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Perceptions of the Intensity of Heart Failure Medications among Hospitalized Older Adults: A Pilot Qualitative Study

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Background: Guidelines for heart failure (HF) management recommend high target doses for medications. These targets are based on standardized dosing regimens that rarely consider the complex challenges faced by older patients. However, little is known about such challenges perceived by older adults. We assessed older adults' perceived challenges with HF medication utilization, which may guide a more patient-centered definition of the target intensity for HF medications. **Methods:** We conducted a pilot qualitative study using one-on-one, semi-structured interviews with older adults. We included patients over the age of 65 years admitted to the acute cardiac care units (cardiac intensive care unit or cardiac intermediate care unit) with a known diagnosis of HF. We conducted a deductive and inductive thematic analysis based on a prior conceptual framework for the Medication-Related Burden Quality of Life tool. Subthemes and themes were finalized with two other coders who were study investigators. **Results:** Ten patients were enrolled in the study. Six major themes were identified in the perception of challenges of HF medication utilization. The most common themes were experiencing adverse drug effects (80%) and psychological distress (80%), followed by problems in logistics (70%), the burden from the number of medications (70%), impact from patient-doctor relations (70%), and burden from the cost (40%). **Conclusions:** The results from this pilot study provide preliminary insight into the perceived challenges of HF medication utilization and the distinctive ways the treatment burden is experienced by patients. These results will need validation in larger studies and different patient settings.

Key Words: Heart failure, Drug therapy, Qualitative research

INTRODUCTION

Heart failure (HF) imposes a substantial societal burden and represents a significant public health challenge. As one of the leading causes of mortality and morbidity, HF predominantly affects older adults, up to 80% of patients with HF are 65 years of age or older.[1-3] Despite progress in HF management, the financial burden to society remains high, costing about $40 billion per year, and the cost of HF is projected to ever increase, with the estimated annual cost reaching $70 billion by 2030.[4,5]

Older adults with HF are at high risk of significant medication-related problems. In the last few decades, guideline-directed medical therapy for HF has evolved by adding medications with survival benefits one by one to the list of multiple medications, recommending a combination of several medications, including beta-blockers, angiotensin-converting enzyme inhibitors, mineralocorticoid receptor antagonists, or sodium-glucose cotransporter 2 inhibitors.[4-7] Consequently, older adults with HF experience high medication burden and complexity, taking an average of 6.8 prescribed medications per day with 10.1 doses per day.[8] Ironically, though such combinations of medications with complex dosing regimens have shown survival benefits among patients with HF,

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the medications have brought problems, including medication errors, drug-drug or drug-disease interactions, and adverse drug effects capable of compromising clinical outcomes, including increased rates of hospitalization and readmission.[4-14]

For similar reasons, older adults are known to be less likely to get prescribed the target high doses of HFrEF (heart failure with reduced ejection fraction) medications.[15] The American College of Cardiology Foundation/American Heart Association Guideline (ACCF/AHA) for the Management of Heart Failure recommends titrating the dose of HF medications up to the target dose as tolerated. However, in real-world populations, fewer than 30% of older adults get prescribed the target dose of beta-blockers.[15]

Therefore, there has been speculation that the target dose of the recommended medications may not be practical for older adults.[16] Current definitions of the target focus solely on dose intensity, not accounting for the multidimensional challenges associated with medication utilization. This oversight is particularly crucial for older adults who are taking multiple medications with a high risk of medication-related problems. From an older adult's perspective, the overall intensity of medication utilization should encompass factors beyond dose intensity. Understanding how older adults perceive challenges in HF medication utilization and identifying key aspects we have to account for when defining the target intensity of HF medications could help clinicians establish more effective, safe, and patient-centered targets in HF management. However, little is known about older adults' multidimensional perceptions of HF medication utilization. Therefore, we performed a qualitative study to identify and understand older adults' perceptions of challenges in HF medication utilization.

