Elder and caregiver solutions to improve medication adherence

K. E. O’Quin1*, T. Semalulu2 and H. Orom3

1The School of Public Health, Georgia State University, P.O. Box 3965, Atlanta, GA 30302-3965, 2Northern Ontario School of Medicine, Thunder Bay, ON P7B 5E1, Canada and 3Department of Community Health and Health Behavior, University at Buffalo, Buffalo, NY 14214, USA

*Correspondence to: K. E. O’Quin. E-mail: koquin1@gsu.edu

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Abstract

Medication mismanagement is a growing public health concern, especially among elders. Annually, it is a major contributor to emergency hospitalization and nursing home placement. Elders and their caregivers, as healthcare consumers and stakeholders in this issue, are uniquely qualified to inform strategies to improve medication adherence. We conducted a qualitative study to ascertain caregiver and elder perceptions of barriers to medication management and to identify community-derived solutions to improve medication management. Nine focus groups (N = 65, mean age = 71) were conducted with caregivers or elders from five communities. Participants were recruited by key informants utilizing snowball sampling methodology. The following themes were identified in the participant-recommended proposed solutions improving medication adherence: (i) use of personal systems to overcome barriers to medication adherence, (ii) various solutions to address cost concerns, (iii) the need for regular review of medications by doctors or pharmacists to eliminate unnecessary medications, (iv) desire for community-driven support systems, and (v) using medical advocates. Elders and caregivers recognized medication non-adherence as a community-wide issue and were eager to offer solutions they thought would work in their communities. These solutions can lend credibility to strategies currently being developed/utilized and offer innovative recommendations for future interventions.

Introduction

In 2010, there were more than 40 million adults over 65 in the United States. This number is projected to increase to 88 million by 2050 [1]. More than half of elders use five or more medications a day and nearly 30% use five or more prescription medications a day [2]. The increasing number of elders using multiple medications contributes to a rising public health concern: medication non-adherence. Medication adherence or management involves obtaining medications, taking the correct drugs and correct dosages at the prescribed time, and monitoring for side effects [3]. Medication non-adherence has been defined as a failure to adopt a medication regimen, stopping or dropping out of a drug treatment, and/or alterations in the dosage [4].

It has been estimated that, each year, 28% of hospitalizations in the elderly are drug related [1, 5]. Additionally, approximately 3 million older adults are admitted into nursing homes and skilled nursing facilities because of medication mismanagement-related events and other drug-related problems annually [6, 7]. Several barriers to medication adherence have been reported for elders. These include cognitive deficits, diminished physical senses, the increased risk of side effects associated with aging, taking large numbers of medication and complexity of medication regimens, beliefs that may conflict with adherence protocols, practicing alternative medicine that may conflict with adherence protocols, and perceived need and effectiveness of medications [3, 8–11]. Social determinants such as...
race, low health literacy and low socioeconomic status, and poor physician–patient communication can also impact people’s ability to manage medications [12–14].

The existing research on interventions to improve medication adherence has tested improvements to healthcare services, such as periodic medication reconciliation and hospital discharge planning [15–17], changes to healthcare provider prescribing practices [18, 19], and interventions to improve motivation and intentions to be adherent [3, 20]. Intervention approaches used to date have not been consistently effective in achieving long-term improvements to medication management [19, 21, 22]. Another challenge to improving medication management is that many older adults may not be aware of current interventions or practices to improve medication adherence [23]. In one study, although the majority of older adults used a simple medication management tool (such as a pillbox), many did not know of other strategies to improve adherence (i.e. as many as 40% of participants did not know that they could request medication reconciliation/reduction) [23].

A strategy for improving health care delivery and quality used elsewhere [24, 25], and gaining traction in the United States [26], is including consumers in planning and decision-making about health services, including fundamental aspects of the research process such as determining research questions and methods [27]. Taking into account healthcare consumers’ preferences may improve the effectiveness and accessibility of services, as well as meet an ethical obligation that patients be involved in decision-making about the care they receive [25]. To date, consumer perspectives on medication adherence have been primarily focused on the barriers to medication adherence [8, 28] and despite having a central role in this issue, few studies focus specifically on elderly populations or their caregivers [29]. We posit that elders and their caregivers, as healthcare consumers and stakeholders in this issue, are uniquely qualified to inform our strategies to improve medication adherence. To this end, we conducted focus groups with elders and caregivers from Western New York, with the goal of describing not only how elders and their caregivers perceive barriers to medication management, but to identify community-derived solutions to improve medication management.

