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Building Community-Engaged Multidisciplinary Partnerships to Improve Medication Management in Elderly Patients With Multiple Chronic Conditions

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Purpose	Many studies in preventing adverse drug events have been researcher-driven, yet few have engaged patients in the development of a project. This project aims to engage minority elderly patients with multiple chronic conditions in the development of research questions and strategies to improve medication safety.
Methods	Elderly patients (≥65 years old) who were prescribed 7 or more chronic medications were recruited through a university-based aging resource network in a historically African American community in Houston, Texas. Patients and a caregiver participated in a multidisciplinary workgroup comprised of a physician, pharmacists, a nurse, health educators, and a social worker. Patients were engaged by utilizing the 4 patient-centered outcomes research engagement principles. The workgroup created a strategic plan, completed an environmental scan, identified research problems, and reviewed current evidence-based approaches in the literature. Workgroup findings were presented to a broader audience within a community town hall setting, and input was collected from a community-wide survey.
Results	From April 2018 to July 2018, 3 patients and 1 caregiver participated in 5 multidisciplinary workgroup meetings. A total of 74 seniors attended the town hall meeting, and 69 completed the surveys. The most common drug-related problems among survey participants were doubts about drug advertisements (79%) and drug interactions (70%). Most participants (88%) were more comfortable in receiving face-to-face counseling compared to an app or virtual visits. Findings aided in developing 3 grant proposals.
Conclusions	This narrative provides a roadmap for conducting multidisciplinary, patient-centered participatory research to refine research strategies in minimizing drug-related problems. (<i>J Patient Cent Res Rev</i> . 2021;8:113-120.)
Keywords	drugs; side effects; adverse reactions; elderly; polypharmacy; patient-centered care; multiple chronic conditions

Adverse drug event (ADE), defined as injury caused by a medical intervention related to a drug, is a significant health problem in the United States.¹ ADE accounts for 3.5 million physician office visits, 1 million emergency room (ER) visits, and 125,000

hospital admissions each year.^{1,2} Two major independent risk factors for ADE are old age and multiple medication use (ie, polypharmacy).^{2,3} According to the U.S. Census, the population of adults age 65 and older has increased from 38.8 million in 2008 to 52.4 million in 2018 (a 35% increase) and constitutes about 18% of the U.S. population.⁴ The racial minority percentage is also projected to increase from 19% of the older adult population in 2008 to 34% in 2040.⁴ Studies have shown that elderly patients disproportionately experience higher rates of ADE-related ER visit (34.5% of all ADE-related ER visits are elderly) and hospitalization (43.6% of those elderly ADE-related

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ER visits result in hospitalization) compared to any age group.^{5,6} African American patients have been reported to experience a higher risk of ADE-related deaths.⁴

Elderly patients have a high prevalence of polypharmacy, with 29% taking more than 5 medications daily.⁷ This places nearly 1 in 22 older individuals at risk for significant drug-drug interactions.⁸ Medications used for chronic conditions such as anticoagulants, insulin, and opioid analgesics are implicated in about 60% of ADE-related ER visits.⁶ Most ADEs (50%–90%) have been reported to be type A adverse drug reactions, which are dose-related, predictable, and preventable events caused by known pharmacologic effects of drugs.^{2,9}

To overcome the critical problem of ADE, the Centers for Medicare & Medicaid Services developed regulations and guidelines for hospitals, clinics, and nursing homes, in partnership with patients, to promote safe medication use.¹⁰ Medication reconciliation strategies have had a positive impact on reducing ADEs, but the quality of evidence has been low and the definition of ADE lacks standardization.^{11,12} Most strategies to improve medication safety have been limited to medication education from provider to patient.¹³ In 2018, a multidisciplinary workgroup comprised of leaders in the fields of cardiovascular disease and aging concluded that more research would be needed to improve patient engagement and communication as well as coordination of care for older patients with multiple comorbidities who encounter multiple health care providers.¹⁴

To date, few studies in the literature have fully engaged patients as research partners to identify research problems or to design strategies for improvement. Herein, we describe an innovative patient engagement project — supported by the Patient-Centered Outcomes Research Institute (PCORI) — involving African American elderly patients with polypharmacy who reside in a single urban community. The primary goal of this project was to identify research problems and refine intervention strategies by engaging minority seniors with polypharmacy in the local community to improve medication safety.