MATERIALS AND METHODS

Setting, Participants, and Study Design

We conducted a pilot qualitative study of one-on-one, semi-structured interviews engaging older adults (age ≥65 years) who were hospitalized in the acute cardiac care units (cardiac intensive care unit and cardiac intermediate care unit) at Memorial Hermann Hospital at Texas Medical Center from December 2021 to May 2022. Interviews were conducted during their hospitalizations. We excluded individuals who were diagnosed with HF for the first time during that hospitalization, could not answer the questions properly due to mental status changes, or declined to participate. We conducted interviews until thematic saturation was obtained,[17] and adhered to the Consolidated Criteria for Reporting Qualitative Research (Supplementary Table S1).[18] This study was reviewed and approved by the Institutional Review Board at the University of Texas Health Sciences Center at Houston (No. HSC-MS-21-0874).

Previous Framework

We used a framework of the Medication-Related Burden Quality of Life tool by Mohammed et al.,[19] with four domains related to the medication-related burden affecting the quality of life (social well-being, psychological well-being, physical functioning, and physical burden). Given that our study aimed to explore the patients' multidimensional perceptions of HF medication utilization, this framework may not encompass all aspects that older adults may experience. However, in the absence of a pre-existing framework for this specific research question, we adopted this conceptual model that assesses several domains related to medication utilization experience. Additionally, we used open-ended questions to capture a broader range of perspectives from participants.

Interview Guide

We formulated the interview guide (Table 1) through collaboration with a group of community members from the University of Texas MD Anderson Cancer Center Community Scientist Program at UTHealth.[20] The Community Scientist consists of diverse community members who give feedback to the researchers regarding the research design, feasibility, and cultural appropriateness.

The final interview guide had four key questions. The first question is a general open-ended question asking participants what they think of their heart medication utilization experience. Second, we asked in which situation they would feel that the medications were too much, with prompt questions inquiring about side effects, medication number burden, effect on cognitive or executive function, or impact on diet. Thirdly, we inquired about what would make medication management easier, with prompt questions about the medication's dosing, frequency, timing, refilling schedule, and costs. The last question was about their overall issues in medication management.

Two authors (N.A. and S.S.) conducted all in-person interviews in the hospital. The interviews were audio-recorded, de-identified, and professionally transcribed. After the transcriptions for the first nine interviews were completed, two authors (N.A. and M.K.) independently reviewed each interview and developed a codebook with the themes using inductive and deductive thematic analysis.[21] Then, N.A. conducted another interview to ensure no additional theme would emerge. After 10 interviews were transcribed, the additional independent coders (M.H. and C.B.) reviewed all the interviews and refined the codebook. The final codebook identified six themes describing the older adults' perceptions of challenges in HF medication utilization.

Table 1. Interview guide questions

1. What do you think about your heart medications?
a. Are there any specific concerns in taking heart medications?
2. In what situation have you felt that your heart medications are too much?
a. What if you had side effects?
b. What if you think you are taking too many medications?
c. What if you forgot to take your medications?
d. What if you could not remember which medication is for heart?
e. What if your diet has been affected by the medications?
3. If you would like to change the medication schedule to make you more comfortable, what would you like to change?
a. What about the dose of the medication?
b. What about the frequency of the medication?
c. What about the timing of the medication?
d. What about refilling schedule of the medication?
e. What about the cost?
4. In what situation have you felt that you have problems managing your medications?

RESULTS

Patients' Basic Characteristics

We completed interviews with 10 hospitalized older adults with chronic HF (Table 2). Of the 10 patients enrolled in the study, 8 (80%) were females and 2 (20%) were males. Six patients had HF with preserved ejection fraction, three with HF with reduced ejection fraction, and one with unknown ejection fraction. The mean age was 74.7 years, with a standard deviation of 7.75. Four patients (40%) were Whites, and 4 (40%) were African Americans. The mean number of comorbidities that they had, except for HF, was 6.4 with a standard deviation of 2.01, and the mean number of medications that they were prescribed at the time of the interview was 12.3 with a standard deviation of 4.52.

Themes Recognized in the Patient's Perceived Challenges in HF Medication Utilization

Through our analysis, we identified six major recurring themes in the perception of HF medication utilization (Table 3).