### Materials and methods

Nine focus groups were conducted with 65 participants from five communities. The focus groups consisted of either elders or caregivers and were conducted in urban and rural locations in October and November of 2012. The study protocol was reviewed and approved by the University at Buffalo Social Sciences Institutional Review Board.

### Approach

Community stakeholders and key informants were invited to a regional priority setting meeting where medication adherence was identified as a key factor that impacts the health and quality of life of elders. This meeting resulted in identifying a need for exploratory research on the causes of, and potential ways of reducing medication non-adherence, and it was agreed that a focus group approach would be used to accomplish this.

### Participant recruitment

Stakeholders and key informants recruited participants using snowball sampling. Inclusion criteria for the elder focus groups were being age 60 or older, and having taken medication at least once a day for 10 consecutive days during the previous 6 months. The inclusion criterion for the caregiver focus groups was being a caregiver of an elder who met the above criteria. In order to facilitate openness among participants, focus groups consisted of either caregivers or elders.

### Instrument development

The semi-structured interview guide was developed with stakeholder input. The first author developed an initial set of questions and prompts. The initial questions were reviewed and revised by a stakeholder representative and additional questions and prompts were added. The topics covered in the interview
guide included: barriers to, and facilitators of effective medication management, knowledge of medications, strategies to improve medication management and question asking during interactions with healthcare providers. Some example questions include: There are many reasons why some people do not take their medications as prescribed—In your experience, what are the three biggest reasons why you or someone you know doesn’t take medications as prescribed? Is taking the medications you are prescribed compatible with your quality of life? and What kinds of support, related to your medication, would be helpful? A written demographic survey was also developed in conjunction with a community stakeholder. Participants were asked about basic demographic information (age, race/ethnicity, education, gender and income). Additionally, we asked participants if they had any form of health coverage, including government plans such as Medicare, Medicaid and private plans that supplement Medicare benefits (i.e. Medicare Advantage). We were also interested in whether participants had a usual source of care; we asked whether they had one person they considered to be their primary care physician and whether they had one person they considered to be their personal pharmacist.

Focus group procedures
The first author facilitated all focus groups (6 elder, 3 caregiver groups) using the semi-structured guide. The locations and times were chosen by the key informants and community stakeholders to be convenient for participants. The sessions lasted between 60 and 90 min. Participants had time at the beginning of each session to eat and establish rapport. During the discussion, the participants sat in a circular arrangement to facilitate dialog and the discussions were audio recorded and transcribed verbatim.

Data analysis
The trancripts were analysed using thematic content analysis [30] to identify themes within and across transcripts. Two members of the research team reviewed the data to develop an initial set of codes. The code lists were compared, discussed and incorporated into a set of 16 codes. Transcripts were independently coded by the same two members of the research team. Inter-rater reliability was calculated using ReCal2 software [31]. The average percent agreement for all codes was 96% and the average Cohen’s kappa ¼ 0.76. Coding discrepancies were reviewed and resolved by the same two members of the team.

Results

Participant characteristics
There were 17 participants in the caregiver focus groups and 48 participants in the elder focus groups. See Table I for specific information about each focus group and a description of the communities in which the focus groups were held. Mean participant age was 71 years (range ¼ 48–88 years). Participants were 77% female; and 82% white, 16% black and 2% other. Approximately 95% of participants had at least a high school diploma or Generalized Education Diploma (GED) and 34% a college degree or higher. The majority of participants (77%) was retired. Nearly 98% had some form of insurance, with 46% reporting having Medicare and 38% reporting having a Medicare Advantage plan. See the Table II for additional demographic characteristics of elders and caregivers.

