care at a skilled nursing facility or home setting.[11] Coleman et al. identified four domains from focus group data including information transfer; patient and caregiver preparation; support for self-management; and empowerment to assert preferences.[11] The full 15-item CTM contains three items that focus on medications, specifically on understanding the purpose for taking each medication, how to take each medication (including how much to take and when), and

the possible side effects of each medication.[12] The CTM was found to be highly

relevant and comprehensive and may be a useful health system performance

evaluation tool.[11] The CTM has also been shown to perform in a more diverse

population of a national sample of African American, Hispanic American, and rural-

dwelling individuals aged 18 to 90 years.[12] Parry et al. found that the 3-item CTM

accurately predicts the score on the full 15-item CTM, which may lead to lower cost and

response burden.[12] Additionally, Shadmi et al. assessed the validity and reliability of the

Hebrew and Arabic translations of the CTM.[13] The Hebrew and Arabic translations of

the questionnaire were found to be reliable and valid for the assessment of patients'

transitions between hospital and community care.[13] The CTM is also a valid and

reliable measure for evaluating care transition quality in Singapore.[14]

Hallmarks of successful care interventions have been identified by Sims-Gould et

al. based on semi-structured interviews.[3] These hallmarks include a focus on

information gathering and communication in addition to patient autonomy and care

pathways (physical and medical benchmarks).[3] Future attempts to improve transitions

in care should focus on these hallmarks. Formal feedback loops for sharing information

and letting go of rigid care pathways may be two approaches for breaking barriers.[3]

d. Recommendations

Recommendations have emerged from studies focusing on approaches to

improving transitions in care. The Transitional Care Model (TCM), a team-based care

delivery system led by a nurse, was developed to improve care transitions.[15] The aim of

the TCM is to align the care system with the needs, preferences, and values of the

patient and caregiver in order to obtain improved outcomes and lower costs.[15] The

TCM includes comprehensive discharge planning and follow-up care at home for

chronically ill, high-risk, older adults.[15] It focuses on the patient and caregiver in terms

of managing symptoms, educating and promoting self-management, collaborating,

assuring continuity, coordinating care, maintaining relationships, screening, and

engaging elder and caregiver.[15] The TCM targets older adults with two or more risk

factors, such as a history of recent hospitalizations, multiple chronic conditions or

medications, and poor self-health ratings.[15] Key components of the TCM are the

transitional care nurse; an evidence-based plan of care; home visits; continuity of care

between physicians and follow-up visits from both the transitional care nurse and

physician; focus on each patient's needs; active engagement; early identification and

response to risks; multidisciplinary approach; physician-nurse collaboration; and

communication between the patient, caregivers, and health care providers.[15,16] The

TCM has resulted in a reduction in preventable hospitalizations, improved health

outcomes, enhanced patient satisfaction, and a decrease in total health care costs.[15]

It is also important to recognize barriers and facilitators impacting the TCM.

Naylor lists several barriers to implementation of the TCM including legal, regulatory,

and administrative; organizational culture and standard operating procedures;

enrollment and marketing of innovation; patient and provider needs and expectations;

defining roles of staff; and information technology needs.[15] Facilitators of the TCM

include strong champions; good fit for the organization; all involved and fully engaged

from start to finish; flexibility; awareness of external climate; marketing plan; and

milestones and success measures.[15]

A large health plan integrated the TCM and found health status and quality of life improvements; specifically, there was a decrease in re-hospitalizations and total hospital days.[16] Also of note is a cost savings was found with the implementation of the TCM.[16]

Hospital readmissions have also been successfully reduced with a Transitions of Care Program that was implemented based on the Transitional Care Model.[17] The Transitions of Care Program utilized home care nurses educated in transitional care that provided intensive education and follow-up for Medicare patients with chronic diseases and a high risk of readmission.[17]

A checklist was developed of processes and elements required for optimal discharge, which was completed by researchers, process improvement experts, and hospitalists and endorsed by the Society of Hospital Medicine.[9] Medication safety, patient education, and follow-up plans are the focus of the checklist.[9] The final list contains the following data elements: the presenting problem that precipitated hospitalization; key findings and test results; final primary and secondary diagnoses; brief hospital course; condition at discharge; discharge destination; discharge medications with a written schedule, purpose, cautions, and comparison with preadmission medications; follow-up appointments with provider's name, date, address, phone number, purpose, and suggested management plan; all pending labs or tests and to whom results should be sent; recommendations from sub-specialty consultants; documentation of patient education and understanding; any anticipated problems and suggested interventions; 24/7 call-back number; identify referring and receiving providers; and resuscitation status and other end-of-life issues.[9]

The pharmacist's role was studied utilizing an intervention that involved pharmacists, in collaboration with other health care providers, reconciling and optimizing medications from multiple settings of care.[18] The pharmacist also provided care management and ongoing support for 30 days after discharge.[18] The intervention led to a 30% reduction in readmission rates.[18] Novak et al. concluded that pharmacists managing care transitions between sites reduces unnecessary health care utilization and cost, as well as provides benefits to the patient allowing the patient to remain healthy at home after hospitalization.[18]

A study of Department of Veterans' Affairs (VA) patients in acute care with sub-acute needs found that there were 34% of admissions to acute care when a different level of care would be appropriate.[19] Costs can be reduced by identifying patients with sub-acute needs and admitting or transferring these patients to a more appropriate and lower cost setting; therefore, the VA should consider developing strategies to identify patients with sub-acute needs.[19]

The Transitional Care Center (TCC) is a partnership between a large managed care organization and five nursing homes and is a sub-acute program with the purpose of promoting continuity of care for frail older adults.[20] Rehabilitation and geriatric evaluation are provided through the TCC partnership.[20] A retrospective study found the TCC resulted in a lower post-acute length of stay and high patient and physician satisfaction.[20] An economic benefit and improvements in care and utilization outcomes were also associated with the TCC partnership.[20]

Not all studies have shown a decrease in hospitalization and costs. An analysis was conducted summarizing the results of 15 randomized controlled trials of care

coordination programs, which involved nurse-provided patient education and monitoring (mostly via telephone).[21] The results indicated an inability to show a significant difference compared to usual care with regards to hospitalizations.[21] Peikes et al. also concluded that care coordination programs are unlikely to yield a decrease in Medicare expenditures, particularly without a strong transitional care component.[21] It is suspected that the best approach would be to combine an ongoing model with proven transitional care models to reduce hospital readmissions.[21]

Regarding emergency care transitions, Beach et al. recommend improving team situational awareness and communication; creating a culture that encourages joint accountability; exploring information technology to facilitate effective transfer of relevant information; and increasing awareness of hazards of transitions and techniques for successful knowledge transfer.[10]

Parsons et al. studied emergent care transport patterns in the residential setting and found significant differences between independent senior apartments, licensed residential care, and nursing homes, as well as between facilities within these categories.[22] The results indicated that standardization of transfer processes from one setting to the next are advisable.[22] In addition, home health services and other outpatient services may be necessary.[22]