METHODS

Patient Recruitment

This project was conducted in the Third Ward community of Houston, Texas, from April 2018 to August 2018. The study protocol was reviewed and approved by the institutional review board of Texas Southern University (Houston, TX). Third Ward is a historically African American community (population: 14,295) located approximately 3 miles from Houston's Texas Medical Center. In 2015, 8% of individuals residing in Third Ward were 65 years old or

older, 67% were African Americans, 22% did not have a high school diploma, and 51% had an income of <\$25,000 per year.¹⁵ It is the 15th most dangerous neighborhood in the United States, where approximately 1 in 13 individuals becomes a victim of a violent crime every year.¹⁶

The primary participants recruited were African Americans. To reach this specific group in Third Ward, which has been underrepresented in research studies historically, investigators collaborated with a university-based geriatric community network for patient recruitment. This community network has been active in engaging seniors in the Third Ward and Greater Houston for over 20 years. Prior to study recruitment, the pharmacist investigators provided 2 free community health-screening activities at the Third Ward Community Center and the Hobby House (a local gathering home) to engage with local seniors. Each health-screening activity included a presentation about polypharmacy, a blood pressure screening, and a comprehensive medication review.

The director of the geriatric community network assisted with hosting a recruitment event to a senior exercise group that met at Emancipation Park in Third Ward. Investigators presented project goals, eligibility criteria, time commitment, and compensation at the event. Interested parties completed the patient partner consent forms and the eligibility screening forms. Eligibility for participation in the multidisciplinary workgroup included individuals 65 years old or older who consumed 7 or more chronic medications daily and resided in Third Ward.

The project target included recruiting 3 patients and 1 caregiver to participate in a multidisciplinary workgroup focused on improving the safe use of medication. The rationale for selecting a small number of patient partners to participate in the workgroup was to build a close relationship and trust between the researchers and the patient partners in the exploratory stage of the study. The patients and caregiver were termed “patient partners” because they served as partners in the research development. The role of patient partners was to actively participate in each workgroup meeting. Patient partners served as representatives of the Third Ward community at large to share opinions about medication safety. They were selected based on eligibility criteria and their availability to attend workgroup meetings. If more individuals were eligible than the target recruitment number, those individuals would serve as alternates when a patient partner could not attend a meeting.

Stakeholder Recruitment

Invitations were sent to local health community partners, including city-funded community centers, faith-based

organizations, university health-related disciplines (health educator program and geriatric community network), and 2 prominent Texas Medical Center-affiliated institutions (medical school and hospital) to form a multidisciplinary workgroup consisting of a physician, nurse, pharmacists, health educators, and social worker. The goal was to recruit at least 1 member from each discipline along with 1 alternate for the workgroup. The role of the physician, nurse, and pharmacist was to provide insights into the identification of research questions and strategies. The role of the health educator and social worker was to serve as gateways to patient recruitment into workgroup and town hall meetings. Health educators were extremely resourceful about existing health-related promotional activities in the community.

Workgroup Tasks

The overall goal of the workgroup was to engage patient partners in identifying research problems and refining research strategies for medication safety. The workgroup was tasked with 4 activities: 1) create a strategic plan; 2) complete an environmental scan and problem identification; 3) participate in comparative effectiveness review of current evidence-based approaches; and 4) organize a community town hall meeting to solicit input on research strategies from a boarder group of seniors in Third Ward.

An environmental scan was guided by 3 questions modified from the principles of the Asset-Based Community Development process.¹⁷ The 3 discussion questions were: 1) What community resources have been most helpful for seniors taking multiple medications to improve medication safety? What helps you to be better informed about how to take your medications? 2) How can the Houston community better support seniors who take multiple medications based on existing strengths? What are needs not being met? 3) What help would you need the most right now to improve medication safety? Each workgroup member was encouraged to express his/her opinion and had a chance to speak during the discussions.

