



# Patients' Comprehension of the Medicine Information Given by Pharmaceutical Personnel at the Compounding Unit Pharmacy at a Tertiary Hospital in Northwestern Tanzania

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**How to cite this paper:** Dotto, M., Mwita, S. (2025) Patients' Comprehension of the Medicine Information Given by Pharmaceutical Personnel at the Compounding Unit Pharmacy at a Tertiary Hospital in Northwestern Tanzania. *Open Access Library Journal*, 12: e13702.

<https://doi.org/10.4236/oalib.1113702>

**Received:** May 30, 2025

**Accepted:** July 8, 2025

**Published:** July 11, 2025

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## Abstract

**Introduction:** Pharmacies serve not only as medication dispensing points but also as key sites for patient education. Despite this, there is growing concern regarding patients' comprehension of the information provided during medication dispensing. Thus, this study aimed to assess patients' comprehension of medicine information provided by pharmaceutical personnel at the compounding unit pharmacy of a tertiary hospital in northwestern Tanzania. **Methods:** This cross-sectional study was conducted at the Compounding Unit Pharmacy, one of the pharmacies located within Bugando Medical Centre (BMC). Data were collected using an interviewer-administered questionnaire. The comprehension was assessed and categorized into three levels: poor, moderate, or good. **Results:** A total of 223 participants were included in the study. Only 13.4% correctly identified the written generic names of their medications. Understanding of oral instructions was higher in specific details, such as the route of administration (95.5%), duration of medication (91.9%), and frequency of administration (83.9%). About half of the participants understood the number of units per dose (51.6%). Patients who were on three medications had the lowest rates of comprehension, with only 4.2% demonstrating good understanding. **Conclusion:** This study highlights inadequate patients' understanding of medication information. To reduce the risk associated with inadequate medication information comprehension, a holistic approach is required, involving system-level interventions, customized pharmaceutical personnel training, and enhanced patient education strategies.

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## Subject Areas

Public Health

## Keywords

Patients' Comprehension, Medicine Information, Pharmaceutical Personnel, Compounding

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## 1. Introduction

Effective communication between healthcare providers and patients is fundamental to optimal health outcomes, particularly in medication management [1]. In low- and middle-income countries (LMICs), where access to health information is often limited and literacy levels are variable, ensuring patient understanding of medication instructions becomes even more critical [2]. Providing accurate and comprehensible medicine information is a critical component of pharmaceutical care, ensuring that patients use their medications safely and effectively [3]. Unlike standard outpatient pharmacies, compounding unit pharmacies prepare customized medications tailored to individual patient needs, such as specific dosages, forms, or ingredients. These formulations often lack standard labeling and packaging, making verbal communication especially critical. In healthcare settings, particularly in pharmacies, pharmaceutical personnel play a critical role in educating patients about their prescribed medications, including dosage, administration, potential side effects, and storage instructions [4]. However, the extent to which patients comprehend this information remains a significant concern, especially in resource-limited settings where health literacy levels may be suboptimal [5].

In Tanzania, like in many other LMICs, pharmacies serve not only as medication dispensing points but also as key sites for patient education [6]. Despite this, there is growing concern regarding patients' comprehension of the information provided during medication dispensing, especially in specialized settings such as compounding unit pharmacies within tertiary hospitals. Patient comprehension of medication-related information encompasses understanding prescribed drugs' purpose, dosage, administration route, duration, and potential side effects [7]. Poor comprehension has been linked to medication errors, non-adherence, and ultimately poorer health outcomes [8]. The pharmaceutical personnel working in compounding units are uniquely positioned to bridge the information gap. Their role extends beyond dispensing medications to ensuring that patients understand the rationale behind compounding, the correct use of compounded formulations, and any specific storage or administration instructions. However, the high patient volume, limited staffing, and time constraints in tertiary hospitals may compromise the quality of this crucial communication process [9].