Care transitions have also been studied in the field of gerontological social work. An intervention was studied in which social workers contacted patients transitioning from an acute care setting to home who were identified based on risk factors.[7] A psychosocial assessment was conducted and a plan of care was developed over the phone.[7] Through interviews with the social workers, themes of surprises after discharge

were identified as common, many of which cannot be anticipated or addressed ahead of time.[7] Short hospital stays, compressed time frames, and difficulty anticipating circumstances after discharge make it difficult to prepare and educate patients and caregivers prior to the transition.[7] Social workers also commented on their focus on incorporating the target client system (patient and caregiver) and action system (resources to help accomplish goals).[7] The theme of relationship building also emerged. Patients benefited most from participation in the helping relationship with the social worker.[7] These themes highlight the importance of the role of surprises after discharge, expansion of the view of the client system, and development of a helping relationship for the success of interventions.[7]

Encouraging patients and caregivers to actively engage in the patient's care is important. Coleman et al. found that encouraging community-dwelling adults admitted to the hospital and their caregivers to take an active role during care transitions may reduce rates of subsequent hospitalization.[23] The patients and caregivers were provided tools to promote cross-site communication, encouraged to be active in their care and assert their preferences, and received help from a transition coach.[23]

The Canadian Health Services Research Foundation published an article on connected care, which discussed building successful, patient-centered pathways.[24] Important elements of building successful pathways outlined in this article can be applied to many types of transitions. Recommendations include seeking input on a new process from all stakeholders; ensuring the process has advantages for all stakeholders and they are aware of the advantages; and asking for stakeholder feedback on

improvements and visibly incorporate improvements into the process.[24] The result was improved satisfaction for patients and caregivers.[24]

Recommendations for improving transitions in care focus on communication between health care professionals as well as between the patient and the health care provider.[25] Five recommendations were mentioned by Coleman and Williams regarding executing high-quality care transitions.[25] These recommendations include greater recognition for the role of caregivers; define an appropriate follow-up interval; define physician accountability for patients who are referred to home health; delineate the role of the hospitalist in the advanced medical home; and develop the ability to examine episodes of care.[25]

Given the growing older adult population, health care professionals need to have the education and training to meet the needs of this population. There has been a lack of formal education regarding improving patient care transitions. Tanner et al. identified one example of a lack in necessary knowledge. Through focus groups and interviews, deficits in medical knowledge and skills to care for older adults were identified in academic general internists, which also leads to internists' frustration with the process of delivering care to this population.[26] Additionally, gaps in knowledge of guiding care transitions for patients and using multidisciplinary teams effectively were acknowledged; this also impacts effectively teaching the proper care of older adults.[26] These deficits should be addressed through education and training in order to improve geriatric care. An online survey indicated that 63% of neurosurgical residents had not received formal instruction regarding effective handoffs (verbal and written communication during care

transitions).[27] Education regarding effective patient care handoffs should be increased in training programs.[27]

Several studies have focused on meeting this need for education through clerkships, faculty development workshops, web-based modules, and virtual classrooms. To address this gap, Bray-Hall et al. developed a feasible and effective program to teach evidence-based transitional care.[28] The program, Transition in Care Curriculum, consisted of interactive sessions and self-directed learning exercises and was found to improve medical students' overall combined confidence in transitional care skills.[28] The program also enabled students to identify medication discrepancies during 43% of post-discharge visits and the most common reasons for discrepancies were found to be patient lack of understanding of instructions and intentional non-adherence to the medication plan.[28]

Another attempt to close the education gap involved a mandatory geriatrics clerkship for third-year medical students focusing on clinical experiences in outpatient clinics, transitional care units, nursing homes, and hospice programs, in addition to core didactic sessions.[29] This clerkship provided students with sufficient knowledge to complete the requirements satisfactorily, but results indicated that the students did not highly value the experience and only a few students were inspired to pursue a career in geriatrics.[29] Powers et al. also mentioned the importance of strong leadership and administration's support for the success of the program.[29]

Another clerkship was implemented for pharmacy students and focused on transitional care.[30] Pharmacy students were involved in transitional care planning for patients discharged from general medicine services, which included interviewing

patients; assessing discharge medications; reconciling medications at admission and discharge; providing medication counseling; and conducting follow-up via phone post-discharge to help with MRPs and other patient concerns.[30] The clerkship had an impact on the number of assessments and interviews of patients, as well as students' provider-patient and provider-provider communication skills.[30] Medication adherence barriers were also identified and resolved as a result of the students.[30] The impact of the clerkship was not only positive for the students, but also for the hospital and the patient care services provided.

A faculty development workshop was developed to improve general internists' knowledge and self-perceived competence in their care of geriatric patients and to increase their teaching of this population for students.[31] Content discussions and small group role plays were developed focusing on assessment of cognition, function, and decisional capacity; managing care transitions; and treatment of behavioral symptoms.[31] Eckstrom et al. found that the workshop improved knowledge scores and self-perceived competence.[31]

A 30-minute, online, case-based module was developed for medical trainees and students with the intent of increasing their understanding of transitional care.[32] Specifically, learners were educated on the importance of effective communication during the discharge process; the sources of payment for older adults in the health care system; and the various discharge site options.[32] For fourth-year medical students, a virtual classroom was used to educate on care transitions and how to develop and implement a safe discharge plan.[33] Eskildsen et al. determined that the virtual

classroom improved students' confidence and knowledge regarding performing

discharge tasks.[33]

Care transitions have been researched from a number of angles. Studies

regarding transitions in care focus on different settings of care, barriers to effective

transitions, methods of assessing the quality of transitions, and recommendations for

improvement. Barriers and recommendations may or may not apply to different health

care settings. It is important to understand each setting and setting-specific challenges

in order to develop an approach to improving care transitions.

II. Assisted Living

As previously noted, there are studies in the literature that have focused on

barriers to effective care transitions and recommendations for improving transitions.

Many of these studies have not focused on the assisted living setting. In order to

improve care transitions involving assisted living, an understanding of this unique

setting is needed, including knowledge of the characteristics and regulations.

a. What are Assisted Living Facilities?

Assisted living facilities (ALFs) are congregate "residential settings that provide

or coordinate personal and health care services, 24-hour supervision, and assistance

for the care of four or more adults who are aged, infirm, or disabled," according to the

Virginia Department of Social Services.[34,35] ALFs are not nursing homes and they are a

non-medical setting.[34] ALFs are also not the same as independent living. The goal of ALFs is to help older adults maintain independence as long as possible. ALFs may range in size from large houses to apartment buildings.