Theme 1: Adverse drug effects

Out of the 10 patients participating in the study, eight expressed concerns about adverse drug effects, which were perceived as a significant burden. The most reported adverse effects were fatigue, drowsiness, generalized weakness, frequent urination, easy bruising, and nose bleeds. In the words of one patient, "Making you sleepy all the time, and then I don't have any energy to do anything. Sometimes I wake up and half of the day is gone and messed up." Another patient mentioned his distress regarding frequent urination in these words "Furosemide, shoot, I was pissing, pissing like a cow on a flat rock. I couldn't hold nothing. I couldn't go nowhere. I couldn't even go downstairs and socialize with nobody. I'm a singer. I'm pretty good, but I can't do that. I can't even stand up. If I stand up, it's going to come down." Easy bleeding was also of significant concern: "Yeah, and I 'm bruised all the time", and a patient's spouse reported: "if he has a little cut, we worry about it as the least little cut makes up (makes him bleed)."

Theme 2: Psychological distress

Eight out of 10 study patients exhibited distress in the form of losing self-esteem and dignity, guilt or worry, the fear of forgetting to take the medications on time, and distress because of the dietary restrictions imposed on them due to their heart medications. "It (medicine) was killing my purpose. I couldn't be the real me. Part of me that – nature and God gave me is gone because I cannot identify myself. I don't know who I am myself. So, you – that throw you off your purpose in life. If you don't have no purpose, you don't have nothing." Another patient had significant psychological distress about the constant worry and fear of missing a medication, which is evident in these words. "I feel so bad. I think about it so much. I say, oh, my God, I missed my medication. They're not going to be happy of that." The following quote is an example of guilt felt when a medication was forgotten or not given on time by a family member. "It feels like I have let him (the patient) down and not done what I should. ----Mm-Hmm and then I get mad at him (patient) because he didn't remind me." Another distress we identified was a concern about the dietary restrictions the patient had to follow while taking HF medications: "The medicine keeps me from eating what I want."

Table 2. Patient characteristics

Sex/Age (y)	Race/Ethnicity	Type of HF	Number of comorbidities except for heart failure	Number of medications
Female/71	Hispanic	HFpEF	9 (atrial fibrillation, anemia of chronic disease, chronic kidney disease, diabetes mellitus, hypertension, hyperlipidemia, morbid obesity, obstructive sleep apnea)	16
Female/82	African American	HFrEF	3 (breast cancer, hyperlipidemia, hypertension)	20
Female/67	African American	HFpEF	5 (stroke, pulmonary embolism, atrial fibrillation, hypertension)	7
Male/74	African American	HFpEF	4 (atrial fibrillation, chronic obstructive pulmonary disease, diabetes mellitus, hypertension)	7
Female/69	other	HFrEF	6 (atrial fibrillation, alcohol abuse, anemia of chronic disease, hypertension, hypothyroidism and mild liver disease)	6
Female/70	White	HFpEF	8 (coronary artery disease, chronic obstructive pulmonary disease, stroke, diabetes mellitus, hypertension, hypothyroidism, peripheral arterial disease, obstructive sleep apnea)	15
Female/66	African American	HFpEF	9 (chronic obstructive pulmonary disease, coronary artery disease, diabetes mellitus, gastroesophageal reflux disease, hypertension, hyperlipidemia, hypothyroidism, morbid obesity, obstructive sleep apnea)	14
Male/75	White	HFrEF	6 (coronary artery disease, atrial fibrillation, end-stage-renal disease, hypertension, hyperlipidemia, hypothyroidism)	13
Male/85	White	Unknown	7 (atrial fibrillation, diabetes mellitus, hyperlipidemia, hypertension, hypothyroidism, major depression, peptic ulcer disease)	11
Female/88	White	HFpEF	7 (coronary artery disease, chronic obstructive pulmonary disease, cerebral venous sinus thrombosis, hypertension, atrial fibrillation, chronic kidney disease, obstructive sleep apnea)	14

HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction.