Evidence from various studies indicates that patients in many LMIC settings,

including Tanzania, often leave pharmacies with inadequate knowledge about their medications. For example, a study conducted in a tertiary hospital in eastern Tanzania found that 65.3% of patients in ambulatory care were unable to correctly read the prescription and match the drugs they were carrying, and 73.9% were unable to correctly tell the dosing frequency and duration [10]. In the context of compounded medications, inadequate comprehension can have particularly severe consequences. Unlike commercially manufactured drugs, compounded preparations often require specific handling, storage, and administration instructions that, if misunderstood, can lead to therapeutic failure, microbial contamination, or adverse reactions. Despite the recognition of the problem, little is known about the specific context of compounded medication and how patients comprehend the information provided in such settings. Thus, this study aimed to assess patients' comprehension of medicine information provided by pharmaceutical personnel at the compounding unit pharmacy of a tertiary hospital in northwestern Tanzania.

## 2. Methods

### 2.1. Study Setting and Design

This study was conducted at the Compounding Unit Pharmacy, one of the pharmacies located within Bugando Medical Centre (BMC). BMC is a referral, consultancy, and teaching hospital situated in Mwanza City, in the northwestern part of Tanzania, along the shores of Lake Victoria. It is among the five largest referral hospitals in the country.

A cross-sectional study design was employed, conducted over one month from April to May 2023. The target population comprised all adult clients (aged 18 years and above) who attended the Compounding Unit Pharmacy during the study period. Clients who were unable to communicate, such as those who were critically ill, were excluded from the study.

### 2.2. Sample Size and Sampling Procedure

The minimum sample size of study participants was obtained by using the Taro Yamane formula:

$$n = N / (1 + N(e^2))$$

$N$  = The population size (500).

$e$  = The margin of error (0.05).

$n$  = The sample size (223).

The minimum sample size of study participants obtained was 223 patients. Participants were recruited consecutively using a convenience sampling method as they visited the Compounding Unit Pharmacy during the data collection period.

### 2.3. Data Collection

Data were collected using an interviewer-administered questionnaire consisting

of 11 questions. These included three written components—generic name, number of units per dose, and frequency of administration—along with eight oral components: generic name, indication, number of units per dose, route of administration, frequency of administration, timing relative to meals (before, after, or with food), duration of treatment, and any special instructions. The questionnaire was originally written in English and subsequently translated into Swahili to ensure comprehension by all participants. Each respondent's comprehension was assessed and categorized into three levels—poor, moderate, or good—based on the total score obtained.

Scores for single medication	Scores for double medication	Scores for triple medication	Level of comprehension
0 - 3	0 - 7	0 - 9	Poor understanding
4 - 7	8 - 16	10 - 22	Moderate understanding
8 - 11	17 - 22	23 - 33	Good understanding

## 2.4. Data Analysis

Collected data were coded and entered into Microsoft Excel and then analyzed using STATA version 15. Descriptive statistics, including frequencies, percentages, means, and standard deviations (SD), were used to present the findings.

## 2.5. Ethical Consideration

Ethical clearance for this study was obtained from the joint CUHAS/BMC Research Ethics and Review Committee (IRB No. 2560/2023). Informed consent was obtained from all participants, who were assured that their identities would remain confidential. Unique codes were used instead of names, and only the research team had access to identifiable data.

## 3. Results

A total of 223 participants were included in the study, with a mean age of 38.9 years (SD  $\pm$  12.2). The majority (70%) were aged between 18 and 45, females (56.1%), unemployed (73.1%), and had primary education (62.3%) (**Table 1**).

**Table 2** presents patients' understanding of written medicine instructions given by pharmaceutical personnel. Only 13.4% correctly identified the generic name of medications. Regarding dosage units per administration, 41.7% responded correctly. Similarly, for the frequency of administration, 41.1% gave correct answers.