The differences between ALFs and nursing facilities involve activities of daily living (ADLs) and instrumental activities of daily living (IADLs). ADLs are basic tasks of everyday life and include eating, bathing, dressing, toileting, and transferring.[36] IADLs are more complex activities including handling personal finances, cooking, shopping, traveling, doing housework, using the telephone, and taking medications.[36]

The Virginia Department of Medical Assistance Services specifies differences between assisted living and nursing facilities. Two levels of care in ALFs are indicated as residential living level of care in an ALF and regular assisted living level of care in an ALF.[37] Residential living is the basic level of care and to qualify, individuals must be rated dependent in only one of seven ADLs; or rated dependent in one or more of four selected IADLs; or rated dependent in medication administration.[37] To qualify for regular assisted living level of care, an individual must be rated dependent in two or more of seven ADLs; or rated dependent in behavior pattern.[37] Medicaid only pays for regular assisted living, not residential living level of care in an ALF.[37]

In contrast, to qualify for a nursing facility, an individual must meet at least one of the following three categories (meeting all elements within the category) and must have medical nursing needs.[37] An individual has medical nursing needs if the individual's medical condition requires observation and assessment to assure evaluation of needs due to an inability for self-observation or evaluation; or the individual has complex medical conditions that may be unstable or have the potential for instability; or the

individual requires at least one ongoing medical or nursing service.[37] The three

categories are: Category 1 – rated dependent in two to four ADLs; and rated semi-

dependent or dependent in behavior pattern and orientation; and rated semi-dependent

in joint motion or semi-dependent in medication administration; Category 2 – rated

dependent in five to seven ADLs; and rated dependent in mobility; and Category 3 –

rated semi-dependent in two to seven ADLs; and rated dependent in behavior and

orientation.[37]

b. Regulations

ALFs are regulated by the state in which the facility is located. Direct care staff in

ALFs are certified nurse aides, nursing assistants, geriatric assistants, or home health

aides, or have completed an approved 40-hour direct care staff training.[35] For facilities

licensed for both residential and assisted living care, all direct care staff are required to

have at least 16 hours of training relevant to the population in care annually.[35] The 16

hours of training is in addition to required first aid training, CPR training (if taken), and

for medication aides, continuing education required by the Virginia Board of Nursing.[35]

Individuals cannot live in an ALF if they have certain needs, such as dependent on a

ventilator; require intravenous therapy or injections directly into the vein; have an

airborne infectious disease that requires isolation; take psychotropic medications

without appropriate diagnosis and treatment plans; nasogastric tubes; or require

continuous licensed nursing care.[35]

Personal assistance and care are provided to each resident of an ALF as needed

including activities of daily living; instrumental activities of daily living; ambulation;

hygiene and grooming; and functions or tasks such as shopping, transportation, and correspondence.[35] An individualized service plan is created to maximize the resident's level of functional ability and should be filed in the resident's record and a copy should be accessible at all times to direct care staff. The individualized service plan should be completed within 72 hours of admission for each resident that is not capable of maintaining themselves in an independent living status.[35] Outcomes should be noted on the plan or a separate document as progress is made. The individualized service plan must be reviewed and updated at least once every 12 months and as needed as the resident's condition changes.[35]

Medication management is provided at ALFs. The facility should manage medications for residents appropriately and have a written plan for doing so.[35] The ALF should have a method for verifying medication orders are accurately transcribed on the medication administration record (MAR) and no medication, dietary supplement, diet, medical procedure or treatment can be started, changed, or discontinued without a valid order from a prescriber.[35] Medications include prescription, over-the-counter, and sample medications. It is particularly important to note that "whenever a resident is admitted to a hospital for treatment of any condition, the facility shall obtain new orders for all medications and treatments prior to or at the time of the resident's return to the facility."[35] The ALF also has the responsibility to be sure the primary physician is aware of all medication orders.[35] Additionally, "a licensed health care professional, acting within the scope of the requirements of his profession, shall perform a review every six months of all the medications of the resident."[35] It is important to note that some ALFs have an on-site pharmacy while others do not.

It is important that health care professionals involved in the care of ALF residents are educated on these regulations. A lack of knowledge may lead to health issues for the resident, such as medication-related problems and poor coordination of care at care transitions. Obtaining an understanding of this setting and the residents of assisted living is important in order to provide the best care to the patient during interactions with the health care system and transitions in care.

c. Demographics

The average cost for assisted living in Virginia is $43,650 annually, compared to nursing homes that cost $66,100 annually.[38] Part time care is available at an annual cost of $14,100 for day care providers.[38] There are 994,359 older adults living in Virginia.[38] There are 6,315 professionally managed assisted living communities nationwide with approximately 475,500 apartments.[39] The average resident of an ALF in the United States is an 87 year old female widow requiring help with two or more activities of daily living.[39] Medication management has been identified as the most common reason for an older adult to move into an ALF and it is associated with quality of life and quality of care.[40] Estimates of the number of daily medications taken by ALF residents range from 3.8 to 6.2.[40]

According to Martin, ALFs and nursing facilities are comparable in terms of percentages of residents age 85 and older, Caucasian, and female.[41] There are several differences between these settings. It was reported that 83% of nursing facility residents were impaired in at least one ADL, which compares to 26% of assisted living residents.[41] Moderate-to-severe dementia was reported in 51% of nursing facility

residents and 33% of assisted living residents.[41] Behavior problems were indicated in

30% of nursing facility residents and 42% of assisted living residents.[41] Interestingly,

the medication use in terms of routine medications, antidepressants, antipsychotics, and

anxiolytics were similar in the two settings.[41]

Of Medicare enrollees age 65 and older, 12% had limitations in IADLs only; 18%

had limitations in one to two ADLs; 5% had limitations in three to four ADLs; 3% had

limitations in five to six ADLs; and 4% were in a LTC facility, according to data from

2009.[42] Approximately 3% of Medicare enrollees age 65 and older resided in

community housing with at least one service available and 4% resided in LTC facilities

in 2009.[42] The percentage of people residing in community housing with services and in

LTC facilities increased with age.[42] Among those residing in community housing with

services, 48% reported access to help with medications.[42] A greater number of

functional limitations were noted for residents of LTC facilities than individuals in

community housing with services, which were more than the functional limitations of

traditional community residents.[42] In fact, 51% of individuals in community housing with

services had a limitation in at least one ADL, which compares to 26% of traditional

community residents and 84% of LTC residents.[42]

Impairment and medication management are important issues for LTC residents.

There are specific characteristics of the ALF setting that may complicate transitions and

increase vulnerability of residents. ALFs contain elements of independence similar to

community-dwelling situations, but residents of ALFs are more dependent in IADLs.

ALFs are less regulated and lack the medical support of a nursing facility. The

functional and cognitive status of residents, lack of medically trained staff, increased

opportunity for miscommunication, and regulatory requirements create challenges during care transitions to ALFs. Furthermore, the medical team is not on site and may not function as an interprofessional team.