Table 3. Identified themes related to the older adults' perceptions on HF medication utilization

Themes identified	Number of patients (%)	Examples of the quotes from the patients
Adverse drug effects (e.g., fatigue, drowsiness, generalized weakness, frequent urination, easy bruising, or nose bleeding)	8 (80)	"...make you sleepy all the time, and then I don't have any energy to do anything", "I couldn't hold nothing (referring to urination). I couldn't go nowhere. I couldn't even go downstairs and socialize with nobody"
Burden from Psychological distress on patients (e.g., losing self-esteem and dignity, guilt or worry, fear of forgetting to take medications on time, or distress because of dietary/lifestyle restriction)	8 (80)	"It (medicine) was killing my purpose. I couldn't be the real me", "I feel so bad. I think about it so much. I say, oh, my God"
Problems in logistics (e.g., multiple steps in picking up the medication, requesting for refills, or finding a pharmacy)	7 (70)	"the refill is no problem. It's getting the medication to me. That's what the problem is. Because I don't have any way to go there", "Yeah, it's hard for one person to do it. Even for me being a healthy person. It takes a village"
Burden from the number of the medication (e.g., too many medications)	7 (70)	"I don't want to take all this medication,… I'm so tired of taking all this medication. It's too much", "I wish I didn't have to take so many"
Impact from the patient-doctor relations (e.g., mistrust, skepticism, or dependency on physicians)	7 (70)	"I just take it (medication). Doctor tells me I need it, I take it.", "The same, the pharmaceutical and the insurance is getting more money"
Burden from the cost of the medications (e.g., fixed income)	4 (40)	"The only thing that bothers me is I don't want to leave this world in debt", "I stopped it (medications)about two and a half months ago because I couldn't afford them"

Theme 3: Problems in logistics

Seven out of 10 participants were burdened because of the logistics of getting the medications. Most are reported as the multiple steps involved in picking up the medications, calling the doctor's office for refills, and trying to figure out which pharmacy a certain medication may need to be picked up. As one patient reported in the following words: "(No), the refill is no problem. It's getting the medication to me. That's what the problem is. Because I don't have any way to go there." There was frustration associated with multiple family members' engagement, which was required to ensure that medications were provided promptly and no lapses occurred: "Yeah, it's hard for one person to do it. Even for me being a healthy person. It takes a village."

Theme 4: Burden from the number of medications

Seven out of the 10 study participants reported the number of

medications taken as a significant burden. "I don't want to take all this medication, ------I'm so tired of taking all this medication. It's too much. At first, I was taking eighteen different medications at one time." Another patient reported in these words, "I don't know. I take so many that the list when I type it out double spaced fills an eight and a half by eleven sheet of paper this way, by the eleven." Another patient's spouse expressed this concern in these words: "Every morning when you take that handful, he says, "I wish I didn't have to take so many." These quotes indicated that several patients were focused on the number of pills they had to take and perceived themselves as sicker as the number of pills increased.

Theme 5: Impact from the patient-doctor relations

While some patients expressed themes of dependency on their physicians, others had mistrust and skepticism, especially of the pharmaceutical companies' influence on their physicians. "I just take it (medication). Doctor tells me I need it, I take it." This statement illustrates the complete trust in their doctors, while other patients were very open about their disconcert and mistrust of the healthcare system. "The same, the pharmaceutical and the insurance is getting more money. They about the richest company than any other in the United States." Another patient reported similar concerns in the following words. "I worked in a doctor's office. And, you know, we got bombarded by drug reps and things they have. And the drug reps tend to push things……, you know, you get the free samples. But that may not necessarily be the right one, you know, the most expensive antibiotic isn't possibly the best one because it's new on the market."

Theme 6: Burden from the cost of the medications

The cost of the medications was the least reported category in the context of the treatment burden, with only four out of 10 study participants reporting it. "Because at our age living on a fixed income, it gets kind of tight every once in a while. And then if you add hospital visitations and hospital on all that stuff, it all adds up real quick. And man, pretty soon you find out you can't pay your bills……. You've got to make a choice whether you pay your bills or eat. …. The only thing that bothers me is I don't want to leave this world in debt. Another patient reported, "I stopped it (medications) about two and a half months ago because I couldn't afford them. And so, I finished up the medications that I had."