**Table 3** presents patients' understanding of verbal medicine information given by pharmaceutical personnel. Nearly all patients (98%) misunderstood the generic name. However, understanding improved for specific details, such as the route of administration (95.5%), duration of medication (91.9%), and frequency of administration (83.9%). About half of the participants understood the number of units per dose (51.6%).

**Table 1.** Social demographic characteristics of participants (N = 223).

Variables		Frequency	Percentage
Age (Years)	Mean $\pm$ SD	38.9 $\pm$ 12.2	
Age group	18 - 45	156	70
	46+	67	30
Gender	Male	98	43.9
	Female	125	56.1
Employment	Employed	60	26.9
	Unemployed	163	73.1
Education	Primary	139	62.3
	Secondary	55	24.7
	College and above	29	13

**Table 2.** Patients' understanding of written medicine instructions given by pharmaceutical personnel (N = 223).

Variables		Frequency	Percentage
Readability of the generic name	Wrong answers	193	86.6
	Correct answers	30	13.4
Readability of units per dose	wrong answers	130	58.3
	Correct answers	93	41.7
Readability of frequency of administration	wrong answers	131	58.9
	Correct answers	92	41.1

**Table 3.** Patients' understanding of selected verbal medicine information given by pharmaceutical personnel (N = 223).

Variables		Frequency	Percentage
Generic name	Wrong answers	219	98
	Correct answers	4	2
Number of units per dose	Wrong answers	108	48.4
	Correct answers	115	51.6
Route of administration	Wrong answers	10	4.5
	Correct answers	213	95.5
Frequency of administration	Wrong answers	36	16.1
	Correct answers	187	83.9
Duration of medication	Wrong answers	18	8.1
	Correct answers	205	91.9

**Table 4** presents the status of patients' understanding of the medicine information given by pharmaceutical personnel. The patient's understanding declined as the number of prescribed medications increased. Among those taking a single medication, 14.1% had a good understanding, 52.3% moderate, and 33.6% poor. For patients on two medications, good understanding dropped to 5.6%, with 52.1% moderate and 42.3% poor understanding. The group on three medications had the lowest rates of comprehension, with only 4.2% demonstrating good understanding, 45.8% moderate, and half (50%) exhibiting poor understanding.

**Table 4.** Status of patients' understanding medicine information given by pharmaceutical personnel.

Number of medications	Status of understanding	Frequency	Percentage
Single medication (N = 128)	Good	18	14.1
	Moderate	67	52.3
	Poor	43	33.6
Double medication (N = 71)	Good	4	5.6
	Moderate	37	52.1
	Poor	30	42.3
Triple medication (N = 24)	Good	1	4.2
	Moderate	11	45.8
	Poor	12	50

#### 4. Discussion

This study assessed patients' understanding of medicine information provided by pharmaceutical personnel at a tertiary hospital. The findings reveal significant gaps in comprehension, particularly regarding medicine names, dosing instructions, and the impact of polypharmacy on understanding. The socio-demographic profile of the respondents revealed that the majority of respondents had primary-level education, is indicative of a population with potential vulnerabilities in health literacy. This is consistent with prior studies that have shown low education levels to be associated with poor comprehension of medication-related information [11]-[13]. In such contexts, literacy becomes a crucial determinant of patients' ability to understand and follow medication instructions, both written and verbal. Misunderstanding medication information can lead to adverse health outcomes, including non-adherence, medication errors, and adverse drug events [14].