III. Medication-Related Problems

Provided the vulnerability of assisted living residents, medication-related problems in this setting should be identified and addressed in order to provide proper care to the resident. Consequently, the classification and effects of medication-related problems will be discussed. Pharmaceutical care will also be addressed as it applies to medication-related problems.

a. Classification

The purpose of pharmacotherapy is to treat conditions and improve the well-being of the patient. As stated in the literature, the purpose of administering medications is to achieve cure of a disease, reduce or eliminate symptoms, slow the progression of a disease, and/or prevent a disease.[43,44] However, medications are a double-edge sword, as positive and negative effects can occur. Therefore the risk of diminishing the patient's quality of life is a very real threat. Negative outcomes may result from inappropriate prescribing, inappropriate delivery, inappropriate behavior by the patient (such as noncompliance), patient idiosyncrasies, and/or inappropriate monitoring.[43]

Medication-related problems can compromise the intended benefits of the treatment. Although there are a number of variations of the definition, most include common components. A medication-related problem (MRP) has been defined as "an event or circumstance involving medication therapy that actually or potentially interferes with an optimum outcome for a specific patient."[44,45] In addition, some classification systems include "preventable" in the definition. As van Mil et al. point out, classifying MRPs is important for the development of pharmacy practice as well as research focused on pharmaceutical care.[45]

There have been a number of attempts to create a classification of medication-related problems, but no standard set of categories has been adopted. There are different designations for the categories depending on the classification system and the approach to developing the classification may vary. The cause of the MRP may be separated from the problem; the problem may describe the cause; and some may include a coding system for interventions.[45] Additionally, the focus of the classification system may vary with regards to perspective.

One example is a classification system developed by Strand et al., which involves eight categories including untreated indications, improper drug selection, subtherapeutic dosage, failure to receive drugs, overdosage, adverse drug reactions, drug interactions, and drug use without indication.[43] Untreated indications are defined as medical conditions that require medication, but the patient is not receiving a medication for the indication. Improper drug selection is defined by a patient taking a medication for an indication, but is taking the wrong drug. A medical condition treated with too little of the correct drug describes the subtherapeutic dosage category. If the

patient has a medical condition as a result of not receiving a drug, it is in the failure to

receive drugs category and includes pharmaceutical, psychological, sociological, and

economic reasons for not receiving the medication. Overdosage involves treating

medical problem with too much of the correct drug. Adverse drug reactions include the

patient experiencing a medical problem as a result of an adverse drug reaction or

adverse effect. If the patient is taking a drug for no medically valid indication, it is

included in the drug use without indication category.[43] In this classification system,

problems and causes are not separated, as van Mil et al. point out.[45] This is the list of

categories the American Society of Health-System Pharmacists includes in their

statement on pharmaceutical care in 1993, as well as the list mentioned on the

American Society of Consultant Pharmacists website.[44,46]

Additionally, medication regimens should be screened for appropriateness based

on consideration for individual patient characteristics. Tools have been developed that

can be applied to aid in this screening process. For example, the Beers criteria was

developed by a consensus panel of experts to identify potentially inappropriate

medication use in adults 65 years and older in the United States.[47] A systems-defined

medicine review tool, known as the Screening Tool of Older Persons' potentially

inappropriate Prescriptions (STOPP), was developed by geriatric pharmacotherapy

specialists by a Delphi consensus method.[48] Each of these tools are standard

approaches and well-established criteria for identifying potentially inappropriate

medications (PIMs).

b. Effect

MRPs can lead to a decrease in physical and mental function, and therefore, a decrease in self-care abilities and quality of life.[46] The economic consequences are also concerning. Older adults are more susceptible to MRPs and the degree of severity may also be worse in this population.

Hanlon et al. published a literature review concerning medication-related problems, which provided insight regarding medication use in the older adult population. Approximately 5% of patients had one or more adverse drug events within the previous year and approximately 20% used one or more inappropriate medications, as determined by studies of ambulatory older adults.[49] The most common medication-related problems identified were drug-disease interactions and duration of use.[49] Sixteen percent of older adults in assisted living facilities used one or more inappropriate medications.[49] A prospective case series identified MRPs in home care patients and found 39% of the 380 charts reviewed required pharmacist intervention.[50] Of the 232 MRPs identified, 28% were suboptimal therapy and 24% were the use of unnecessary medications.[50] The majority of recommendations were discontinuing a medication (38.6%) and consulting the prescriber (23.2%).[50]

c. Pharmaceutical Care

According to the American Society of Health-System Pharmacists, it is the pharmacist's mission to provide pharmaceutical care.[44] "Pharmaceutical care is the direct, responsible provision of medication-related care for the purpose of achieving definite outcomes that improve a patient's quality of life."[44] The major functions of

pharmaceutical care involve identification, prevention, and resolution of MRPs.[44,45]

Consequently, pharmacists should take the responsibility of addressing MRPs in order

to provide the best care possible to patients regardless of practice setting. It is

important to note that this does not diminish the responsibility of other health care

professionals; rather a collaborative approach should be utilized and continuity of care

should be maintained. Overall, improvements should be made to avoid MRPs resulting

from low health literacy; lack of education for the patient, caregiver, and provider; and

medication information tracking challenges.[46] One approach to decreasing MRPs is the

process of medication reconciliation.

IV. Medication Reconciliation

Medication reconciliation involves a systematic and comprehensive review of a

patient's medication regimen at transitions in care. The goal of medication

reconciliation is to avoid inconsistencies, adverse effects, and duplicate or unnecessary

medications.[51] The importance of proper medication reconciliation in transitional care is

brought to light when considering medication changes are common during transfers and

are a cause of adverse drug events.[2] Approximately half of adults experience a medical

error after hospital discharge, and 19%-23% experience an adverse event, which is

most commonly related to medications.[52] Medication errors and adverse events caused

by a lack of proper medication reconciliation at transitions in care impact patient welfare

and cause a financial burden.[53] These facts underscore the importance of proper

medication reconciliation in achieving safe care transitions.

V. Gap in Literature

There is a lack of information in the literature regarding transitions in care

involving assisted living. Before an appropriate model can be developed to improve

care transitions involving assisted living, we must first understand the type of problems

related to medication use that occur and the barriers to effective transitions.

CHAPTER 2

Significance and Specific Aims

Multiple chronic conditions impact approximately half of older adults in the United States.[15] Quality of life, functionality, and survival rates decrease as a result of age-related changes coupled with multiple medical conditions and the concurrent use of multiple medications. It has been determined that a positive linear relationship exists between the number of medication-related problems and the number of medications used.[54] An increase in the number of health conditions can lead to usage of an expanded network of providers and can result in a lack of continuity of care.

Hospital readmission within 30 days of discharge has been observed for almost one in five Medicare patients.[18] A study by Coleman et al. aimed to describe patterns of post-hospital care transitions.[55] The Medicare Current Beneficiary Survey was used to identify patients 65 years and older who were discharged from an acute care hospital. Results found that 61.2% of the beneficiaries experienced a single transfer; 17.9% experienced two transfers; 8.5% experienced three transfers; and 4.3% experienced four or more transfers.[55] Coleman et al. indicated 13.4% to 25.0% of the post-hospital care patterns were complicated, meaning one or more transfers from lower- to higher-intensity care environments.[55] This raises concern for patient safety and cost. It is

important to recognize that the potential for errors increases with an increase in care transitions.[55]

It has been noted that almost 67% of adverse events following discharge are medication related, 29% of which are serious or life threatening and may lead to emergency department use and unscheduled hospital admissions.[30] It has been determined that up to 60% of adverse drug events are preventable.[30] The Institute of Medicine has stressed the importance of improving the health of older adults and decreasing costs by referring to it as a national priority.[15]

It is important to recognize that pharmacist-specific interventions can lead to the identification and resolution of medication discrepancies, a decrease in the number of preventable adverse drug events following discharge, and a reduction in the amount of return visits to the emergency department.[30] The cost of care to the health system has been estimated to increase by $3.8 million annually because of preventable adverse drug events that result in hospital readmissions.[30] Medication reconciliation conducted by pharmacy students found that nearly half of patients admitted to an emergency department had at least one medication missing from medication lists recorded at triage.[30]

There is lack of literature specifically focused on ALFs in terms of care transitions and medication-related problems. It has been noted that inappropriate prescribing is common among assisted living residents.[49] Since ALFs are state regulated, it is difficult to generalize results from studies in this setting. Nonetheless, it is important to investigate the state of care transitions and medication-related problems in this setting.

