Understanding Over-the-Counter Medication Decision-Making Among Older Adults and Caregivers

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Abstract
Over-the-counter (OTC) medications are widely used in the U.S., yet everyday OTC decisions can be safety-critical for older adults and informal caregivers who must reconcile symptoms, comorbidities, and concurrent prescription and supplement use. Through semi-structured interviews with 17 participants (12 older adults and 5 informal caregivers of individuals with cognitive impairment), we examined how older adults and caregivers make OTC decisions in everyday life and what information they need to use OTCs safely. Our findings characterize OTC decision-making as a staged process involving (1) deciding whether medication is necessary, (2) determining which OTC is appropriate given personal conditions and concurrent medications, and (3) prioritizing safe use over time through dosing and timing practices. We discuss opportunities for personalized, caregiver-aware OTC decision support that helps users translate safety information into actionable, context-specific guidance.

1 Introduction

Over-the-counter (OTC) medications are commonly used in everyday health management such as pain, allergies, sleep disturbances, and gastrointestinal symptoms.[1] Unlike prescription medications, where clinicians typically initiate, monitor, and adjust treatment, OTC medication use often depends on consumers making decisions independently and without immediate access to professional guidance.[2] In the U.S., the Food and Drug Administration (FDA)-mandated Drug Facts label is the primary standardized mechanism for communicating OTC safety information, including active and inactive ingredients, warnings, and dosing instructions. These labels are intended to support safe self-care at the point of decision-making.

In practice, however, safe OTC use requires more than locating information on a package. Consumers must interpret label information in relation to their symptoms, existing conditions, and medications, and translate those instructions into decisions about whether, what, and how to use OTC medications over time.[3] This often involves reconciling label guidance with comorbidities, prior medication experiences, side-effect tolerance, supplements, and concurrent prescription medications.[3] These demands can be especially challenging for older adults and informal caregivers, who often navigate polypharmacy, multiple chronic conditions, age-related physiological changes, and incomplete access to professional support or shared medication records.[4,5]

Prior work in health informatics and gerontology shows that medication management among older adults extends beyond adherence to include planning, monitoring, sensemaking, and ongoing risk management across changing health conditions and daily routines.[4,6] Older adults frequently balance formal medical guidance with experiential knowledge, including prior bodily responses, perceived tolerability, practical constraints, and personal risk thresholds.[7,8] Informal caregivers face similar, and often greater demands. Many caregivers are older adults themselves (51 years old on average[9]), and they must manage OTC products for care recipients while also managing their own health needs.[10,11] Caregiving research has highlighted medication burden, uncertainty, and potentially inappropriate medication use in home settings, emphasizing that medication decisions are often distributed, emotionally charged, and shaped by uneven access to information and support.[10,12,13]

At the same time, the design of current Drug Facts labels can further intensify these challenges. Although standardized, these labels remain largely static, text-dense, and non-personalized.[14,15] Prior research shows that consumers often misunderstand or overlook critical Drug Facts content, particularly warnings about contraindications, interactions, and dosing limits.[16,17] These difficulties may be especially critical for older adults and caregivers with limited health literacy, sensory constraints, or high caregiving burden, for whom complex medication information can be difficult to interpret and operationalize.[6] Such challenges matter because OTC medication misuse can lead to serious adverse drug events. These include dosing errors, unintentional overdose across products, drug-drug interactions, and side effects such as sedation, falls, and gastrointestinal complications that disproportionately affect older adults.[18-20]

Some prior work has sought to address these problems through improved label presentation and consumer-facing decision support. For example, prior systems have introduced structured guidance for reading medication information, including pharmacy-based kiosks and digital dashboards that help consumers access OTC safety

content.[21,22] However, many existing medication technologies continue to reproduce the same text-heavy interaction model as the label, offering reminders, static reference information, or medication lists rather than supporting the comparative and interpretive work involved in OTC decision-making.[23] More recently, AI-enabled health tools have introduced new possibilities for personalized guidance, but they often lack transparency, explicit safety constraints, and rigorous validation, all of which are especially important in safety-critical medication contexts.[24]

As a result, important gaps remain in understanding OTC medication safety in everyday life. Much of the existing literature centers on prescription-oriented tasks such as adherence and refill management or evaluates comprehension of a single medication in isolation.[25–27] Prior work has begun to characterize OTC decision-making among older adults, for example, mapping in-store OTC selection behaviors and barriers and proposing conceptual models of OTC treatment and purchase decisions in senior-living settings.[7,28] However, these studies primarily focus on selection and purchasing behavior. Less is known about how older adults and caregivers interpret, prioritize, and operationalize OTC information as part of a broader decision-making process that unfolds across time and context. To design more effective OTC decision support, we need a deeper understanding of how older adults and caregivers currently make these decisions in daily life, what criteria and strategies they rely on, and where existing information resources fail to support them.