The study revealed a deficiency in the understanding of written medicine instructions, particularly about the generic names of medications, where only 13.4% of patients provided correct responses. This finding is consistent with previous research, where patients had difficulty identifying names [15] [16]. Misidentification of generic names can lead to confusion, duplicate therapies, or medication

errors, especially when patients receive care from multiple sources. Patients should know the names of their medications to prevent administration errors, overdosing, and duplications, to check if the medications they are given are right, and to notify other medical professionals of any medication allergies in an emergency [17]. Understanding of the written dosage units per administration and frequency of administration was relatively better (41.7% and 41.1% correct, respectively), but still suboptimal. This has critical implications for patient safety and therapeutic outcomes. A previous study reported that most of the respondents (77.6%) misunderstood more than one dosage instruction, 8.75% misunderstood the dose, 51.3% misunderstood the frequency and 58.59% misunderstood the duration of treatment [18]. Incorrect interpretation of dosage frequency, for instance, can result in underdosing or overdosing, leading to therapeutic failure or adverse drug reactions [19]. In resource-limited settings where patients may not have access to frequent follow-up care, the risk of such outcomes is amplified. The low levels of understanding of written instructions necessitate the redesign of medication labels and packaging to include pictograms. Pictorial aids have been demonstrated to improve comprehension and adherence among low-literacy populations [20] [21].

Interestingly, the findings indicate that verbal communication by pharmaceutical personnel was more effective than written instructions in conveying key medication information. Over 95% of patients correctly understood the route of administration, and over 91% understood the duration of medication. These findings echo earlier studies, which highlighted the importance of verbal communication in enhancing comprehension, particularly among populations with low literacy levels [22]. However, despite high comprehension in some areas, significant deficiencies were noted in others. Nearly all patients (98%) failed to grasp the generic names even when explained verbally. These findings suggest that while verbal communication may help clarify procedural elements of medication use (e.g., how and when to take the drug), it is less effective for communicating more abstract or less emphasized elements, such as pharmacological terms. When compared to general instructions like “twice daily,” the use of precise terminology and time frames can enhance patient comprehension [23]. Effective communication techniques, including the use of teach-back methods, where patients repeat the instructions in their own words to confirm understanding, should be encouraged [24] [25]. This method has shown promise in improving comprehension and reducing hospital readmissions [26].

One of the most important findings of this study is the inverse relationship between the number of medications prescribed and the level of patient understanding. As polypharmacy increased, comprehension declined. Patients on a single medication had a better grasp of usage instructions than those on two or more drugs. Only 4.2% of those taking three medications exhibited good understanding, while 50% demonstrated poor comprehension. This aligns with previous literature emphasizing the cognitive burden of polypharmacy, particularly among

patients with limited education or literacy [27]. Polypharmacy not only increases the complexity of the medication regimen but also exacerbates the risk of drug-drug interactions, adverse events, and nonadherence [28]. These findings suggest that interventions aimed at simplifying regimens and enhancing patient education are urgently needed. Healthcare providers should be encouraged to assess the necessity of each prescribed drug and prioritize medication counseling for patients on multiple therapies. Pharmacists should allocate more time for these patients and possibly use medication charts or calendars to reinforce the regimen.

### Study Limitations

While the study provides valuable insights into patients' comprehension of the medicine information, it is not without limitations. The single-center design limits the generalizability of the findings to other hospitals or regions. Future studies should incorporate multiple centers and a more diverse population sample. Additionally, the cross-sectional nature of the study captures understanding at a single point in time and does not account for knowledge retention or behavior over time. Longitudinal studies would better assess the sustainability of understanding and its impact on medication adherence and health outcomes. Another limitation is the reliance on self-reported measures of comprehension, which may be influenced by social desirability bias or patients' reluctance to admit a lack of understanding. Objective assessments, such as direct observation or follow-up interviews, could complement self-report data in future research.

## 5. Conclusion

This study highlights inadequate patients' understanding of medication information. The findings emphasize that written medication instructions are poorly understood, particularly by a population with low literacy. Verbal counseling shows improved outcomes, especially regarding procedural information such as route and duration of administration. To reduce the risk associated with inadequate medication information comprehension, a holistic approach is required, involving system-level interventions, customized pharmaceutical personnel training, and enhanced patient education strategies.

## Conflicts of Interest

The authors declare no conflicts of interest.

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