The specific aims of this study are:

1. To summarize demographic information for residents/patients who experienced one or more transitions to a 200-bed assisted living facility located in Virginia from their home, hospital, or a nursing home over a three month period.

2. To describe and classify medication-related problems (MRPs) experienced by patients during transitions to a 200-bed assisted living facility located in Virginia from their home, hospital, or a nursing home over a three month period.

CHAPTER 3

Aims 1 and 2

I. Methods

A retrospective medical and pharmacy record review was conducted to address the aims of this project. Approval for this study was obtained from the Virginia Commonwealth University Institutional Review Board as it qualified for exemption. Data was collected from existing medical and pharmacy records at a long-term care pharmacy in Virginia for patients who transitioned to the approximately 200-bed assisted living facility from home, hospital, or nursing home between January 1, 2011 and March 31, 2011. This includes new admissions to assisted living from any setting or readmissions after hospitalization or nursing home stay. The residents of this assisted living facility are primarily Caucasian and female with an average age of 86 years.

Data was collected from paper documents at the pharmacy including prescriptions, medication lists, and notes from the pharmacist documented at the time of the transition for cases of medication reconciliation problems. Demographic data for each patient and transition were recorded including age, sex, type of institution from which patient transitioned, length of stay at institution, and reason for transition.

Medication regimen information was recorded (drug name, indication, strength, frequency, and directions) prior to the transition, upon admission to the assisted living facility, and a final list after medication reconciliation by the pharmacist. MRPs, who identified the MRPs, and the resolution of the MRP were recorded. The Strand et al. classification was modified for this study, as described in Table 1.[43] MRPs were categorized as: 1) PIM: potentially inappropriate medication utilization for specific patient characteristics based on the Beers[47] and STOPP[48] criteria for medication lists prior to the transition, upon admission to the assisted living facility, and after medication reconciliation by the pharmacist; 2) OU: overuse, including drug dose too high, drug with no medically valid indication, or therapeutic duplication; 3) UU: underuse, including drug dose too low or additional drug therapy needed; 4) DDI: any type of drug interaction detected (not screened); 5) ADE: adverse drug event or drug allergy (detected, not screened); 6) NA: non-adherence to prescribed therapy or drug therapy inaccessible; or 7) NI: no indication recorded (an indication must be documented on the order as required for administration of all prescription and over-the-counter medications and dietary supplements for assisted living residents in Virginia). Any MRPs that could not be easily categorized were labeled as miscellaneous (MISC) and described qualitatively after consulting with the pharmacist for further details.

Table 1. Classification of MRPs and Comparison to Strand et al. Classification

Classification Used	Comparison	Strand et al. Classification[43]
PIM: potentially inappropriate medication utilization for specific patient characteristics based on the Beers[47] and STOPP[48] criteria	PIMs are defined by Beers and STOPP criteria in this study.	**Improper Drug Selection**: patient has a drug indication, but is taking the wrong drug
OU: overuse, including drug dose too high, drug with no medically valid indication, or therapeutic duplication	Drug Use without Indication and Overdosage were both classified as OU.	**Drug Use without Indication**: patient is taking a drug for no medically valid indication **Overdosage**: treating medical problem with too much of the correct drug
UU: underuse, including drug dose too low or additional drug therapy needed	Untreated Indications and Subtherapeutic Dosage were both classified as UU	**Untreated Indications**: medical problem that requires drug therapy, but the patient is not receiving a drug for the indication **Subtherapeutic Dosage**: medical problem treated with too little of the correct drug
DDI: drug interaction		**Drug Interactions**: medical problem as a result of a drug-drug, drug-food, or drug-laboratory interaction
ADE: adverse drug event or drug allergy		**Adverse Drug Reactions**: medical problem as a result of an ADR or adverse effect
NA: non-adherence to prescribed therapy or drug therapy inaccessible		**Failure To Receive Drugs**: medical problem as a result of not receiving a drug (for pharmaceutical, psychological, sociological, and economic reasons)

Classification Used	Comparison	Strand et al. Classification[43]
NI: no indication recorded	Category added due to requirements in Virginia ALFs	
MISC: Any MRPs that could not be easily categorized were labeled as miscellaneous and described qualitatively	This category was added for any MRPs other than the above categories	

The data was entered into Microsoft® Excel spreadsheets from the paper documents by a team of four Doctor of Pharmacy students. Consultation with the on-site pharmacist occurred as needed for clarification and additional information regarding the documents. After collection, the team reviewed the data and classified MRPs together until a consensus was reached. The number of MRPs for each transition was calculated. Patient demographics and MRPs were summarized using descriptive statistics. MRPs classified as miscellaneous were then examined further to provide more detailed categorization using the notes collected in the data collection process.

Data analysis was performed at Virginia Commonwealth University School of Pharmacy. The data was stored using RDataStorage to keep the information secure. Only research personnel had access to the data.

II. Results

A total of 45 patients (71.1% female) experienced a total of 59 transitions. It was found that 26.7% of patients who transitioned during the three month period

experienced more than one transition. The highest number of transitions for a single

patient during this time period was three transitions. At the time of the first transition,

the average age of the patients was 85.6 years (range of 56 to 101 years). The median

length of stay away from the assisted living facility for those transitioning from a facility

was three days (range 1 to 180 days). The length of stay did not include patients

transitioning from home to the assisted living facility. The median length of stay in the

emergency department was one day (range 1 to 7 days) and in the hospital was three

days (range 1 to 15 days), compared to 30 days in the nursing home (range 7 to 180

days). Table 2 presents the study demographics. There was an average of 18.3 pre-

transition medications (range 6 to 29 pre-transition medications), 12.5 medications

(range 0 to 29 medications) in the discharge orders and/or upon admission to the ALF

(post-transition medication list), and 15.9 medications (range 1 to 32 medications)

following reconciliation by the pharmacist (final medication list).