In this paper, we ask: **How do older adults and caregivers select OTC medications and navigate medication safety in everyday context?** Through semi-structured interviews, we focus on the criteria and strategies participants employ, as well as how these practices are shaped by caregiving responsibilities, prior experience, and the broader information environment in which decisions occur. Our work makes three contributions: First, we shift attention from isolated label comprehension to OTC decision-making as an ongoing process of reconciliation, in which older adults and caregivers interpret safety information alongside current symptoms, medication uses, prior experiences, and situational constraints. Second, we extend understanding of medication management among older adults and caregivers by characterizing how OTC decisions are shaped by caregiving roles, uncertainty, and distributed access to information. Third, we identify design opportunities for consumer-facing health technologies that better structure and personalize OTC safety information, helping users map Drug Facts content to their own conditions, medications, and everyday contexts in support of safer and more confident self-use and caregiving decisions.

2 Methods

2.1 Participants and recruitment

We recruited 17 participants, including older adults and informal caregivers, using community-based outreach and referrals. Recruitment aimed to capture rich descriptions of recent OTC decision-making experiences while including variation across self-use and caregiving contexts. Participants were eligible if they (1) are an older adult (60 years and older) or an informal caregiver/care partner (50 years and older) who had experience providing unpaid care to an individual with cognitive impairments, (2) have experience choosing or using OTC medications in the past year, (3) have experience using a smartphone/tablet, and (4) are fluent in English. The interview was part of a larger study on digital health technology support for safe OTC medication decision-making among older adults and caregivers, and lasted approximately 20 to 30 minutes, conducted in person in either the research lab or the participant's home. Participants received $100 for lab participation and $50 for in-home participation. This study was approved by the University of Maryland's Institutional Review Board, and all participants provided informed consent prior to participation.

Participants completed a brief demographic questionnaire that captured age, gender, education, caregiving experience, and relevant health background at the very beginning of the study. Health literacy was assessed using the BRIEF scale commonly used in prior health research.[29] Scores were computed and categorized into three levels: limited, marginal, or adequate, and these categories are reported alongside participant demographics in Table 1.

2.2 Data collection and analysis

During the semi-structured interview, we asked participants to describe their health background, everyday medication use, and any caregiving responsibilities. We then focused on how they typically decide whether to use an OTC medication, how they select among products, how they interpret Drug Facts label information, and what information sources they consult during decision-making.

All interviews were audio-recorded and transcribed verbatim. Transcripts were de-identified prior to analysis, categorizing participant IDs into O1-O12 (older adult), C1-C3 (caregiver), and B1-B2 (those serving both roles). We analyzed interview transcripts using reflexive thematic analysis.[30] Because this approach recognizes researchers' perspectives as part of qualitative interpretation, we explicitly considered how our backgrounds in human-computer interaction, health informatics, and consumer health technology design shaped our attention to medication safety,

Table 1. Participant demographics and health literacy ($N = 17$)

ID	Age	Gender	Ethnicity	Highest Level of Education	Health Literacy
O1	65	Female	White	Graduate or Professional Degree	Adequate
O2	65	Male	Black or African American	Bachelor's Degree	Adequate
O3	69	Female	Black or African American	Graduate or Professional Degree	Adequate
O4	63	Female	White	Graduate or Professional Degree	Adequate
O5	79	Male	White	Graduate or Professional Degree	Marginal
O6	75	Male	White	Graduate or Professional Degree	Adequate
O7	80	Female	MENA	Graduate or Professional Degree	Adequate
O8	67	Female	White	Graduate or Professional Degree	Limited
O9	77	Female	White	Bachelor's Degree	Marginal
O10	79	Female	White	Some college	Adequate
O11	70	Female	White	Graduate or Professional Degree	Adequate
O12	65	Female	White	Graduate or Professional Degree	Marginal
C1	51	Female	Asian	Bachelor's Degree	Marginal
C2	58	Female	Black or African American	Graduate or Professional Degree	Adequate
C3	50	Male	Black or African American	Bachelor's Degree	Marginal
B1	62	Female	Asian, White	Graduate or Professional Degree	Marginal
B2	65	Female	Black Latino	Bachelor's Degree	Limited