DISCUSSION

Medications, while essential for treating chronic medical conditions, can be associated with a significant burden.[22] Patients experiencing severe medication-related burdens often report poor health-related quality of life.[19,23,24] Therefore, an appropriate tool to assess the medication-related burden is needed to ensure that patients benefit from the medications while minimizing the negative effects. The guidelines for HF management recommend relatively high target doses for older adults, without comprehensive consideration of such patient-centered challenges into the "target." Furthermore, existing tools for assessing medication burdens,[19,25] often overlook patient-reported measures. This inadvertence emphasizes the need to explore and learn more about patients' perspectives on HF medication utilization. Therefore, we conducted this qualitative study to understand patients' viewpoints on their HF medication utilization experience.

Although the results from our pilot study need further validation in future studies, they can be a foundation for a future prospective study to assess an intervention to determine a more patient-centered approach in defining the target intensity of HF medications for older adults. Furthermore, the different categories of themes identified can prompt the prescribers to assess them individually and strategize interventions to mediate any medication-related burden experienced by older adults with HF. Therefore, future studies addressing each domain and providing relevant interventions could facilitate a more patient-centered precision medicine to optimize the care for HF among older adults. For example, patients with positive answers to questions in the adverse effects domain of their medications should be assessed for dose or frequency reduction in their medications to achieve their own target intensity. Patients with positive answers in the medication accessibility and complexity number domain should be actively sought to simplify their medical regimen and facilitate an easier solution to procuring their medications.

The current study has several limitations. First, since participants could choose to participate in the interviews, we could not avoid selection bias. For example, we did not include individuals with altered mental status, and we could have selected patients with less severe heart failure or less symptomatic, which might have a strong association with the perceived burden from the medications. Second, the sample size is relatively small, although we achieved thematic saturation. Third, we conducted this study in a single academic center, which may limit its generalizability. Despite these limitations, we believe our study has many strengths. It provides important insights into patients' perspectives on their HF medication utilization, which have not been previously reported. Furthermore, our study's participants included a diverse population with racial and ethnic diversity among the patients interviewed.

In conclusion, through a pilot qualitative study among hospitalized older adults with HF, we identified the following six themes related to patients' perceived challenges of HF medication utiliza-

tion among older adults—adverse drug effects, psychological distress, problems in logistics, burden from the number of medications, impact from the patient-doctor relations, and burden from the cost of the medications.

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CONFLICT OF INTEREST

Min Ji Kwak received a consult fee from Novo Nordisk. Otherwise, no potential conflict of interest relevant to this article was reported.

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AUTHOR CONTRIBUTIONS

Conceptualization, MK; Data curation, NA, SS, CB, MH; Funding acquisition, MK; Investigation, NA, SS, CB, MH; Methodology, MK, SS; Project administration, MK, SS, NA; Supervision, MK; Writing-original draft, MK, NA; Writing-review & editing, MK, SS, CB, MH.

SUPPLEMENTARY MATERIALS

Supplementary materials can be found via https://doi.org/10.4235/agmr.24.0182.