Table 2. Demographics for Patients Transitioning to Assisted Living

Total Number of Patients	45
Number (Percent) of Males	13 (28.9%)
Number (Percent) of Females	32 (71.1%)
Average Age of Patients (at time of first transition)	85.6 years
Age Range	56 to 101 years
Total Number of Transitions	59
Number of Patients with 1 Transition	33
Number of Patients with 2 Transitions	10
Number of Patients with 3 Transitions	2
Average Number of Transitions Per Patient	1.3
Median Length of Stay in Institution	3 days
Length of Stay Range	1 to 180 days
Total Number of Medications in Pre-Transition Medication List	678
Total Number of Medications in Post-Transition Medication List	736
Total Number of Medications in Final Medication List	941

A total of 979 MRPs were identified, not including PIMs. The most common MRP identified was no indication documented on the order, followed by underuse, overuse, and non-adherence (excluding miscellaneous MRPs and PIMs). As previously mentioned, a recorded indication is required on each order for all prescription and over-the-counter medications and dietary supplements for assisted living residents in the Commonwealth of Virginia. Figure 1 shows a graphical representation of the total number of MRPs by type. It was found that there were a total of 478 prescriptions without an indication recorded and a total of 267 cases of underuse identified. A total of 171 PIMs were identified based on the total number of PIMs as defined by at least one of the three criteria (Beers criteria considering diagnoses or conditions, Beers criteria independent of diagnoses or conditions, and STOPP criteria) in the final medication list after medication reconciliation by the pharmacist.
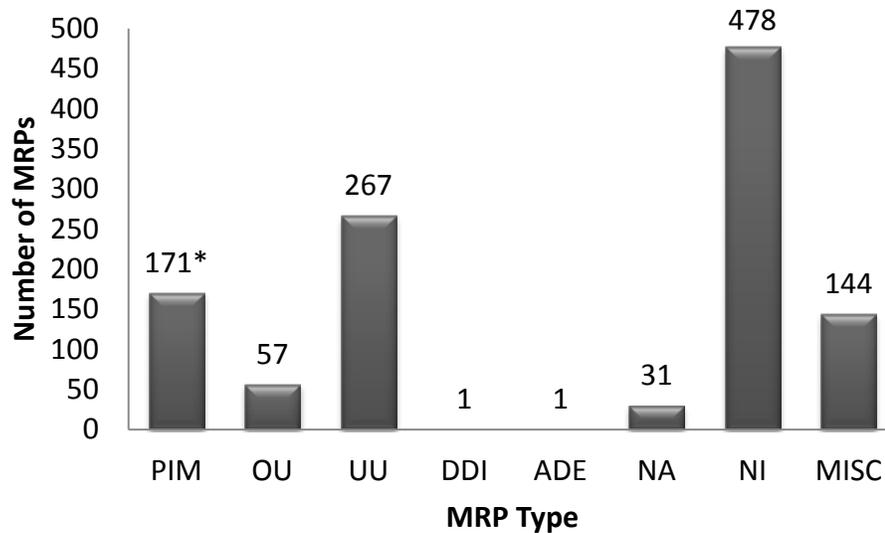
Figure 1. Total Number of MRPs by Type
*The PIM total is based on the total number of PIMs as defined by at least one of the three criteria (Beers criteria considering diagnoses or conditions, Beers criteria independent of diagnoses or conditions, and STOPP criteria) in the final medication list after medication reconciliation by the pharmacist.

Figure 2 shows the average number of MRPs per transition by type. Per transition, there was an average of 8.1 prescriptions without an indication recorded. Additionally, there was an average of 4.5 cases of underuse per transition. There was an average of 2.9 PIMs per transition based on the total number of PIMs as defined by at least one of the three criteria (Beers criteria considering diagnoses or conditions, Beers criteria independent of diagnoses or conditions, and STOPP criteria) in the final medication list after medication reconciliation by the pharmacist, divided by the total number of transitions.
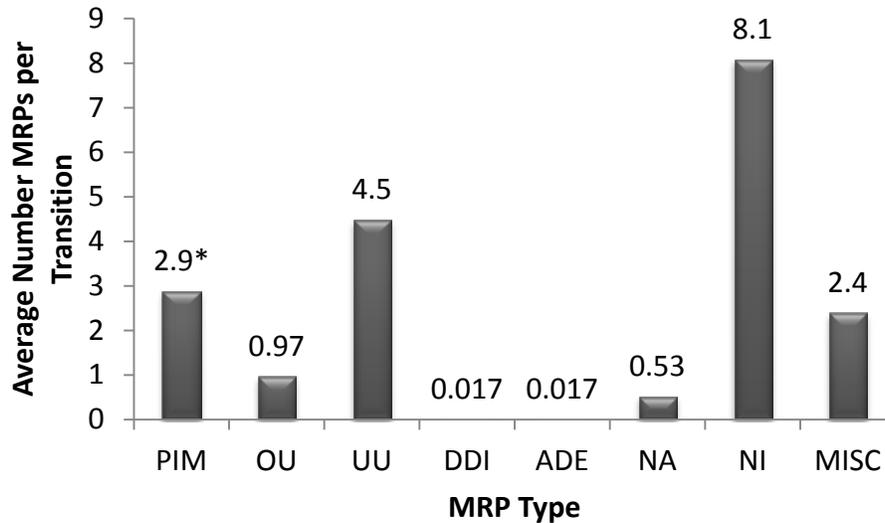
Figure 2. Average Number of MRPs per Transition by Type
*The PIM average is based on the total number of PIMs as defined by at least one of the three criteria (Beers criteria considering diagnoses or conditions, Beers criteria independent of diagnoses or conditions, and STOPP criteria) in the final medication list after medication reconciliation by the pharmacist, divided by the total number of transitions.

Miscellaneous MRPs were examined and further categorized into four groups: incomplete directions; outdated, incorrect, and/or incomplete medication lists; inconsistent and/or incorrect directions; and incorrect formulation. Incomplete directions accounted for 90 (62.5%) of the miscellaneous MRPs in this study. Outdated, incorrect, and/or incomplete medication lists accounted for 38 (26.4%) of the miscellaneous MRPs, while 14 (9.7%) of the miscellaneous MRPs were due to inconsistent and/or incorrect directions. Also, there were two (1.4%) cases of incorrect formulations on the medication list.

The three criteria used to identify PIMs were the Beers criteria considering diagnoses or conditions, Beers criteria independent of diagnoses or conditions, and

STOPP criteria. Table 3 details the number of PIMs identified in each medication list (prior to the transition, upon admission to the ALF, and a final list after medication reconciliation by the pharmacist) by each of the three criteria. The number of PIMs identified was higher after medication reconciliation using both the Beers and STOPP criteria to define PIMs. Beers criteria independent of diagnoses or conditions indicated 27 pre-transition PIMs, 30 post-transition PIMs, and 39 PIMs on the final medication list. Beers criteria considering diagnoses or conditions indicated 45 pre-transition PIMs, 39 post-transition PIMs, and 56 PIMs on the final medication list. The STOPP criteria indicated 83 pre-transition PIMs, 93 post-transition PIMs, and 113 PIMs on the final medication list.