health information-seeking, caregiving, and decision-support needs. Analytic work proceeded both inductively and deductively, with the goal of characterizing participants' routine OTC decision-making processes and the considerations that shape those processes in everyday contexts. The first author conducted repeated readings of each transcript to support familiarization and to document early analytic observations. Initial codes were generated inductively to capture salient decision practices, safety reasoning, information-seeking behaviors, and differences between self-use and caregiving contexts when applicable. Codes were iteratively refined as analysis progressed, through discussion between the first and last author, with memo-writing used to support reflexive interpretation and to document emerging patterns across interviews. Related codes were then organized into higher-level themes, which were reviewed and refined through team discussions to ensure that themes were internally coherent and had clear distinctions from one another. The themes reported in the Results section reflect these final analytic groupings.

3 Results

Across participants, OTC decision-making emerged as a set of staged considerations that extends beyond "reading the label" (see Figure 1). Participants described practices related to (1) deciding whether medication is necessary, (2) determining which OTC is appropriate given personal conditions and concurrent medications, and (3) prioritizing safe use over time through decisions about dose, timing, and repeated use. Decision-making was further shaped by caregiving responsibilities, information access, and reliance on pharmacists and patient portals.

3.1 Evaluating whether to take medication

Participants described a preliminary decision process that focused on whether medication was necessary at all. Before initiating pharmacological treatment, participants evaluated the seriousness and possible causes of their symptoms and considered alternatives such as waiting, tolerating symptoms, or using non-pharmacological approaches. This evaluation acted as a threshold-setting step that determined when medication use was appropriate.

3.1.1 Assessing symptom causes before considering medication

Participants often attempted to interpret the source of their symptoms before taking medication. Rather than immediately reaching for an OTC drug, they first considered whether the symptom could be attributed to temporary or behavioral causes. For example, O4 reflected on sleep difficulties before deciding whether medication was warranted: "Trying to understand whether melatonin... Nesta... or whatever over-the-counter sleeping pills are what I wanted. Or was I feeling anxiety and depression at the time?" Similarly, B1 described attributing symptoms to factors such as caffeine withdrawal or sleep deprivation before considering medication use.

3.1.2 Establishing thresholds for when action is needed

Participants also described personal thresholds that determined when symptoms warranted intervention. These

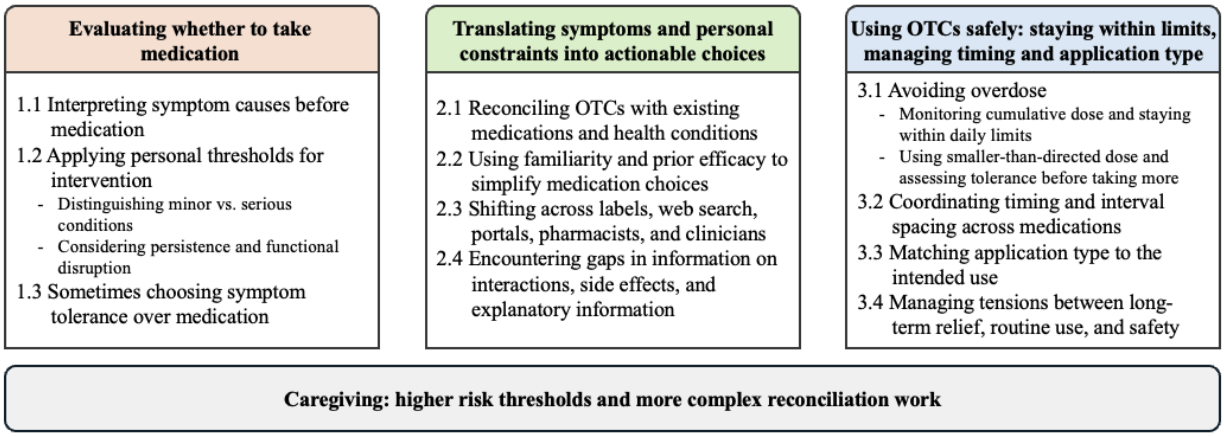

Figure 1. OTC decision-making emerged as a set of staged considerations summarizing the key findings of this study. This decision-making includes (1) evaluating whether to take medication, (2) translating symptoms and personal constraints into actionable choices, and (3) using OTCs safely.

thresholds were shaped by both objective indicators and subjective assessments of severity. Some participants relied on objective markers, such as body temperature, to guide decisions. For instance, B1 described using fever readings as a trigger to decide whether medication or clinical care was necessary, "If there is an elevated temperature... then I'm more likely to send a quick message to my primary care physician," whereas without fever they were more likely to take an OTC medication. Others relied on the combination or persistence of symptoms to evaluate seriousness. O1 described contacting a clinic when multiple symptoms appeared together. In contrast, isolated or mild symptoms were often handled independently using OTC medications.