REFERENCES

1. Rich MW. Heart failure in the 21st century: a cardiogeriatric syndrome. J Gerontol A Biol Sci Med Sci 2001;56:M88-96.
2. Cherubini A, Oristrell J, Pla X, Ruggiero C, Ferretti R, Diestre G, et al. The persistent exclusion of older patients from ongoing clinical trials regarding heart failure. Arch Intern Med 2011;171:550-6.
3. Masoudi FA, Havranek EP, Krumholz HM. The burden of chronic congestive heart failure in older persons: magnitude and implications for policy and research. Heart Fail Rev 2002;7:9-16.
4. Voigt J, Sasha John M, Taylor A, Krucoff M, Reynolds MR, Michael Gibson C. A reevaluation of the costs of heart failure and its implications for allocation of health resources in the United States. Clin Cardiol 2014;37:312-21.
5. Heidenreich PA, Albert NM, Allen LA, Bluemke DA, Butler J, Fonarow GC, et al. Forecasting the impact of heart failure in the United States: a policy statement from the American Heart Association. Circ Heart Fail 2013;6:606-19.
6. Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE Jr, Colvin MM, et al. 2017 ACC/AHA/HFSA Focused Update of the 2013 ACCF/AHA Guideline for the management of heart failure: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America. Circulation 2017;136:e137-61.
7. Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE Jr, Drazner MH, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol 2013;62:e147-239.
8. Masoudi FA, Baillie CA, Wang Y, Bradford WD, Steiner JF, Havranek EP, et al. The complexity and cost of drug regimens of older patients hospitalized with heart failure in the United States, 1998-2001. Arch Intern Med 2005;165:2069-76.
9. Wong CY, Chaudhry SI, Desai MM, Krumholz HM. Trends in comorbidity, disability, and polypharmacy in heart failure. Am J Med 2011;124:136-43.
10. Marcum ZA, Amuan ME, Hanlon JT, Aspinall SL, Handler SM, Ruby CM, et al. Prevalence of unplanned hospitalizations caused by adverse drug reactions in older veterans. J Am Geriatr Soc 2012;60:34-41.
11. Mastromarino V, Casenghi M, Testa M, Gabriele E, Coluccia R, Rubattu S, et al. Polypharmacy in heart failure patients. Curr Heart Fail Rep 2014;11:212-9.
12. Gastelurrutia P, Benrimoj SI, Espejo J, Tuneu L, Mangues MA, Bayes-Genis A. Negative clinical outcomes associated with drug-related problems in heart failure (HF) outpatients: impact of a pharmacist in a multidisciplinary HF clinic. J Card Fail 2011;17:217-23.
13. Volpe M, Chin D, Paneni F. The challenge of polypharmacy in cardiovascular medicine. Fundam Clin Pharmacol 2010;24:9-17.
14. Kim KI. Optimal management of chronic medical conditions through digital medicine. Ann Geriatr Med Res 2018;22:117-20.
15. Düngen HD, Apostolovic S, Inkrot S, Tahirovic E, Topper A, Mehrhof F, et al. Titration to target dose of bisoprolol vs. carvedilol in elderly patients with heart failure: the CIBIS-ELD trial. Eur J Heart Fail 2011;13:670-80.
16. Kwak MJ, Schaefer C, Krause TM, Goyal P, Kim DH, Dhoble A, et al. The median doses of beta-blockers among older adults with heart failure with reduced ejection fraction. J Am Geriatr Soc 2023;71:3322-5.
17. Guest G, Namey E, Chen M. A simple method to assess and re-

port thematic saturation in qualitative research. PLoS One 2020;15:e0232076.
18. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care 2007;19:349-57.
19. Mohammed MA, Moles RJ, Hilmer SN, Kouladjian O'Donnel L, Chen TF. Development and validation of an instrument for measuring the burden of medicine on functioning and well-being: the Medication-Related Burden Quality of Life (MRB-QoL) tool. BMJ Open 2018;8:e018880.
20. The University of Texas MD Anderson Cancer Center. Community Scientist Program [Internet]. Houston, TX: MD Anderson Cancer Center; c2024 [cited 2025 Apr 1]. Available from: https://www.mdanderson.org/research/departments-labs-institutes/programs-centers/center-for-community-engaged-translational-research/community-scientist-program.html.
21. Nowell LS, Norris JM, White DE, Moules NJ. Thematic analysis: striving to meet the trustworthiness criteria. Int J Qual Methods 2017;16:1609406917733847.
22. Boyd CM, Darer J, Boult C, Fried LP, Boult L, Wu AW. Clinical practice guidelines and quality of care for older patients with multiple comorbid diseases: implications for pay for performance. JAMA 2005;294:716-24.
23. Sav A, Kendall E, McMillan SS, Kelly F, Whitty JA, King MA, et al. 'You say treatment, I say hard work': treatment burden among people with chronic illness and their carers in Australia. Health Soc Care Community 2013;21:665-74.
24. Tran VT, Barnes C, Montori VM, Falissard B, Ravaud P. Taxonomy of the burden of treatment: a multi-country web-based qualitative study of patients with chronic conditions. BMC Med 2015;13:115.
25. George J, Phun YT, Bailey MJ, Kong DC, Stewart K. Development and validation of the medication regimen complexity index. Ann Pharmacother 2004;38:1369-76.