Medication management barriers and solutions
We identified five overarching themes in participants’ discussion about medication mismanagement barriers and associated solutions: (i) use of personal systems to reduce barriers to medication adherence, (ii) cost, (iii) the need for regular review of medications by doctors or pharmacists to eliminate unnecessary medications, (iv) desire for community-driven support systems and (v) using medical advocates. Each theme is discussed in detail below.

Use of personal systems
Two common barriers to medication adherence were forgetting to take the medication and/or a
change in routine that resulted in failure to take the medication. One participant described a situation in which she might forget to take medications: ‘the thing that disrupts me most is when I go out to dinner, out to somebody’s house or a restaurant. Then when I get home I just let it go by until it’s bedtime, and then I remember’ (Female, Focus Group 5). Additionally, participants described difficulty remembering medications to be taken in the middle of the day. For many participants, remembering to take medications upon waking and before sleep was typically not difficult. As one participant said: ‘but they’ll forget that in-between time, that in-between time is difficult’ (Female, Focus Group 2). Others described situations in which they forgot to take their medication upon waking and would not remember to take them until the end of the day. One participant referred to occasionally forgetting whether or not he had taken his medication as having a ‘senior moment’ (Male, Focus Group 5). As this was a common, and expected, event. Most of the participants had experience with these issues and many had solutions and strategies in place to help alleviate them.

In order to minimize the impact of forgetfulness, many participants described having personal systems in place to help remember medications. One participant described how she attempted to assist her husband by associating his medication routine with regular television programs that he watched: ‘I try to associate it with a story that he likes to watch on television. When that story comes on, you take your

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Percentages are based on the number of responses received for each question.

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meds’ (Female, Focus Group 2). Many participants suggested using pill boxes, lining up medication bottles on a prominent shelf, or turning over pill bottles after the medicine had been taken. Although these systems worked for participants the majority of the time, many described situations where they use these systems yet forget to take their medication: ‘Sometimes you even forget the routine...sometimes you forget to put them in the [pill boxes] and then you’re really confused because you don’t remember if you took them or not’ (Female, Focus Group 9). Another strategy described by a few participants was using medication blister packs. The participants who had experienced blister packs liked that the packaging labeled when pills were to be taken and helped people track if medications had been taken. In many ways, blister packs help people avoid errors made with other personal systems such as forgetting to fill the pill boxes.

**Cost**

Cost was another barrier that impacted many participants. Participants described issues with paying for regular monthly prescriptions, paying for medications that later caused side-effects or were ineffective, and hitting the ‘doughnut-hole’, the gap in coverage between standard Medicare Part D drug coverage and the catastrophic-coverage threshold; while in the doughnut-hole people will pay for their prescriptions entirely or partially out of pocket depending on their level of additional coverage [32]. Solutions to this barrier included asking for generic medications and asking a physician for samples, to ascertain whether the medication was an effective option both to avoid paying for a medication that would not work and to help alleviate some of the financial burden of copays. One group recommended prescribing 7- to 14-day prescriptions in lieu of samples to ascertain the feasibility of the medication for the patient before a 30- or 90-day prescription was ordered. Participants who had encountered the doughnut-hole described only paying for 1 month at a time instead of 3. It was recognized that getting a 90-day prescription was generally preferable and more cost effective; however, in the midst of the doughnut-hole, where the insured is responsible for a large percentage of the medication costs, a 90-day prescription was often too costly. Participants in two of the focus groups described situations where individuals would take medication every other day and friends and family members would share prescriptions to cut down on costs.

**Review and reduction of medications**

Participants identified that taking large numbers of pills was a barrier to medication management; the more pills taken per day, the more difficult it was to adhere to each medication’s specific regimen. Participants believed that taking large numbers of pills made it more difficult to understand and remember the names and purposes of all the medications. Additionally, participants expressed fear that as people age, there is a ‘buildup of medication’, i.e. individuals are prescribed increasingly more medications without really judging whether medications remain effective after long periods of use or possible interactions. Some participants described being concerned about the negative effects of taking a medication for longer than recommended, side-effects and overmedication. Some expressed a lack of confidence in the practice of prescribing medications to treat the side-effects of other medications. Both elders and caregivers expressed concern and worry about overmedication. The need for reconciliation and reduction sometimes resulted from multiple physicians prescribing medication with a lack of transfer of this information between physicians. This lack of transfer of information seemed especially present between hospitals and primary care physicians. One participant discussed this difficulty:

> We haven’t run across a lot of coordination between specialists and the primary care physician, and it makes it very difficult, and then you throw a hospitalization in there, and things being changed...I would really like to see a better way to manage all of those medications... (Female, Focus Group 7).
This participant was a caregiver who also took medications. She acknowledged the difficulty that inconsistent transfer of information about medications had on medication adherence in both herself and the people she cared for.

One suggestion that frequently arose in response to questions regarding what support would be needed to improve medication management was working one-on-one with physicians to assess whether medications could be reduced or eliminated. Although this was not explicitly connected by participants to overwhelming medication regimens, the research team determined that it could be considered an implicit response since it arose from questions regarding support needed to help manage medications. One participant spoke of how he worked with his wife’s doctors to reduce her medications:

You’d be surprised how many of those pills they’ve eliminated... I mean they just cut it down... and some of that stuff that they were giving to her that was really, really messing her up. [The doctor] whittled it down to a certain level of what she needed. When he got finished with her, [she was taking] maybe four or five pills... I worked with them in that area so I did suggest that there were too many pills and they needed to be looked at, to see if she needed those... (Male, Focus Group 9).

This might be a formal review process, as suggested by another participant:

I do wonder if there shouldn’t be an assessment of these people who are on all these different medications, and if you’ve got all these different doctors, what is the coordination? I cannot believe people have to have that much medication to survive... (Female, Focus Group 3).

She expressed that a review of medications might lead to a reduction of medications and an improvement of an individual’s health-related quality of life.

A few participants had experienced the medication review process for themselves or for individuals for whom they were caring. A participant described how her primary care provider conducts medication reviews on a regular basis and how it helps reduce the number of medications she is taking.

The healthcare practice that I go to; I have to admire them. Part of your annual is you bring in your list of medications... They review it and they verbalize that they’re on a quest to look at these pills... and as a result of that, I’ve been able to get off one whole blood pressure pill a day, and we just titrated down... I admire that they’re looking at trying to eliminate unnecessary medications. You know they just need to review it and talk to you about it (Female, Focus Group 3).

Participants who had experienced the medication review process thought very highly of it and believed that it was an effective tool in medication management. Participants believed that taking fewer medications would alleviate the fear of being overmedicated and make it easier to manage medication regimens.

Another strategy that could facilitate regular medication reviews was the implementation of electronic medical records (EMR). Participants believed that doctors could use EMR to improve communication within and between practices. One participant discussed a situation in which a primary care doctor has referred a patient to a specialist:

[... The specialist’s office] is supposed to convey that information to the primary doctor. You do have to have some coordination of this or else you are over prescribed with medication. I don’t quite understand with this day and age, with all of this technology, why is it so difficult to get this information to one another (Female, Focus Group 1).

EMR were considered to be a useful tool, i.e. patients carried printouts generated from their record in place of hand-written medication lists. Additionally, they believed that they could use these lists to verify that their physicians had the most recent and accurate information.
Implementing community-driven support programs

Another perceived barrier to medication adherence was isolation or lack of social support. Participants believed that isolation and lack of social support made it more difficult for elders to accomplish aspects of medication adherence such as remembering to take medication and that isolated elders were less likely to have personal systems in place such as having a spouse or friend to remind them to take their medications.

To address this issue, participants recommended the implementation of community support programs or networks to aid with medication management. Participants spoke of their own experiences and informal strategies that they were already using, as well as suggestions that they believed should be implemented. The informal strategies that were already in place were occurring in social networks, and in church and community groups. One gentleman spoke of a system used by two of his friends. The two women lived across the street from each other and would raise their blinds every morning after they had taken their medication. If one woman failed to raise the blind, the other would call to make sure she was ok and to remind her to take her medication. Others spoke of having networks in place through church or other community groups to check on isolated elders. When speaking of these informal support systems, one participant described the role she takes with one of her friends:

You [have] to be there to help them remind them that they take the medication. Especially if the individual is really sick at that time. When...you’re hurting already you don’t want to be bothered with a pill. Now I have a friend like that. And she goes ‘I’m not going to take that’, I says ‘Take the pill, please take the pill. If you don’t take your pill, I’m not taking mine’. And then we go at it all day and then she finally takes that pill... (Female, Focus Group 9).