Moreover, participants frequently differentiated between minor and major conditions when deciding whether to medicate. Minor ailments—such as headaches, mild colds, or sinus symptoms—were typically treated independently using OTC medications for quick relief. In contrast, symptoms perceived as more serious or uncertain often prompted consultation with clinicians or pharmacists. In some cases, participants evaluated how much the symptom disrupted daily functioning before deciding to medicate. As B1 mentioned, "Like a headache, or if I feel nauseous... I do this sort of interoception. What is it? How bad is it? ... So I sort of do this self-assessment." For some participants, symptom persistence over time served as an additional decision trigger. For example, C1 avoided medication for early cold symptoms but reconsidered OTC treatment if symptoms lasted longer than expected.

3.1.3 Choosing symptom tolerance over medication use

Even when medication could provide relief, some participants intentionally chose not to medicate. This decision often reflected concerns about potential side effects or disruptions to daily activities. For example, B1 described preferring to tolerate allergy symptoms rather than risk medication-induced drowsiness that might interfere with work or daily responsibilities: "I remember not liking the feeling that we get sleepy... so most of the time, I just bypass it, I typically don't take an antihistamine."

3.2 Translating symptoms and personal constraints into actionable choices

Participants described OTC selection as a process of reconciling symptoms, personal constraints, and medication histories across multiple information sources. Rather than choosing solely based on symptom labels (e.g., "cold and flu"), they drew on multiple practices to construct OTC decisions: checking home supplies, comparing active ingredients, consulting digital records, and calibrating how much additional information was worth seeking given urgency and perceived risk.

3.2.1 Medication reconciliation as everyday practice

Many participants began OTC decision-making with a physical inventory check before any new purchase. Participants commonly checked medications already available in-home cabinets and sometimes verified expiration dates before deciding whether a pharmacy trip was necessary. Most participants maintained a personal medication list or informal tracking system to coordinate refills and avoid duplication. Some relied on written lists prioritizing prescriptions and regularly used OTCs while excluding temporary OTC use. Others described using medication dashboards (e.g., MyChart, Kaiser) to support OTC decisions, particularly when reconciling current prescriptions with potential OTC use. Some participants engaged in multi-source alignment, such as cross-checking portal medication lists against what was actually taken in their cabinets or recorded on their personal lists.

3.2.2 Heuristics for simplifying OTC decisions

When selecting medications, participants repeatedly relied on *familiarity* and *perceived efficacy* as heuristics. Many described defaulting to medications that had worked previously for recurring problems (e.g., familiar antihistamines or pain relievers), treating prior success as evidence that reduced the need for renewed evaluation. Some participants described a simplified "anchor medication" strategy to minimize interaction risks, such as treating Tylenol as a familiar or lower-risk default. B2 described trial-and-error use, continuing products that produced positive outcomes and modifying use if side effects emerged. Participants also described self-defined risk categories that shaped whether OTC products were considered "important enough" to track: some OTCs were handled like prescriptions and documented, while episodic OTC use was treated as low-risk and left undocumented. For example, O6 explained: "The occasional times that I'll take an antihistamine for a sinus problem or a Tylenol or an aspirin for an ache or a headache, those are periodic, so I don't have a list for those." Participants also sought *scenario-based* guidance (e.g., "for fever with diabetes," "for headache with my current meds"), reflecting a desire for decision support grounded in symptom contexts rather than broad product categories. Some excluded options based on personal constraints and adopted alternative products to avoid side effects such as drowsiness.