Workgroup discussions were recorded and transcribed by research personnel. Transcripts were evaluated by thematic analysis to identify the common consensus of medication safety-related problems experienced by this workgroup.

Literature Search

Project investigators conducted a literature search via the Texas Medical Center Library One Search database using the terms “polypharmacy,” “adverse drug events,” “intervention,” “elderly,” “community,” and “pharmacist.” Only primary literature and guidelines in an outpatient community setting were included. A lay summary of each article was presented to the workgroup, followed by discussions in 2 workgroup meetings after research

problem identification and before research strategy discussion. The summary contained article citation, study population, setting, intervention, results, and conclusion. Patient partners provided comments and feedback on the strategies and outcomes of the studies reviewed.

Community Town Hall and Survey

Workgroup members assisted with the design, promotion, organization, volunteering, and execution of the community town hall meeting. The town hall included an introduction about patient-centered research, a report about the workgroup activities, sharings from each workgroup member, and a collection of community feedback on the name of the proposed project, medication-related problems, and strategies obtained via a written survey. After the presentations, participants were free to visit booths of vendors representing a variety of local health clinics and community organizations. Each participant received a medication organizer (pillbox) and a complimentary lunch.

Engagement Approach

This project was carried out based on the 4 patient-centered outcomes research engagement principles for engaging a hard-to-reach population: reciprocal relationships, partnerships, co-learning, and transparency-honesty-trust.¹⁸ In reciprocal relationships, all workgroup members were viewed as equal partners and key personnel. Investigators and workgroup members developed a collaborative strategic plan, which described the role of each member in the decision-making process.

As partners, workgroup members were compensated for their time and effort in attending the workgroup meetings. A mutually agreed contract was established for each workgroup member, which specified hourly pay, time commitment, and job description. The cost for parking to attend workgroup meetings was included in the compensation. The meeting location and time were set according to the patient partners’ activity schedule. Investigators traveled to patient partners’ preferred meeting locations. Investigators and workgroup members were selected based on expertise in their respective disciplines and the ability to adapt to and meet the cultural needs of this patient partner group.

In co-learning, investigators helped patient partners and community partners to understand the research process and patient-centered research. Peer-reviewed articles were summarized in lay terms (ie, third-grade reading level) and discussed with patient partners. Patient partners and other workgroup members were actively engaged in identifying the research problem and reviewing the potential causes of and solutions for the research problem.

In transparency-honesty-trust, each patient partner had a chance to express their opinion and cast votes to make decisions. Patient partner votes counted as twice in weight compared to other workgroup members. Decisions made were carried out and reported during the next meeting. Both patient partners and investigators arrived at the meetings on time to show respect for all attendees' time and effort.

RESULTS

Workgroup

A total of 24 seniors attended the recruitment event. Of those, 3 individuals and 1 caregiver were interested in and eligible to participate in the project. The workgroup formed consisted of those 4 participants along with 3 pharmacists, 1 physician, 1 nurse, 3 health educators, and 1 social worker. Most workgroup members (90%) were African Americans. All patient partners were African American women. This collaborative workgroup consisted of representatives from the medical school, the college of pharmacy, the health educator program, 2 Texas Medical Center-affiliated hospitals, and 2 community organizations.

The workgroup had meetings every other week from June to August. Each meeting lasted for approximately 1 hour during lunchtime, of which complimentary food and beverage were provided. Two patient participants attended all 5 meetings; the other patient missed 2 meetings due to a personal conflict. The physician, nurse, pharmacists, caregiver, health educators, and social worker were in attendance for all the meetings. Patient partners were actively engaged in all the meetings, and examples of their involvement are listed in Table 1.

