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Polypharmacy in the Homebound Population

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KEYWORDS

• Polypharmacy • Homebound • Home health agency • Pharmacist • Team-based • Deprescribing • Home-based primary care

KEY POINTS

- Homebound elders are at higher risk for polypharmacy than other community-dwelling elders.
- The period after a hospital stay is associated with increased medication use and medication errors, leading to potential harm.
- Team-based care, including hospital-based and community-based pharmacists and home health agencies, can be helpful in addressing polypharmacy in homebound elders.
- The United States health system continues to struggle with caring for the homebound population.

Abbreviations	
Sars-Cov-2	Severe respiratory Syndrome Corona Virus 2
NSAID	nonsteroidal anti-inflammatory drug

BACKGROUND

The number of homebound individuals—those who never or rarely (once a week or less) leave their home—is rising in the United States. In 2011, the estimated number of homebound individuals aged older than 65 years was approximately 1,974,400, or 5.6% of the elderly population.[1] By 2018, that number had risen to 4.5 million, approximately 12.7% of all those aged older than 65 years.[2] The Sars-Cov-2 COVID-19 pandemic more than doubled the share of homebound elders; with an estimated 30% of those aged older than 70 years being defined as homebound, with black non-Hispanic and Hispanic/Latino individuals having twice the risk of being homebound than white individuals.[3]

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Homebound elders tend to be older than other community-dwelling seniors (average 80 years vs 74 years), women (67.9% vs 53.4%), and nonwhite (34.1% vs 17.6%). They are more 2.8 times more likely to have 5 or more chronic conditions, 3.2 times more likely to have recently been discharged from the hospital, 5 times more likely to report depression, and 4 times more likely to have possible or probable dementia. They are 2.5 times more likely to be dependent in one or more activities of daily living.[1,2]

Given that the homebound population has a high burden of illness, it might be expected that these individuals are at risk for polypharmacy. However, one could postulate that this group sees fewer specialists and are at decreased risk for multiple prescriptions. It seems, however, that the risk for multiple medication use is elevated. In one study of Medicare Advantage Plan participants, 47.9% of homebound individuals took 5 or more prescribed medications as compared with 27.6% of the nonhomebound population.[4] In another study, the median number of medications in a homebound population was 17.[5] Polypharmacy can lead to confusion, errors, medication nonadherence, medication interactions, adverse medical events, higher costs, increased caregiver stress, and a decrease in overall quality of life for the homebound individual.

Studies of polypharmacy in this population vary in their findings but, in general, the homebound elder takes an average of 6 to 9 different prescription medications daily; many of these medications are to be taken more than once a day.[6–8]

The home-care clinician also has the potential to take a more complete medical history—the clinician is often able to take an inventory of all pill containers, to perform a pill count, to see nonprescription products in the home, to combine pill bottles when appropriate, and to assist the patient and caregiver in proper storage and disposal.

The medical community is only beginning to study and report on this special subset of older individuals. One unique study from Japan[9] studied 153 home-care patients in Japan and found that they used an average of 5.9 prescriptions. Furthermore, 69.9% were prescribed potentially inappropriate medications (hypnotics, diuretics, NSAIDs), compared with 31% of outpatients in Japan. Polypharmacy (6 or more medications) was statistically significantly correlated with age, Charlson Comorbidity Index, functional status, nutritional status, insomnia, and insurance type, among others. One factor also associated with polypharmacy was a 2.88 times greater risk for the use of laxatives, indicating another potential adverse effect of the use of multiple medications. The authors' findings also showed a trend toward deprescribing as a patient's condition worsened; deprescribing principles may be followed more frequently in the homebound patient.