3.2.3 Distributed information seeking

For label-reading practices, participants often treated active ingredients as a basis for comparison rather than relying only on brand identity. Several participants compared products by matching active ingredients to identify generic alternatives to brand-name products or options when a familiar product was out of stock. Others scanned labels for specific effects, such as drowsiness or strength differences among pain relievers. When seeking such information, participants described shifting across resources depending on urgency and perceived complexity. For relatively minor concerns, they often relied on quick web searches; for moderate concerns or interaction questions, they turned to asynchronous portal messaging; and for low-urgency questions, they deferred to routine clinical visits. Pharmacists were frequently positioned as an efficient safety check for minor symptoms or unfamiliar products, especially when participants prioritized speed over extensive research. As C1 described, "sometimes when you are under distress... I didn't think of going to the internet to research it. I wanted kind of a quick answer. So that's how I went to the pharmacy." In contrast, participants managing more complex medication regimens reported escalating to clinicians when they believed clinicians had access to a more complete medication history than pharmacists.

3.2.4 Challenge in navigating OTC information environment

Despite these strategies, participants described situations where OTC decision-making became difficult because labels and available tools did not provide information in ways that supported reconciliation across medications, health conditions, and personal risk thresholds.

Participants raised recurring concerns about interaction risks that were difficult to evaluate using OTC labels alone. Some did not routinely check warnings especially for familiar OTC products, while others preferred explicit reassurance about compatibility with multiple prescriptions or chronic conditions. For example, O3 often double-checked with her doctor whether any OTC products might interact with her levothyroxine. Interaction concerns extended beyond prescription-OTC combinations to include multiple OTC pain relievers, supplement-OTC overlap, and specialized contexts such as high-altitude medication use. B1 and B2 described mentally simulating potential conflicts but also acknowledged gaps in the knowledge needed to evaluate these interactions confidently. Some participants also mentioned age-related safety concerns, as C1 noted, "I will ask for this age. What is the best over-the-counter medication she can take? ... Or thinking about the side effects. Is this harmful for her age?"

Participants also described confusion about dose, product quantity, and incomplete side-effect information. For example, O2 struggled to compare dose versus quantity across products, while O6 was uncertain whether new symptoms (e.g., rash, allergic reactions) were medication related. Several participants interpreted symptoms as possible side effects only after taking a medication and sought additional products to manage those symptoms or retrospectively reinterpret what had happened. For example, O4 described managing symptoms associated with a cholesterol medication, "Most of my medicines are paired with a prescription drug. I take Rosuvastatin. It lowers the cholesterol… But that drug comes with side effects including leg cramps, muscle function loss... So I pair it with CoQ10. But... what should I take, what amount, what brand?" Some participants worried that consumer-facing information did not fully capture side effects or reactions relevant to their situation, like B2 mentioned, "I try to be super vigilant, even giving her a Tylenol... it can be scary or stressful that you don't know how OTC medication is going to interact with medications. Even if you look up all the side effects, the information is not there."

Some participants sought underlying explanations for how medications work. O4 described choosing between similar variants, "during allergy season... do I want this 12-hour drug, do I want a 24-hour drug? I like to see how they work. And what the benefits are." In these cases, participants wanted mechanistic distinctions to support

confident selection. When Drug Facts labels did not provide sufficient explanation, participants relied on online searches, professional advice, or prior experience. Unfamiliar symptoms often prompted more intensive information seeking and ingredient-focused research. These cases increased cognitive effort and prolonged comparison work, particularly when participants felt unsure how a symptom category mapped onto OTC product categories.

Participants also noted accessibility barriers, such as tiny print on drug labels and dim pharmacy lighting. B1 and O10 described system constraints where digital medication infrastructures were organized around prescriptions and did not accommodate OTC visibility, creating gaps in documentation and potential inaccuracies in medical records.

3.3 Using OTCs safely: staying within limits, managing timing, and matching application type

Participants described "safe OTC use" as more than reading a drug label warning once; it involved ongoing attention to dose, timing, and careful application choices. Safety practices were often shaped by participants' awareness that OTCs can create harm when used repetitively, combined across products, or taken without attention to cumulative limits. Participants therefore developed routines to prevent overuse, to coordinate timing across medications, and to ensure that the form and location of application matched the intended use.

3.3.1 Operationalizing safety through dosing limits and monitoring

Participants frequently framed safe OTC use as staying below dose limits, particularly for products perceived as posing cumulative risk (e.g., acetaminophen). Several participants monitored total daily intake and weighed symptom relief against long-term harm. For example, B1 described tracking cumulative acetaminophen exposure while caring for her mother with arthritis: "Because of her arthritis, she was prescribed Tylenol every day, which I was worried about because of liver, so I talked to her doctor, can she take this much every day? ... it was all about how to schedule to keep her comfortable. But not give her too much Tylenol." Some participants described ongoing verification of dose limits (e.g., re-checking labels, confirming with clinicians) as symptoms persisted and medication use extended over time. O5 described consulting pharmacists to avoid unnecessary duplication when managing multiple blood pressure medications with different doses.