To begin the first workgroup meeting, members played 2 ice-breaker games to meet and greet. The group created a strategic plan consisting of the mission, goals, project period, objectives, membership requirements, role and expectations of workgroup members, meeting dates, decision-making procedures, compensation, and communication methods. The group decided that patients' votes would count double in the decision-making process. The meeting location and time were based on the participants' schedule, either at the Emancipation

Table 1. Summary of Patient Partners' Engagement Activities

Milestones	Patient Engagement Examples
Create a strategic plan	<ul style="list-style-type: none"> • Patient partners in the workgroup acted as key personnel for the project by deciding on the location and time of each meeting. They suggested that the best time to meet was after their exercise activities, and location varied according to their exercise schedule. • Patients' votes counted double in the decision-making process of the workgroup.
Environmental scan	<ul style="list-style-type: none"> • Patients provided input on what has been effective in promoting medication safety in the community. They mentioned local pharmacy, church, clinic, community centers, radio, TV, and friends.
Problem identification	<ul style="list-style-type: none"> • Patient partners in the workgroup identified major problems they experience related to adverse drug events.
Literature review	<ul style="list-style-type: none"> • Investigators presented short summaries of studies on interventions to improve medication safety by using a standardized template. • A patient partner found and communicated with the investigator a novel intervention found on PubMed.
Community town hall meeting	<ul style="list-style-type: none"> • Patients decided on the best time, location, and name of the town hall meeting. • Patient partners helped with the planning of the town hall meeting. • Patient partners who participated in the workgroup shared their experiences with peers in the panel discussion. • Patients at the town hall voted to decide on the name of the project. They provided feedback on the importance of research problems identified by the workgroup.
Identify research strategies	<ul style="list-style-type: none"> • Patient partners in the workgroup actively shared the strategies that are most suitable for themselves and their peers. • Patient participants in the town hall provided feedback on proposed strategies through a survey.
Grant application	<ul style="list-style-type: none"> • Patient partners provided letters of support in two Patient-Centered Outcomes Research Institute grant applications in 2019. • Patient partners continued in the National Institutes of Health's Regional Centers in Minority Institutions grant application under community engagement core activities.

Park community center or Texas Southern University's recreation center. The strategic plan was reviewed and adopted during the second workgroup meeting for the project period April–August 2018.

Existing resources for medication safety in the communities identified by workgroup members included local pharmacies, clinics, hospitals, a church (a weekly blood pressure screen), community, university programs, radio, TV, relatives, and friends. Patient partners shared their interactions with pharmacists mostly through retail chain pharmacies. They were not familiar with medication therapy management provided by a pharmacist in the ambulatory care clinic. Patient partners shared problems experienced when managing multiple medications, including experiences of having ADEs among themselves, families, and friends. The thematic analysis identified 8 drug-related concerns and problems (Table 2).

Investigators conducted a PubMed literature search that resulted in 6 articles to be reviewed with the workgroup.¹⁹⁻²⁴ The presentations of articles described effective strategies to reduce drug-related problems in elderly patients with polypharmacy, such as comprehensive medication reviews and examples of clinical interventions. Based on the evidence presented, the workgroup identified 4 potential strategies that would be appropriate for their target population (Table 3). After the literature review discussion, 1 patient workgroup

member found and shared a peer-reviewed article in PubMed on the use of a self-quantification system for personal health information to the group.²⁵ As a result, the use of mobile app technology was added to one of the strategies to be surveyed by town hall participants.

Community Town Hall and Survey

Workgroup members were actively involved in the planning of the town hall meeting. They named the town hall Ready for Action PCORI, created flyers to promote it, provided advice on the type of promotional gifts for attendees, and volunteered on the meeting dates. Ready for Action PCORI had 74 participants (69 female, 5 male) in attendance and booths for 10 community health promotional vendors from the city of Houston, private hospitals, and university-based organizations. The meeting began with an introduction to patient-centered research, followed by introduction of the workgroup members.