Common Conditions Found in the Homebound Population: Potential for Polypharmacy

Completely homebound elders have multiple chronic conditions, which leads of course to an elevated risk of the use of multiple medications and potential adverse reactions. Among the completely homebound, about 80% of individuals have possible or probable dementia, up to 92% have hypertension, 71% have arthritis, 42.5% have cardiovascular disease, 39% have diabetes, and 30% have depression. Other articles discuss these conditions in greater detail.[1,4,10]

As an example, the Medical Home Visit Program at University of California, Los Angeles (UCLA) is responsible for about 220 homebound individuals. These patients are seen an average of 12 times a year, in order to ensure that any health-related condition can be caught early, and the patient can avoid deterioration of her condition. This creates an opportunity for intensive medication management; for example, if a patient is seen soon after initiation of a new medication (eg, duloxetine), the new tremor observed is more clearly related to the new medication, and the clinician can

avoid starting a prescribing cascade by eliminating the offending medication rather than starting a medication for tremors. The home-based clinician is also uniquely poised to recognize when a patient is undergoing a decline in health or functional status and can work with the patient and family to begin the process of deprescribing. For example, a patient with dementia who has been taking donepezil, memantine, sertraline, and mirtazapine may no longer be verbal or experience anxiety or insomnia. It likely is time to start to taper these medications, and a trusted home-care clinician can monitor the patient carefully as medications are reduced. Medications to control diabetes can also be monitored and reduced as needed—a patient who is losing weight, for example, may benefit from discontinuation of metformin and may no longer require a replacement, depending on comorbid conditions and life expectancy.

Hospitalization as a Risk Factor for Polypharmacy

Transitions of care are a particularly vulnerable period for older adults and are associated with adverse outcomes.[11–15] A care transition is when an individual moves from one health-care setting to another. Transition from the hospital to home, hospital to the skilled nursing facility (SNF), or the SNF to home are common experiences for the homebound older adult. Care transitions can contribute to polypharmacy and medication errors in the older adult. Medication discrepancies are common in the transition period[16] and often start at the time of admission because intake medication reconciliation is often inaccurate.[17,18] Homebound individuals are not reliable historians for home medications given the high prevalence of cognitive disorders in this population, and inpatient or nursing home providers often rely on inaccurate or incomplete medication lists found in the electronic health record (EHR). Additionally, polypharmacy is exacerbated by duplicate prescriptions or dose changes, adding to the physical pill bottle burden in a patient's home.

Patients often leave the hospital with more medications than they had entering the hospital, and many of these prescriptions are unnecessary. One study at the VA found that 44% of frail hospitalized older adults were discharged with at least one new unnecessary drug.[19] New unnecessary prescriptions on hospital or SNF discharge include stool softeners, proton pump inhibitors, antihypertensives, and therapeutic nutrients or minerals. Older adults with dementia are often newly prescribed antipsychotics secondary to hospital-acquired delirium, and these may not be indicated to continue after discharge.[20] Finally, documentation errors in the discharge summary can also contribute to polypharmacy.[21] Collectively, this can lead to medication misuse, patient or caregiver confusion, adverse drug events, and rehospitalization.

Of all the various care transitions, the transition from hospital to home puts the patient at the greatest risk for adverse events or rehospitalization.[22] Hospitalized patients aged 65 years or older have a 30-day readmission rate of approximately 20%.[23] Medication discrepancies may account for 14% of these readmissions.[16] Medication reconciliation after a care transition can be complex because it requires the health-care provider to review hospital discharge summaries, pharmacy records, the patient's physical supply of medications (including over-the-counter medications and supplements), and a comparison with what the patient is actually doing in their home. A complete medication reconciliation should be performed after every care transition.

The Pharmacists' Role in Reducing Harm from Polypharmacy

Pharmacists have been shown to play a vital role in reducing polypharmacy and 30-day readmissions in geriatric patients after a care transition.[24 25,26] A 2019 review showed that pharmacist-led home medicine reviews identified a highly significant

amount of drug-related problems including drug–drug interactions, serious drug side effects, inappropriate medication use, nonadherence, excessive doses, and usage of expired medications.[26] A retrospective cohort study at UCLA showed that after hospital discharge, a home visit by a community health coach and a medication review by a primary-care based pharmacist can prevent 30-day readmissions in older adults.[27] The health coach would relay all medication-related information collected during the home visit to the pharmacist who in turn would check for discrepancies by reviewing the EHR and discharge summary and communicating with the primary-care physician. The predicted probability of being readmitted within 30 days to the hospital was 10.6% compared with 21.4% in the matched-control group.