To reduce overdose risk, some participants described situations in which they intentionally stopped or avoided further medication use, particularly after reaching recommended limits. In these cases, they substituted non-pharmacological strategies rather than taking more medication. For example, C1 chose traditional therapies, "I went for that thing normally so pain will go off normally. You know, use herbal remedies, home remedies... I give her those type of things instead of over-the-counter medication because she is taking a lot of medication."

Given this overdose concern, participants adopted a "minimalist" approach, staying below the allowable maximum. They used smaller-than-directed dose, avoiding unnecessary supplementation, and using small "trial dose" to assess tolerance before taking more. Participants often associated higher doses with increased side-effect risk, and some explicitly linked dose amount to concerns about disrupting glucose levels or cardiovascular responses. For example, B1 described rarely taking the maximum amount: "I'm concerned about dosage. I don't want to take more than I really need... Do I need it every day?... I very, very, very, very rarely take the maximum of dosage, just take one to two tablets." Similarly, B2 described starting with a smaller amount when giving NyQuil to her mother, "I would just give her half or whatever the dosage calls for. Just to make sure I'm not over-medicating. I don't know how it's going to react... I always start from half and see how the symptoms are." B1 reported alternating acetaminophen and ibuprofen as a strategy she perceived as reducing liver burden from acetaminophen while still achieving pain relief.

Participants also monitored symptom changes between doses before deciding whether to take another dose. Several reassessed symptom persistence and observed effects before increasing the dose, like O6 mentioned, "I usually take the standard Tylenol, and if I've got a really bad headache or a real sore, I'll take two of them at one time," suggesting that safe use involved feedback-based adjustment rather than automatic repetition. B1 even integrated Fitbit as a contextual tracking tool to interpret how she was feeling and to decide when another dose was warranted.

3.3.2 Coordinating timing and application practices

Participants described safety as coordinating when and how medications were used. Timing and interval between doses were treated as important safety considerations, often guided by label instructions. For example, O3 described repeatedly checking interval guidance during acute illness when uncertainty about the last dose created risk of accidental overdosing, "I took it at 4 o'clock. I took it at 8 o'clock, and now it's 1 a.m... I can't remember it. Let me check the bottle to see how many doses I can take in a 24-hour period." At the same time, participants reported that habitual medication routine can undermine timing cautiousness, as O5 reflected, "whether you take them in the morning, whether you take them with food or not, or with liquid. So those are the things that I don't check out. I just take everything in the morning with water. But there may be a better way to do it. Because once you're on a routine of taking your medications, then you don't check again to see if you should take them."

Participants also discussed organizing medications through practical systems that embed timing rules into daily life, such as pre-planned schedules or time-of-day groupings (morning vs afternoon). They described evaluating OTC timing relative to prescription timing, mapping daily medication cycles for a parent, or treating medication use as a coordinated daily timetable across products, where timing instructions needed to fit together. For example, B1 was concerned about different timing intervals across medications, "How does taking the steroid twice a day affect any other kind of pain medication? Like if I had a headache... you can take Tylenol every four to six hours... It will be interspersed like ibuprofen... as long as there's two hour gap." In another case, O4 described researching timing not only for safety but for medication effectiveness: "In terms of absorption and what time of day... effects of medicine... My cholesterol drug in the evening after dinner is a better time. So I guess learning those nuances. They seemed insignificant to my doctors, but... I want to make sure it's the most effective."

Safety practices also extended to selecting the appropriate application type, including differentiating topical versus oral treatments, selecting products for specific body sites, and ensuring correct placement. In caregiving contexts, participants described choosing between topical and oral treatments to address symptoms while limiting systemic exposure, particularly for chronic conditions. For example, C1 considered whether topical or oral pain relief would be better for her mother with arthritis.

3.3.3 Challenges in sustaining safe OTC use

Despite these safety strategies, participants described tension between quality-of-life needs and the risk of cumulative harm, especially when OTC use became long-term. For example, O4 described balancing pain relief with staying active as an older adult: "I could have a high quality of life with a little risk, or I could have a lower quality of life and follow all the directions. At least in these early years, I want all the activity and all the fun trips."