This participant described the role she plays and the lengths she goes to help her friends manage their medications. She calls her friends on a regular basis and asks whether they have taken their medications that day. If not, she will wheedle, threaten and outright bully them into taking their medications. Participants also made suggestions for formal community support systems that could help facilitate medication adherence among elders. A frequently made suggestion was creating a phone or visitation tree; people could join a phone list or a group and each person would be responsible for calling or visiting the next person on the list to remind them to take their medication. As one participant described: ‘as a person gets more elderly and you get forgetful, but if you do have somebody that you could have a name to call and find out did you take your medicine this morning or did you take it at noon’ (Male, Focus Group 6). This could not only help remind the person who was being contacted but also the person who was doing the contacting. One participant described the system her block club has in place to improve medication adherence in her community:

I’m personally [president of her block club], and my Vice President, we check on the neighbors, especially the seniors. We go from house to...make sure that person, that senior has had a meal and [ask] did you get your medication, did you get your script taken care? We’ve got a little notebook with us so if they tell us, such and such a thing happened, we log it down... (Female, Focus Group 8).

Whether formal or informal, participants believed that there was an important role for the community to play in improving medication adherence in older populations.

The medical advocate

The final perceived barrier to medication adherence discussed by participants was lack of understanding of medications, their side effects and potential drug interactions. Many participants believed that they could not successfully address their questions with their physicians. One participant described how her mother-in-law felt when discussing medications...
with her doctor: ‘My mother-in-law is very soft-spoken, and when she was going to the doctor, she always said: I feel like they don’t hear me, they don’t pay attention to what I say (Female, Focus Group 4). Some participants believed that physicians dismissed their concerns, did not give them time to ask questions, or in many cases answered questions in a way that was difficult to understand. Others found that their physicians were helpful and willing to discuss concerns about medications and side-effects. Many participants felt that their pharmacists were helpful and knowledgeable when discussing these issues as well.

In order to address their concern about not being well enough informed about their medication regimens, participants suggested making available a medical advocate whom patients and community members could go to with questions regarding medications. Some envisioned the medical advocate to be a person who could accompany the patient to the physician’s office. Their role would be to clarify what the doctor was saying and to ask pertinent questions:

Maybe even somebody going into the doctor with somebody else and saying, you know you might think that your taking what you need, but if somebody else sat down and said ‘Well, what is he taking this for? What is she taking this for?’ (Female, Focus Group 9).

A few participants believed that the medical advocate should receive payment outside of the healthcare system, i.e. the medical advocates should not be employed by medical practices, insurance companies, or pharmaceutical companies so that they had nothing to gain financially from the type of information or advice given. The participants described an advocate who would facilitate communication between the patient and the physician. Furthermore, participants described many different types of education regarding medication, including group sessions with pharmacists, physicians, or insurance companies.

It was also suggested that medical advocates could function in community settings. The advocate might visit a community center or an apartment complex at regular intervals to advise patients about their medications:

[There needs to be a] healthcare advocate who’s not a doctor, a pharmacist or an insurance sales man . . . someone who knows their medicine. They aren’t going to treat you, they aren’t going to lie to you, because it doesn’t do them any good one way or the other. They only get paid to advise you! (Male, Focus Group 3).

Despite the concern about financial ties to the healthcare system, there was an emphasis on the need for the medical advocate to have expertise and knowledge about medications. The participants believed that advocates could facilitate medication adherence by improving elders’ understanding of their medications and the medication adherence regimens.