Inpatient pharmacists are also important in care transitions, because they can help provide accurate admission medication reconciliation and identify discrepancies in medication dosing.[28] Accurate admission medication reconciliation will ensure a more reliable discharge medication list. An unpublished quality initiative pilot at UCLA assessed how an inpatient clinical pharmacist could improve the care transition to home in geriatric patients hospitalized at an academic medical center in a Geriatric Special Care Unit (GSCU). The pharmacist performed medication reconciliation on admission and discharge, medication counseling before discharge, and phone calls to patients at home after discharge for all patients admitted to the GSCU. Additionally, the pharmacist participated in daily interdisciplinary rounds and reviewed medications daily. The average patient in the GSCU was on 14.7 different medications. Before the pilot, the 30-day readmission rate to the unit was 23% and 20% of these readmissions were medication related. The introduction of the clinical pharmacist reduced the readmission rate to 13% and only 2% of the readmissions were medication related. This substantial decrease in medication-related readmissions supports the role of pharmacists in care transitions and can help reduce the number of medications in a homebound patient.

Community Dwelling Homebound and the Community Pharmacist

Evidence from small trials in developed countries has demonstrated the benefit of using pharmacists in the community to assist with medication management of homebound elders.

In England, for example, community pharmacists are reimbursed to provide what are called Medicine Use Reviews (MUR), a consultation service in which the community pharmacist provides a medication review and advice on medication management. A pilot specifically addressing the homebound population, a domiciliary MUR, or dMUR, targeted those who could not attend a pharmacy MUR and were taking at least 6 medications. The study found a very high rate of inappropriate medication use, from skipping doses to confusion over dosing regimens to using inhalers incorrectly. Although this was a pilot study, the pharmacists involved asserted that about one-third of the time an intervention reduced the probability that the patient would require hospitalization.[29]

A Canadian trial of home-based pharmacist visits resulted in the discovery of a 40% noncompliance rate, a 21% rate of adverse drug reactions, and a smattering of other difficulties with medications, including duplications, inappropriate medication, and therapeutic nonresponse.[30]

A recent meta-analysis of studies of community-based pharmacist interventions showed a decrease in the use of inappropriate medications, especially sedative-hypnotics (risk ratio 1.28; 95% CI [1.20, 1.36] $I2 = 0\%$, $P < .00001$) but did not demonstrate a decrease in the rate of falls or of admissions to the hospital.[31]

In short, there is much to be explored about the potential role of the community pharmacist in managing polypharmacy for homebound elders; the experiences

reported in developed countries are preliminary and mixed. Pharmacists have recently taken a more active role in patient health care, and this is another potential source of help for this population.

Benefits of Management of Polypharmacy in the Home and the Potential to Leverage Home Health Nurses

Another potential source to manage polypharmacy may be through home health. Providing home-based primary care allows physicians to actively engage in behaviors that can help reduce polypharmacy of homebound patients. Because many homebound patients often have multiple chronic medical conditions in addition to geriatric syndromes, prescribing must be done with caution. Typically, patients receiving home-based primary care services do not engage with many specialty physicians; therefore, it may be possible for the home-based primary-care team to assume full responsibility of a patient's medication list and engage in judicious and thoughtful prescribing taking into account both medical and functional complexity.