Timing errors also arose from how familiarity and routine shaped attention to intervals. C2 noted that interval guidance ("every so many hours") could fade into the background when the care recipient felt confident managing medications independently. As C2 explained, her mother "takes that herself," and although there is "a certain number per hour," she may take "three or four or two... in fewer hours," indicating that the dose limit remained important while intervals were not always a major concern.

Some participants described recognizing unsafe use patterns only after a problem occurred. For example, O6 realized later that she had misunderstood the instructions for an OTC medication and had taken it intermittently when her joint pain occurred, rather than gradually building up the dose over several days as instructed.

3.4 Caregiving: higher risk thresholds and more complex reconciliation work

Participants described caregiving-related OTC decisions as distinct from self-use, involving higher risks, more reconciliation work, and greater emotional labor. Caregivers often adopted more conservative thresholds, worked to preserve the care recipient's agency, and managed uncertainty through reassurance-oriented explanations.

Caregivers repeatedly described applying stricter safety thresholds when selecting OTC products and deciding how much to give care recipients than when making decisions for themselves. For example, B2 characterized her self-use decisions as relatively confident and routine, whereas caregiver decisions were more conservative, involving smaller doses and heightened monitoring. This shift was partly shaped by differences in medication complexity. As B1 explained, deciding for herself was simple, but managing OTC use for her aging parents required considering multiple prescriptions and possible interactions: "My parents got much older, there are many medications that help to keep blood pressure and keep their heart to blood thinners… I'm juggling a bunch of different things. What if I put this here, is there any effect?" Caregivers also adapted their OTC choices when they perceived changes in tolerance or efficacy, but the rationale differed by role—B2 framed self-use adjustments around whether a medication "worked," whereas caregiver-use changes prioritized avoiding risk even if symptom relief was slower.

Despite these role-dependent shifts, caregivers often reported using the same informational workflow—reading labels, searching online, and comparing options—but caregiving expanded what that workflow needed to accomplish. Depending on the care recipient's cognitive condition, caregivers sometimes emphasized joint decision-making and preserving the care recipient's agency. For example, B1 described interpreting drug labels collaboratively and using evidence to support shared understanding, rather than overriding her mother's preferences, "You might have to look up something and show it to her so she could say, well, 'I'm making the decision myself' to give her a sense of peace." Similarly, C3 described making substitution decisions together when a familiar medication was out of stock, "Sometimes I take a picture of the alternative and I send it to my mom, can I get this?" C1 likewise suggested that OTC decisions were shaped not only by symptom management but also by her mother's expectation for reassurance and willingness to take the medication. Caregiving also involved reinforcing safety rules: C2 described ensuring her mother understood dose and timing to reduce overdose risk.

Beyond decision-making, caregiving increased both system-level workload and emotional burden. B1 described how reconciliation became harder when care involved multiple providers and heterogeneous electronic health record (EHR) systems, requiring fragmented specialist care and information to be combined into a coherent medication list. In contrast, shared provider systems reduced this burden by making information easier to access and interpret. B2, who lacked a shared digital dashboard, relied on phone communication with physicians but experienced delays and limited visibility into prescriptions, which constrained real-time reconciliation when making OTC decisions. These infrastructural gaps compounded emotional urgency. Caregivers described heightened concern due to comorbidity and anxiety driven by uncertainty about interactions, with time pressure limiting how thoroughly they could search.

4 Discussion and Limitations

Rather than simply reading a Drug Facts label and choosing a product, our participants described a broader process of deciding whether medication was needed, evaluating fit with their health context, and managing use safely over time. However, their strategies sometimes relied on personal heuristics, symptom interpretations, or medication-risk assumptions that may be incomplete or clinically uncertain. These patterns highlight opportunities for consumer-facing health technologies to move beyond static information access and support the practical, contextual, and personalized OTC decision-making, while helping users recognize uncertainty and seek professional guidance.

Support early-stage treatment threshold setting through symptom- and scenario-based decision scaffolds. OTC decision-making often begins before medication selection, when users judge whether symptoms are serious, persistent, or disruptive enough to warrant treatment. This points to tools that begin with symptom context. For example, a decision support system could ask structured questions about symptom duration, severity, comorbidities, and functional disruption. More preparatory and patient-centered decision support could help users articulate concerns and weigh tradeoffs clearly.[31] Such support may be particularly useful for unfamiliar symptoms or ambiguous situations, where the challenge is deciding whether self-medication is appropriate.