A survey consisting of the 8 research problems and 4 potential strategies developed by the workgroup was presented to town hall participants for review, and their input was solicited. Participation in the survey was voluntary. A total of 69 participants completed the survey. The majority of participants agreed to having experienced the following problems: multiple medications prescribed by multiple providers, drug-drug interactions, drug commercials, drug side effects, feeling overwhelmed with the drug information provided, and a lack of home

Table 2. Community Town Hall Survey Respondents on Research Problems

Drug-Related Concerns and Problems*	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I go to see doctors from different facilities, and each prescribes new medications. It can get very confusing. (n=69)	23 (33%)	20 (29%)	8 (12%)	10 (14%)	8 (12%)
I am not able to know if one drug that was given by one physician will interact with the rest of my medications. (n=68)	22 (32%)	26 (38%)	11 (16%)	7 (10%)	2 (3%)
I am not sure if the information in drug advertisements is trustworthy or not. (n=69)	34 (49%)	21 (30%)	7 (10%)	4 (6%)	3 (4%)
The drug information given with the bottle from the pharmacy is not helpful. It makes me feel overwhelmed. (n=69)	18 (26%)	18 (26%)	10 (14%)	19 (28%)	4 (6%)
I take a medication for a problem, but that results in a side effect that created another problem. (n=68)	20 (29%)	22 (32%)	12 (18%)	10 (15%)	4 (6%)
My medication costs too much money. I do not take the prescribed medications every day, and I try to save them even if they are expired. (n=69)	19 (28%)	7 (10%)	14 (20%)	19 (28%)	10 (14%)
I forget to take my medications. (n=69)	8 (12%)	19 (28%)	14 (20%)	18 (26%)	10 (14%)
I do not have a medication list with me, so I cannot tell the doctor what I am taking in case of an emergency. (n=68)	16 (24%)	28 (41%)	11 (16%)	8 (12%)	5 (7%)

*n<69 indicates not every participant responded to the question.

Table 3. Survey Respondent Preferences for Research Interventions

Drug-Related Concerns and Problems*	Very Comfortable	Comfortable	Neutral	Uncomfortable	Very Uncomfortable
How comfortable are you to talk to a health professional to review your medications? (n=69)	45 (65%)	16 (23%)	4 (6%)	3 (4%)	1 (1%)
How comfortable are you in using a medication reminder app through your smartphone? (n=67)	15 (22%)	8 (12%)	24 (36%)	7 (10%)	13 (19%)
How comfortable are you in having a virtual pharmacist visit through a web camera with the help of a health educator? (n=67)	12 (18%)	11 (16%)	23 (34%)	12 (18%)	9 (13%)
How comfortable are you in having a peer buddy or peer group to help with medication management? (n=69)	10 (14%)	11 (16%)	25 (36%)	14 (20%)	9 (13%)

*n<69 indicates not every participant responded to the question.

medication lists. Surprisingly, the cost of medications and forgetfulness to take chronic medications were perceived as less-agreed problems.

Most participants (88%) were comfortable with receiving face-to-face counseling by a health care professional. They were less comfortable with using a medication management app, having virtual visits with a health care professional, or having a peer to assist with medication management.

Research Project Proposals

Based on the workgroup feedback and community survey, investigators developed a research proposal featuring a patient-centered intervention study to compare comprehensive medication reviews virtually assisted by a health educator versus face-to-face assistance. The patient partners in this study provided letters of support to express a willingness to serve as patient collaborators. The proposal also expanded the setting to include Houston's Fifth Ward community. The proposal was submitted to a PCORI funding opportunity in 2018 and received comments to improve the proposal in 2019. A revised proposal was submitted in 2019 but was not funded.

Patient partners remained engaged in the development of a Research Centers in Minority Institutions (RCMI) program grant from the National Institute for Minority Health and Health Disparities. Patient partners and workgroup members were collaborators in the community engagement core of that grant proposal, which was awarded by RCMI in September 2020 (2 U54 MD007605-27A1). An additional R15 grant proposal was submitted in February 2021.

DISCUSSION

This project demonstrates a successful patient-centered model to engage minority elderly populations with polypharmacy in identifying problems and making shared decisions on research strategies. Patient partners identified 7 potential ADE-related problems. They reported confusion about receiving prescriptions from different providers and worried about potential drug interactions. They also noted that most medical providers prescribe based on medication histories obtained verbally from patients without access to their official patient charts. A stunning 65% of town hall survey participants reported not maintaining a home medication list and would be unable to tell a provider what they are taking in an emergency.