Aside from taking lead as sole prescriber, a clinician can learn more in the place of residence and by performing a medication reconciliation in person, we learn far more than what can be gleaned in a clinic visit or at discharge from a hospital setting. In the home, we can see where medications are stored and ascertain how medications are administered. We are able to see the duplicate or expired bottles and the numerous over-the-counter medications. When we are in the home, we are able to immediately identify and suggest elimination of medications that are unnecessary or potentially harmful. It is also a critical chance to engage in patient and caregiver education around medication safety and proper administration.

Home-based primary-care providers can also benefit from working in alignment with home health nurses who provide medical services in the home to their patients. They could be leveraged to help reduce polypharmacy. An observational study by Champion and colleagues observed the work of home-care nurses engaging in admission visits with homebound patients with particular attention to the medication reconciliation process. They observed that home-care nurse-led medication reconciliation decreased the number of medications after reconciliation in upwards of 91% of patients.[32] This study lends credibility to the notion that home-care nurses can be used in addressing polypharmacy in homebound patients, providing routine medication reconciliation.

A qualitative study by Sun and colleagues aimed to better understand the challenges that home-care nurses face when addressing polypharmacy in homebound patients. The nurses identified ineffective collaboration and communication with other health-care providers and inconsistent medication reconciliation practices between care settings as barriers in addressing polypharmacy.[33] A follow-up feasibility study by Sun and colleagues in 2021 revealed that home-care nurses are very interested in learning about deprescribing and would like to have tools and protocols that they can use in the home environment when they are engaging in medication reconciliations to help reduce polypharmacy.[34] Further research is needed to implement larger scale education of home-care nurses to address polypharmacy through deprescribing principles and ascertain its effectiveness among homebound patients. Additionally, Sun and colleagues qualitative study results highlight the importance of creating effective means of communication between the home health nurses and the home-based primary-care teams, to help in the process of addressing polypharmacy.

Home-Based Medicine as Team-Based Medicine—a Summary

In short, the home-based patients are at high risk for the deleterious effects on health and quality of life due to polypharmacy. The home-care clinician, although uniquely

equipped to observe and monitor medication use, continues to struggle with polypharmacy and medication interactions. Additionally, the patient's regimen generally changes after a hospital stay, compounding the difficulty in medication management. These patients are frail and ill, and their caregivers (when there is one) are often overwhelmed.[35]

Home-care medicine should be considered team-care medicine.[36] The home-based clinician can approach the hospital team when a patient is admitted, emphasizing the need for careful prescribing and accurate documentation. One can consider enlisting the community pharmacist with medication reviews and potentials for medication interactions.

Many homebound patients also have home health agencies involved in their care. The clinician can contact the home health agency nurse and review the medication regimen with the nurse, in an attempt to reduce errors, improve adherence, and streamline a routine. This takes effort and time, of course, but may help delay the decline in a patient's condition and reduce the risk for admission to the hospital.

Finally, the clinician can consider advocacy to improve the delivery of medical care in the home. As mentioned above, pharmacists in the United Kingdom are able to charge for a home-based medication review.[29] There have been pilot studies of pharmacist involvement in the United States[8] but there has been little change in policy. Clinicians can get involved by means of their professional societies' advocacy groups or can work at the local level (eg, health departments, offices on aging) to improve health services delivery services in their own area.

Home-based medicine, as a modern method of delivering health care across the life span, remains in its research infancy. Future health services research can explore the most efficient methods to guide us in the best use of limited resources to those who consume a high proportion of them. Polypharmacy is as good a place to start as any.

CLINICS CARE POINTS

- Increased involvement of health care providers in the home setting, along with an interprofessional approach to the care of homebound individuals, may result in a reduction in polypharmacy, an improvement in reducing medication burden, and contribute to an improved quality of life for those who are experiencing multiple chronic diseases.
- deprescribe whenever possible.
- engage pharmacists in assisting with drug-drug interactions and side effects.
- actively interact with home health agencies to ensure accurate medication lists and encourage medication adherence.
- perform a follow-up medication review as soon as possible after a hospitalization or emergency department visit.

DISCLOSURE

The authors have nothing to disclose.

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