**Discussion**

The purpose of this study was to report common barriers to medication management experienced by elders and their caregivers, and to describe solutions conceived of, and endorsed by elders and caregivers. The barriers identified, such as forgetting medications, cost, inadequate communication and coordination about medication among healthcare providers, large numbers of medications, insufficient social support for isolated elders and challenges communicating with healthcare professionals, are common barriers that have been previously reported in the literature [8, 33]. This is important because it indicates that the solutions presented here are for medication adherence barriers that are not unique to the participants in our study. Additionally, participants in this study were asked to go a step further than identifying barriers and play an active role in identifying solutions and strategies to improve medication management.

The strategies participants described to offset forgetfulness and cost are, for the most part, well documented in the literature [5, 8–10]. As left-over medications can be a contributing factor to
prescription drug abuse [34, 35], the strategy of attaining samples or a short-term prescription to test medications could have promising implications above and beyond cost reduction. Prescribing 7- to 14-day prescriptions might result in fewer unnecessary medications sitting on shelves and in medicine cabinets, thus reducing access, and potentially, the risk for abuse, of said medications.

A second solution identified by many participants was regular review of prescribed medications. The current focus of research on medication reviews is evaluating the cost-effectiveness of medication reconciliation in transitions of care and the number of adverse events it could prevent [16, 17]. Empirical studies on the topic have yielded mixed results, and so there is limited evidence on the cost-effectiveness or ability of these reviews to reduce adverse events [16, 17]. However, participants were requesting reviews for reasons other than reducing cost or avoiding adverse events. Participants expressed that reducing the number of medications taken would make medication adherence less challenging for elders and their caregivers. Indeed, research has shown that the more medications prescribed, the more difficult it is for patients to adhere to the regimen [36]. Additionally, a regular review of medications could help alleviate participants’ fears and concerns regarding overmedication. In a recent survey of physicians in Denmark, it was found that 85% of respondents felt that patients would benefit from regular medication reviews [37]. Indeed, in a recent study in Canada, it was found that medication reviews identified an average of two drug-related problems per participant [38]. Further research is needed to discover the full value of regular medication reviews for medication adherence and the most feasible method of implementing them within the US healthcare system.

Third, participants recommended implementation of informal and formal community-based support systems to facilitate medication adherence among elders. Henriques et al. found that elders incorporate management strategies into their daily routines, such as taking medication with a meal [39]. Our results indicate that community-based strategies may also be helpful. The focus in these approaches is on using existing social networks and personal systems to supplement the efforts of medical professionals. These strategies are potentially low-cost and can be implemented outside of the clinical setting. Furthermore, the community-based solutions described here may have particular implications for naturally occurring retirement communities (NORCs) and aging in place research. Successful medication adherence is essential to aging in place and is an important part of the NORC philosophy.

One approach to facilitate aging in place in NORCs is a ‘neighbors helping neighbors’ approach. This approach utilizes trained community members to provide ongoing peer-mentoring and support to promote health and wellbeing for elders who are aging in place. In one example, it was used to engage elders in health screenings [40]. Our findings present several strategies to facilitate medication adherence by using social networks to assist elders who are aging in place.

Finally, the suggestion of adding a medical advocate to the healthcare team emerged repeatedly during the focus group sessions. Research suggests that elders are hesitant to communicate with physicians about factors which may impact adherence to medications, such as costs and reducing medication regimen complexity [41]. The medical advocate would facilitate and interpret the interaction between the provider and the patient and/or play a consultation role in a community setting. The medical advocate would play a different role from a patient navigator, as patient navigators are primarily concerned with assisting patients in accessing the services at a clinic or hospital. A similar concept, a community medication consultant, has recently been gaining traction in Canada and Australia [38, 42]. In this literature, a pharmacist has been contracted as a consultant who performs in-home or community-based medication reviews and counseling and communicates the results with the primary care physician [42]. Evidence has shown that access to medication consultants can improve health outcomes, especially in elders [38, 42, 43], and that it can result in improved understanding of medications and medication literacy [42]. The medication consultant movement abroad may parallel the
medication management therapy movement in the United States [44, 45]. Medication therapy management is an emerging field in which the pharmacist plays a more active role in medication management. Medication therapy management services include medication therapy reviews, medication safety surveillance, and disease management and support [44]. Initial reports have demonstrated that medication therapy management has been cost effective and has improved health indicators [46, 47]. However, potential barriers to implementing medication therapy management in the United States include a lack of a sustainable reimbursement model and inadequate communication between pharmacists, physicians and patients [45]. More research is needed to determine whether such programs could be effective in elderly populations and whether more widespread implementation is feasible.