The problems identified by this workgroup are similar to those developed by professional experts from the American College of Cardiology (ACC), the American Geriatrics Society (AGS), and the National Institute on Aging (NIA).¹⁴ According to the ACC/AGS/NIA guidelines, the most critical research problem among patients with polypharmacy is the coordination of care/medications in patients with multiple comorbidities managed by multiple providers.¹⁴ Further intervention is needed to solve this critical problem to enhance medication safety in this community.

The complexity of the medication regimen has been associated with increased cost-related nonadherence in the elderly population.²⁶ About 42% of the survey participants disagreed that their medications cost affected adherence negatively. Patient partners in the workgroup (with polypharmacy) also expressed a similar opinion when ranking the most critical research problem. Our

study was limited in that the town hall survey did not capture the presence of drug insurance or the number of medications taken. Cost-related nonadherence will be higher if a patient is taking multiple medications without insurance or with limited insurance coverage. However, residents without insurance can apply for county discount cards or federally qualified health centers and receive medications with restricted formulary in minimal fees. In a workgroup meeting, a patient partner who had polypharmacy expressed that her medication cost was reduced by using discount plans by Harris County and promotions from retail pharmacies, which can cost as little as \$4 per month. A study by Watanabe et al reported that actual cost of medication use extended beyond just the cost of purchasing the medications.²⁷ The estimated cost associated with nonoptimized medication therapy due to treatment failure was up to \$528.4 billion in 2016.

Another limitation of our study was that it recruited seniors from a community exercise/health promotion program through the university-based geriatric resources network. Therefore, patients who were disabled, were bedridden, or lacked interest in exercise and health promotion activities were not included. Most workgroup and town hall participants were female, and this could limit the applicability of the result to male elderly patients. Patient partners and town hall participants varied in literacy level and knowledge in the use of electronic devices, and this could affect the result of the study.

Another observation was that close to half of the survey participants (45%) reported they disagreed that they forgot to take their medications. The lack of perceived forgetfulness in taking medications has been reported and potentially due to social desirability bias, in which patients tell the provider what they want to hear to avoid embarrassment.²⁸

Patient partners were fully engaged in shared decision-making during each meeting, and the attendance to workgroup meetings was optimal (100% for 2 patients and 1 caregiver, and 60% for 1 patient). This success can be explained by clear communication in each workgroup meeting. Health educators who were responsible for senior activities assisted tremendously in reminding patient partners about meetings. Each meeting date was discussed and agreed to through face-to-face interaction at the previous meeting. Additionally, patient partners communicated with investigators between meetings about ideas, articles, and questions about the upcoming meeting.

The success in having a high attendance for the community town hall meeting was assisted by health

educators calling each senior in the network about the event and peer advertisements by the patient partners in the workgroup. Patient partners were allowed to volunteer as speakers on the panel. Some were hesitant to join at first, but eventually, all 3 patient partners and the caregiver partner stepped up to share their experiences in the town hall meeting.

CONCLUSIONS

This narrative provides a roadmap for conducting multidisciplinary, patient-centered participatory research to answer complex clinical questions. The next step includes refining the procedures described herein to continuously improve community-engagement strategies and promote shared decision-making in the development of interventions aimed at minimizing the adverse drug events that occur due to multiple drug therapies among elderly patients with multiple comorbidities.

Patient-Friendly Recap

- Improper taking of medications by elderly patients prescribed multiple drugs for multiple conditions can lead to serious adverse events.
- With the goal of informing a research proposal aimed at improving medication management, authors engaged seniors from a historically African American community to participate in workgroup and town hall meetings.
- Common problems reported by patient partners were doubts about drug advertisements and interactions between drugs.
- Most seniors were more comfortable receiving face-to-face medication counseling vs app/virtual visits.

Author Contributions

Study design: Poon, Skelton, Bean, Guinn, Jemerson. Data acquisition or analysis: all authors. Manuscript drafting: all authors. Critical revision: Poon, Skelton, Mbue, Charles, Ndefo.

Conflicts of Interest

None.

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