



# Home drug utilization, storage practice and associated factors among people living in Bahir Dar city, Ethiopia

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**Background:** Medicines are maintained at home for several reasons. However, irrational household storage of medicines is a universal public health problem, causing significant harm to health and the healthcare system.

**Objective:** This study aimed to assess home drug use and storage practices among the residents of Bahir Dar. Town, Ethiopia.

**Method:** A cross-sectional household study was conducted in three sub-cities of the town of Bahir Dar from July to October 2022. Multistage stratified sampling was used to select the households included in the study. Data on the prevalence of home drug storage, storage place, and self-medication practice, among others, were collected using a semi-structured questionnaire and analyzed using Statistical Package for Social Science version 20.

**Results:** More than half (57.9%) of the respondents stored medicines at home, mostly in drawers (35%). In this study, the widespread use of self-medication (44.6%) and drug-sharing practices (25%) were observed. Most of the leftover medicines (67.3%) were disposed of in the trash. Education status (AOR = 3.8, 95% CI: 1.6–9.1), occupation (AOR = 2.9, 95% CI: 1.2–7.2), income (AOR = 1.73, 95% CI: 1.01–3.0), and the presence of chronic disease (AOR = 3.2, 95% CI: 1.7–5.9) showed a significant association with home drug storage.

**Conclusion:** Many study participants stored medications at home and bought them from pharmacies without consulting physicians. Disposing of medications into waste and practice of medication sharing were found to be high in the current study, suggesting that there is a lack of home drug utilization and storage practices by the general public.

**Keywords:** drug-sharing, medicine, self-medication, storage

## Introduction

### Background

Medicines are an essential part of treatment and prevention in healthcare systems. However, inappropriate home storage and self-medication of medicines are becoming major public health problems because of nonadherence to treatment or improper utilization of medicines. This affects health, the environment, and

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## HIGHLIGHTS

- More than half (57.9%) of the respondents stored medicines at home, mostly in drawers (35%).
- The widespread use of self-medication (44.6%) and drug-sharing practices (25%) were observed.
- Most of the leftover medicines (67.3%) were disposed of in the trash.
- Education status, occupation, income, and the presence of chronic disease showed a significant association with home drug storage.

healthcare services, which is why they are considered to be two-sided swords<sup>[1,2]</sup>.

Globally, medicines are kept at home for various reasons, such as the treatment of emergency, acute, and chronic illnesses. The increase in the amount and variety of pharmaceuticals eases the accessibility of medicines to consumers, thereby giving options for misuse. This inappropriate use of medicines leads to health risks and economic burdens on governments<sup>[3]</sup>. Home drug storage is a risk factor for irrational drug use mainly because of easy access and improper storage, which increases the risk of accidental poisoning, particularly in children. If recommendations for storage are not followed, drug stability can be affected, leading to ineffective drug therapy. The presence of medicines at

home has also been associated with the sharing of drugs with relatives, which further increases the risk of inappropriate drug use, and hence, the emergence of antimicrobial resistance<sup>[4,5]</sup>.

Self-medication is another factor that influences home drug use. Self-medication is any activity involved in buying and using medicines without advice from healthcare professionals, including acquiring medicines without prescriptions/over the counter (OTC), using leftover medicines, and sharing medicines with friends or relatives<sup>[3]</sup>. This malpractice can result in the wastage of resources and increased resistance to pathogens<sup>[6]</sup>. The use of OTC medicines can increase the risk of drug interactions and adverse drug reactions, which are mostly reported by doctors. Increasing self-medication practice is a global concern that requires more education from both the public and health professionals to avoid the irrational use of drugs<sup>[6,7]</sup>.

A study conducted in Kuwait found high medication hoarding practices, with almost all respondents (95.7%) having at least one stored medicine at home<sup>[8]</sup>. A similar study conducted in Oman reported a medicine storage practice of 55%<sup>[9]</sup>. In a community-based study conducted in the towns of South Gondar and Gondar in Ethiopia, ~44.6 and 40.2% of households, respectively, were found to store drugs at home. The presence of drugs stored at home is significantly associated with self-medication practices<sup>[10,11]</sup>. Another household-level study on drug utilization in Nekemte Town and the surrounding rural areas of Western Ethiopia found a medication storage practice in almost half of the respondents (49.9%), where urban areas were 1.4 times more likely to store drugs than rural areas<sup>[12]</sup>.

International guidance for the disposal of healthcare waste exists; little information is available to the general public, and what is available is often inadequate and sometimes contradictory<sup>[13]</sup>. Pharmacists usually instruct patients on how to use drugs; however, there is a gap in the information provision on the storage and disposal of leftover medications. Moreover, there has been a steady increase in the consumption of both OTC and prescription drugs<sup>[14]</sup> and geographical variations in drug utilization over time should be identified, as they may have medical, social, and economic implications for both individual patients and society<sup>[15]</sup>. Despite being a major concern, home drug utilization and storage practices have long been an unspoken issue worldwide, particularly in developing countries, such as Ethiopia. Hence, the current study aimed to assess the prevalence of home drug utilization and storage practices and to determine the determinant factors among people living in Bahir Dar City, Ethiopia.