Table 3. PIMs Identified

Medication List	Beers*	Beers**	STOPP
Pre	27	45	83
Post	30	39	93
Final	39	56	113
Total	96	140	289

*Beers criteria independent of diagnoses or conditions
**Beers criteria considering diagnoses or conditions

As previously noted, there were 171 PIMs identified by at least one of the three criteria in the final medication list after medication reconciliation by the pharmacist. Of these 171 PIMs, 115 (67.3%) were medications on the medication list prior to the transition. Regarding "as needed" (PRN) medications, 61 (35.7%) of the 171 PIMs in the final medication list were PRN. Additionally, 44 (25.7%) out of the 171 PIMs in the final medication list were added during the resolution of other MRPs. The most common PIMs in the final medication list after medication reconciliation by the

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pharmacist were identified to be aspirin, promethazine, tramadol, lorazepam, and

amlodipine. Each of these appeared in the list of PIMs in the final medication list

between 10 and 18 times.

The number of transitions and MRPs by setting are detailed in Table 4, with the

exception of PIMs. The majority of transitions to the ALF were from the emergency

department (ED) and hospital. Additionally, the total number of MRPs was found to be

the highest in transitions from the hospital and emergency department. The emergency

department and hospital transitions also indicated the highest number of MRPs in these

settings involved no indication recorded and underuse.

Table 4. Number of Transitions and MRPs by Setting

Setting	Number of Transitions	Total MRPs in Each Setting	Types of MRPs						
			OU	UU	DDI	ADE	NA	NI	MISC
Assisted Living	3	37	0	0	0	0	16	17	4
ED	17	327	11	145	1	0	3	129	38
Home	8	55	2	0	0	0	1	30	22
Hospital	16	432	32	88	0	0	7	242	63
Nursing Home	12	121	12	33	0	1	4	59	12
Not Documented	3	7	0	1	0	0	0	1	5
Total	59	979	57	267	1	1	31	478	144

The pharmacist and researcher identified the majority of the MRPs in this project.

Table 5 shows the total number, and average number per transition, of MRPs identified

by the pharmacist, researcher, home health, and a joint effort between the pharmacist

and patient. Not including PIMs, 71% of MRPs were identified by the pharmacist at the

time of transition. The PIMs were all identified by the researcher and these numbers

are not included in Table 5.

Table 5. Who Identified the MRPs*

	Pharmacist	Researcher	Home Health	Pharmacist and Patient
Total	698	276	4	1
Average Per Transition	11.83	4.68	0.068	0.017

*Excludes PIMs, which were all identified by the researcher

III. Discussion

MRPs were identified and classified for patients transitioning to an assisted living facility over a three month period. It is interesting to note 979 MRPs, not including PIMs, were identified in this study and there were 941 total medications in the final list following medication reconciliation by the pharmacist. In an effort to reduce the number of MRPs, interventions targeting the most common MRPs are warranted. Additionally, given the number of PIMs identified in this study, consideration should be given to identifying and addressing PIMs at the time of medication reconciliation for every transition.

Targeted education for the health care professional, patient, and caregiver may decrease MRPs, particularly the most common MRPs identified in this study. Efforts to educate health care professionals should focus on those who practice in the hospital and emergency department settings because the highest number of transitions and MRPs were identified for transitions from these settings. Educational efforts may include training regarding the appropriate ALF regulations, such as the need for new orders and an indication for each order for all assisted living residents in the Commonwealth of Virginia. Additionally, it may be possible to include these

requirements in decision support systems in the electronic health record systems. Education regarding regulations may have an impact on the number of orders without a documented indication, as well as the amount of underuse found in this study. Many residents returned to the ALF without prescriptions for their medications that needed to be continued based on their pre-transition medication list. This may be due to a lack of awareness that the patient is an assisted living resident with the need for new orders for every medication the patient will take upon returning to the ALF. The fast pace and intense responsibility of the acute care setting may also have an impact. However, complying with the regulations in ALFs may decrease adverse events for the resident if the assisted living staff is informed regarding the resident's condition and more time can be focused on optimizing the medication regimen. Additionally, there is opportunity for education regarding appropriate prescribing for the older adult population, focusing on potentially inappropriate medications and preferred treatment choices for this population. It is important to recognize education should also be provided to the patient and caregiver regarding the patient's medical conditions, medications, how to appropriately take each medication, expectations, what to avoid, and what symptoms would warrant a call to the provider. It would also be helpful to communicate information regarding the patient's medical conditions, medications, and plan to the assisted living staff that will be providing care.

The MRPs of DDI and ADE were detected, but not screened. This may have underestimated the number of DDIs and ADEs that occurred because some may not have been reported. Additionally, cases of NA were noted when a medication was not accessible to the patient or notification of non-adherence was provided. NA may be

underestimated in terms of non-adherence. Medication administration records may be useful in shedding light on the issue of non-adherence. Further classification of MISC MRPs identified issues such as incomplete directions and inconsistent and/or incorrect directions, which may indicate a need for focused attention to detail when prescribing.

Transitions involving emergency departments and hospitals resulted in the highest number of MRPs; therefore, these transitions should be a focus for future interventions. Before an intervention can be proposed, an understanding of the current process is needed. For example, when a resident transitions from the ALF in this study to an acute care setting, the intent is for a paper medication administration record to be sent with the resident. The hope is the medication administration record ends up in the hands of the health care professional providing care to the patient. The current study does not provide sufficient information to determine how often the current and correct medication list is available to the provider in the acute care setting. However, the data from this study shows there are a number of patients who return to the ALF with outdated, incorrect, and/or incomplete medication lists. This may indicate current medication administration records do not always land in the hands of the provider. This highlights an opportunity for improved communication and consideration for electronic records shared between settings so the most updated information is available to all health care professionals involved in the patient's care. Utilization of information technology should be considered for future interventions to improve communication.

The number of MRPs identified in this study suggests an emphasis is needed on medication reconciliation at each transition. The quantity of MRPs surrounding care transitions may be decreased by designating qualified professionals at each setting as

the contact persons charged with ensuring that medication reconciliation occurs. This should be done for each patient upon admission and prior to discharge. On average, the pharmacist identified 11.83 MRPs per transition, excluding PIMs; this highlights the amount of effort the pharmacist focuses on medication reconciliation and transitional care in this setting. The pharmacist identified the majority of the MRPs in this study; therefore, the pharmacist could provide valuable input regarding the development of interventions needed to reduce MRPs. Pharmacists have the potential to decrease health care costs by addressing MRPs. Future research investigating the cost of MRPs in the ALF setting is also needed.

An interesting finding in this study was the number of PIMs identified was higher after medication reconciliation using both the Beers and STOPP criteria to define PIMs. This may be due to the pharmacist dealing with more urgent matters at the time of transition and medication reconciliation; consequently, the pharmacist may plan for PIMs to be addressed at the time of medication review rather than at the time of transition. It may also be impacted by the fact that some of the post-transition medication lists were missing most of the patient's medications because new orders were not written (as required by Virginia ALF regulations). As previously mentioned, a number of the PIMs in the final medication list after medication reconciliation by the pharmacist were identified as PRN medications. Others were medications on the medication list prior to the transition and some were added during the resolution of other MRPs. These results indicate there are multiple possible reasons for the increase in PIMs after medication reconciliation. It is also important to note some of the PIMs identified may be appropriate for the individual patient. Criteria used to identify PIMs

should not replace clinical judgment. An appropriate monitoring plan should also be implemented.