Support reconciliation across medications, conditions, and everyday contexts. Participants sought answers from multiple resources, including packaging, medication lists, EHR portals, web searches, and professional advice. Design opportunities therefore extend beyond improving access to Drug Facts content to helping users connect medication questions with their medical histories and care contexts. Features could include quick capture of candidate OTC products, prompts to check duplicate ingredients, and links between OTC questions and medication lists, symptom records, or upcoming clinical appointments.[32] Prior work on patient-facing medication reconciliation tools suggests that such systems are more useful when they fit into patients' existing medication-management practices, offer better editing and review support, and connect data from multiple sources.[33,34] Embedding OTC support into these broader personal health information practices may reduce the burden of mentally reconciling prescriptions, supplements, prior reactions, and situational concerns each time a new OTC decision arises.

Support safe use as an ongoing management process. Participants described safety as something maintained across repeated use, daily schedules, and changing symptoms. This suggests opportunities for systems that externalize safety work, such as tracking cumulative daily dose across products, monitoring intervals between doses, and prompting reassessment when use becomes prolonged or routine. Prior work shows that different systems can produce substantially different alert volumes, underscoring the importance of relevance, severity calibration, and contextualization.[35] Informatics work on home medication schedules suggests that reducing daily medication-taking events, decreasing pill burden, and clarifying which medications can be taken together can make medication use more manageable.[36] Future tools could combine user-inputted medication information, symptom patterns, and contextual data from personal health records or wearable devices to support safer long-term decisions. Personalized OTC decision support might also incorporate clinically validated indicators of medication exposure, metabolism, or residual drug effect, allowing users to reason from both symptoms and biological or pharmacokinetic evidence.

Support reasoning through layered explanations and uncertainty-aware guidance. Participants wanted to understand why one option might fit their situation better than another, how products differed, or what might explain an unwanted effect. However, their reasoning sometimes reflected clinically uncertain assumptions, such as treating familiar medications as broadly low-risk or developing personal rules for dose and timing across products. These patterns suggest that decision support systems should help users distinguish between label-based guidance, personal experience, and areas of clinical uncertainty. Systems could translate safety and efficacy considerations into plain-language rationales tied to users' practical concerns, while allowing access to details for those who want it. This layered presentation may be especially important given that patient-facing systems should accommodate different preferences for simplicity versus comprehensiveness, as well as growing interest in contextualized advice.[37] In unfamiliar situations, confidence may depend not only on receiving an answer, but on understanding enough of the reasoning behind it to decide whether to proceed, seek professional advice, or monitor symptoms further.

Support caregiving as a collaborative and high-burden decision context. In caregiving contexts, medication choices carried higher perceived risks, required more extensive reconciliation across conditions, providers, and records, and involved added emotional work in managing uncertainty and offering reassurance. At the same time, many caregivers worked to preserve agency through shared interpretation and joint decision-making. These patterns suggest that future tools should support collaborative use as well. Prior patient portal work similarly points to the importance of caregiver and family coordination, proxy access, record sharing, and designs that accommodate substantial variation in patient and caregiver needs.[37] Such systems might provide caregiver-facing summaries, shareable explanations, cross-medication and cross-provider views, and communication supports that help caregivers discuss risks and options while maintaining the care recipient's participation in decisions. Future prototypes should also be evaluated with diverse older adults and caregivers in real-world OTC decision-making contexts to assess usability, clinical appropriateness, and effects on confidence, safety, and care coordination.

There are a few limitations in our study. Most participants were females, many identified as White, and our sample was relatively highly educated, with many holding graduate or professional degrees. Although participants represented a range of health literacy levels, most self-reported adequate or marginal health literacy. Focused on older adults and informal caregivers, our findings may not transfer to other populations with different backgrounds, caregiving relationships, or medication-management needs. Finally, while we identify design implications for consumer-facing health technologies, we did not directly test specific design solutions. Future work should examine how these implications can be translated into concrete tools and tested in real-world OTC decision-making contexts.

5 Conclusion

We examined how older adults and informal caregivers make decisions about OTC medications in their daily life, which involved determining whether to medicate, reconciling OTC use with medications and health conditions, and managing safety across time and context. Our findings show that safe OTC decision-making is an ongoing process of threshold-setting, interpretation, coordination, and adaptation. These insights extend current understanding of consumer medication decision-making and point to opportunities for consumer-facing health technologies that better support personalized guidance, longitudinal safety management, and collaborative caregiving.

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