**Caregiver perspectives**

Although the inclusion/exclusion criteria of this study did not limit caregivers to family caregiver participants, only family caregivers responded and participated. The important role of the family caregiver in medication adherence in the elderly has begun to emerge in the last 15 years [48–50]. Review of the analysis of caregiver and elder responses showed that our caregiver participants discussed the same barriers and strategies to improve medication management as our elder participants. Although we are hesitant to draw comparisons between the two groups, in a review of the number of times codes were used, we found that caregivers suggested reviewing/reducing medication more than twice as often as elders. Our findings build upon the previous work that suggested that large/complex medication regimens create hassle for caregivers [48–50]; our caregivers reported large and complex medication regimens as a barrier to medication management and suggested a regular review of medications to potentially address this burden.

**Strengths and limitations**

The strengths of this study lie in the methodology used. Qualitative methods, such as focus groups, have been found to provide the detailed information processes, barriers and facilitators needed to improve healthcare quality, where quantitative methods, such as surveys, have not [51]. Qualitative methods have been used to explain the complexities of health and healthcare service provision [52, 53]. Additionally, the use of two independent coders added rigor to the data analysis. However, utilizing snowball sampling to recruit participants could have introduced volunteer bias into the sample. The volunteers who participated may have been more engaged and vocal than a randomly selected sample. Furthermore, due to the linguistic limitations of the focus group facilitator, the perspectives of non-English speaking participants were not included. Our sample only included family caregivers, which may limit the applicability of our findings for professional caregivers. However, as family caregivers can play an important role in medication adherence, a focus on understanding their unique challenges may be a strength of this work. A further limitation could be that the majority of participants had completed at least some college and may have had relatively high health literacy. However, we conducted focus groups in five different communities and we attempted to solicit a breadth of elder and caregiver perspectives. Another limitation may be that the interview guide was not pilot tested; however, it was developed in conjunction with a community stakeholder representative, which may have improved the credibility of the interview guide [54]. Finally, the study design was not intended to make comparisons between the elder focus groups and the caregiver focus groups. Rather, this was an exploratory study intended to gather as many varied perspectives as possible.

**Implications and conclusion**

Our study suggests that interventions to improve medication adherence among elders should not only expand upon well-documented strategies, but should also incorporate informal strategies currently used by patients. Future interventions should help elders maximize the use of personal systems in an
effort to help elders remember to take their medication. They should also alert physicians of the cost associated with certain prescribing patterns so that planning can be done to reduce the cost barriers certain patients face. Finally, they should ensure that patients work with their healthcare team to review and reduce medications, both to lower cost and reduce medication regimen complexity. More novel ideas to aid with medication management include expanding social support networks through community-driven support programs and introducing a medical advocate who can attend medical appointments and advise patients about medications and regimens. Research suggests that, for medication adherence in elders, the complexity of the intervention (i.e. interventions that target more than one strategy for change, such as educational strategies combined with self-management strategies) may be a determinant of success for the intervention [55–57]. Therefore, interventions to improve medication management in elders may benefit from combining multiple strategies, including those identified by our participants.

Understanding not only what healthcare consumers perceive as barriers, but also as acceptable and feasible solutions, may be an important part of promoting medication management. To this end, elders and caregivers have a powerful message regarding medication management. They are able to articulate the common issues faced by elders and are able to provide unique insight into practical solutions. Participants in the focus groups recognized that medication mismanagement was an issue for themselves and their friends, relatives and neighbors. The solutions they identified are noteworthy because they were generated by people dealing with managing medications on a regular basis and they are solutions that elders and caregivers believe would promote medication adherence and improve health-related quality of life for themselves, their peers and their communities. The solutions uncovered by this study will contribute to moving the medication adherence field past consumer-identified barriers and toward identifying effective solutions.

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Conflict of interest statement

None declared.

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