It was found that the STOPP criteria identified a higher number of PIMs than each application of Beers criteria in this study. This is consistent with previous studies in the literature. One possible explanation is the STOPP was developed more recently than the Beers criteria applied in this study. Again, criteria used to identify PIMs are not the final word on medication appropriateness, rather a screening tool to identify medications that may require additional evaluation prior to use in certain patients. Although medications are technically included in the Beers or STOPP criteria, valid use occurs in practice and may be appropriate for an individual patient; thus, clinical judgment should be utilized. A comprehensive view of the patient's needs, preferences, and medical conditions is necessary to appropriately evaluate and reconcile a patient's medications.

The lack of consensus regarding definitions of MRPs or the classification system for MRPs in the literature makes it difficult to compare results from various studies. It would be helpful to have a clear, standard, accepted definition and classification system for MRPs. This may help in the comparison of future studies in the literature, as well as to increase awareness of MRPs for both practitioners and researchers.

A strength of this study is the data was collected and MRPs were categorized as a team; this strengthens the accuracy of the classifications as a consensus was reached. This approach may also decrease errors in the data because the information was reviewed by more than one researcher. Additionally, the researcher had access to the pharmacy staff, which improved the availability and accuracy of the information

obtained in this study. Many assumptions were minimized with access to the

pharmacist for clarification or verification of understanding the information provided in

the medical and pharmacy records. This study contributes to the small body of

literature focused on care transitions involving assisted living.

Several limitations should be acknowledged regarding this study. It is possible

that not all transitions were captured. Transition information was obtained from the

pharmacist for the three month period. Additionally, since the total number of residents

is unknown for this time period, the rate of transitions within the community cannot be

calculated. As is typical for the ALF setting, access to patient comorbidities, lab values,

adverse drug events, and monitoring plans was inconsistent; therefore, the number of

MRPs may be underestimated. In most cases, the pharmacist was only provided with

prescriptions and/or discharge orders. It is important to note that the pharmacist was

aware of the study purpose and time period, which may have influenced the results.

An additional limitation is the STOPP and Beers criteria were applied to all

patients in this study including the two patients who were less than 65 years of age.

Furthermore, the STOPP and Beers criteria were not created specifically for the

assisted living setting and the criteria may not be as appropriate for application in this

setting. The STOPP criteria was developed with a focus on the hospital setting.[48] The

2003 Beers criteria was updated for ambulatory and nursing facility populations and was

developed using literature focused on medication use in community-dwelling older

adults and older adults living in nursing homes, as well as a panel of experts selected to

represent acute, long-term, and community practice settings.[47] Given this information,

application of the Beers criteria to assisted living may be more appropriate than the application of the STOPP criteria.

Also, this study was conducted in one ALF in Virginia; thus, the results may not be generalizable to other populations or facilities in other states as regulations vary by state. Characteristics of ALFs can vary greatly even within the same state; therefore, it is difficult to generalize results and compare these results to other studies. Studying an ALF without an on-site pharmacy may yield different results. Given the wide variety of ways that pharmacy services are provided to ALFs and the variation in the pharmacist's engagement (versus other facility staff), it may be difficult to generalize results to other ALFs in Virginia. Additional studies in various settings would be needed in order to draw further conclusions regarding other long-term care facilities.

Since the analysis of data for this study, an update to the Beers Criteria was completed and published;[56] therefore, another limitation of this study is the use of the 2003 Beers Criteria. The 2012 Beers Criteria has been altered from 2003; it lacks medications that are no longer available and includes medications that have become available since 2003. It also updates research and appropriate prescribing information. Future application of the 2012 Beers Criteria to this data is planned.

CHAPTER 4

Conclusion

MRPs arising during transitions of care to assisted living were identified; many of these are potentially preventable through effective care transitions and medication reconciliation. A number of potential approaches for improvement were discussed. Past studies have demostrated that education has improved knowledge and confidence of providers and has had a positive impact on the patient care provided. It is hypothesized that education provided to health care professionals, patients, and caregivers may improve care transitions involving assisted living. Appropriate health care professionals should be tasked with medication reconciliation at each setting for each care transition. A focus should be placed on improving communication between health care professionals, patients, caregivers, and settings. A consensus definition for MRPs and classification system should be determined and utilized. Additionally, the lack of information in the literature focused on assisted living care transitions should be addressed. A future study to identify barriers to effective transitions in this setting and ways to improve these care transitions from the LTC perspective has been proposed. Once an understanding of the barriers to effective transitions is obtained, an intervention to improve care and reduce MRPs during transitions involving assisted living should be designed, evaluated, and ultimately implemented.

CHAPTER 5

Proposed Next Step

I. Specific Aim

The specific aim of this study is to identify barriers to effective transitions to assisted living facilities in Virginia, as well as possible ways to improve these transitions.

II. Methods

Key informant interviews will be conducted with staff members involved in care transitions (e.g., pharmacy, nursing, marketing, and resident services personnel at two assisted living facilities in Virginia as well as staff at LTC pharmacies). Both assisted living facilities with and without on-site pharmacy services will be included.

Primary contacts at each assisted living facility will be informed about the study and asked which staff members should be approached for an interview at the facility. Initial contact will be made via a phone call from the researcher to ask if he/she is willing to be interviewed. Staff members will be asked for their consent prior to the interview.

Interviewees will not be identified by individual name or facility name. A general description of the facility and his/her role will be used rather than facility name or precise job title. Appendix A includes the interview session information and questions. Interviews will be recorded to improve understanding of the responses. However, recorded interviews will be transcribed and once the transcription is determined to be error free, the recording will be destroyed. Responses to interview questions will be analyzed to identify themes.

Data analysis will be performed at Virginia Commonwealth University School of Pharmacy. The data will be stored using RDataStorage to keep the information secure. Only research personnel will have access to the data.

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Appendix A

Key Informant Interview Session

The following questions will be asked of interviewees in addition to clarifying

questions as needed. Each interview length is estimated at approximately 30 minutes.

Consent will be obtained prior to the interview. Participation in this interview is voluntary

and may be discontinued at any time.

No personally identifiable information will be collected. Interviewees will not be

identified by individual name or facility name. A general description of the facility and

his/her role will be used rather than facility name or precise job title. Any recorded

interviews will be transcribed and once the transcription is determined to be error free,

the tape will be destroyed.

Interview Questions

With regards to medication-related problems during transitions to assisted living:

1. What are your job responsibilities with respect to care transitions and

   medications?

2. What is the current process for handling medications during a transition (moving into the assisted living facility versus returning from a nursing home or hospital)?

3. Other than yourself, who else is involved in managing the transitions process?

4. What do you see as the barriers to effective transitions?

5. Are there examples you can share when transitions went well, and when they did not?

6. What ideas do you have for improving transitions?

Vita

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