## Methodology

### Study area

The study was conducted in Bahir Dar town, the capital city of the Amhara regional state, 565 km from the capital city of Ethiopia. Administratively, Bahir Dar City administration has six sub-cities with an estimated area of 28 Sq kms and a population density of 11 818.1 persons per square kilometer. The estimated population of Bahir Dar is 356 957<sup>[16]</sup>.

### Study design, period, and population

A cross-sectional household survey was conducted to investigate medicine storage practices from July to October 2022. The source population consisted of all households in Bahir Dar town, and the

study population consisted of residents of the three sub-cities at the time of data collection. The study units were the heads of the selected households that were available at the time of the visit.

### Inclusion and exclusion criteria

#### Inclusion criteria

Household members with an age greater than or equal to 18 years old.  
Households in the selected sub-city for more than a year prior to data collection.  
Household members who are willing to participate in this particular study.

#### Exclusion criteria

Study subjects who had serious mental illness.  
Household members who are unable to understand the questions in the questionnaire.

### Sample size and sampling technique

The number of households included in the study was determined by using a single-population proportion formula. Since no previous study has been conducted in the study area regarding the prevalence of medication storage and home drug utilization, we took the prevalence rate (*p*) value of 50% and used the following formula:

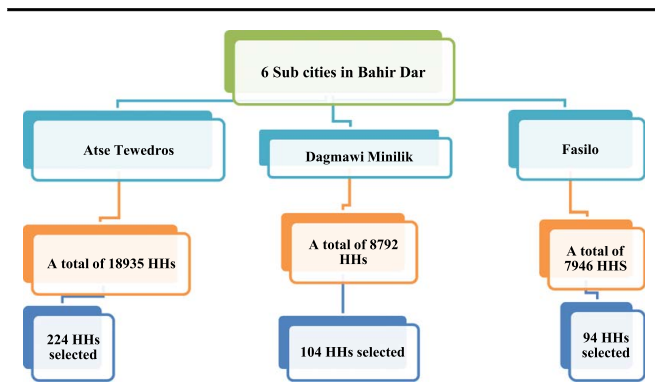
$$n = z^2 * p (1 - p) / d^2$$

Where,

- *n* = required sample size;
- *Z* = standard normal distribution score, usually 95% value (1.96);
- *P* = estimated value for the particular indicator (0.5 in our case);
- *d* = margin of error 5% for our case.

A minimum sample size of 384 households was sufficient to attain 95% confidence, with an absolute error of 5%. Considering a 10% nonresponse rate and incorporating minor adjustments to maintain uniformity in field operations, a final sample size of 422 households was determined to be optimum.

A multistage stratified sampling procedure was used to select the households. Three sub-cities, accounting for half of the sub-cities in the town, were selected in the first stage using simple random sampling (Fig. 1). The three sub-cities involved were Atse Tewodros, Dagmawi Minilik, and Fasilo. The allocation of 422 households among the three sample sub-cities was accomplished proportionally. A constant *k* was obtained by dividing the total number of households in each selected sub-city by the sample size allocated to the respective sub-city. The first household was then randomly selected from each sub-city using the lottery method, and subsequent households were selected by taking consecutive *k*th households, until the allotted sample size for each sub-city was obtained. The head of the household (HHH) was recruited. When HHH was not available at the time of the visit and two subsequent attempts were made, the interview was conducted with the person who was acting as an HHH in that household.



**Figure 1.** The schematic presentation of a multistage sampling technique used to select representative households.

### Data collection techniques and instruments

The data were collected using a semi-structured questionnaire developed based on published literature<sup>9,10</sup>. After developing the questionnaire in English, it was translated into the local (Amharic) language to obtain valid responses from participants who could not understand English. A bilingual expert performed forward translation and another bilingual expert independently performed backward translation. The original and backward translated questionnaires were discussed by the study team multiple times and corresponding changes were made to the Amharic version. The questionnaire was completed during a face-to-face interview by a trained data collector and was pretested by administering it to 10% of the households in the nonselected sub-city of Bahir Dar. Any inquiries raised by respondents were noted and amended accordingly.

### Data analysis and interpretation

The collected data were coded, entered, and analyzed using the (SPSS) version 20 software. A descriptive analysis was performed, and the results are presented in the tables and figures. To determine the association between independent variables and medication storage practices (dependent variable), binary logistic regression tests were performed. A *P*-value cut-off point of 0.05 (95% CI) was used to determine the statistical significance of the association.

### Operational definitions

**Self-medication:** use of modern drugs without advice from a health professional.

**Nonpharmacological:** use of nondrug therapy (e.g. exercise) after consulting health personnel.

**Patient:** anyone who came to a health facility for help from health professionals.

**Leftover drugs:** medicines left from past treatments that were prescribed or purchased (OTC).

### Ethical consideration

A formal letter to the selected study area was provided by the Ethical Review Board of the Pharmacy Department, Bahir Dar University and was assigned a unique identifier of phar03/04/06/2015 E.C, and informed consent was obtained from the participants before commencing the study. All concerned authorities

(Fasilo, Atse Tewodros, and Dagmawi Minilik sub-cities) were informed before the survey was conducted. Respondents were free to accept or refuse to participate at any given time during the data collection. The anonymity of the study participants was assured, and any information provided was kept confidential and informed that only aggregated data would be reported. This research was retrospectively registered at 94 www.researchregistry.com with unique identifying number researchregistry9644 and reported according to 95 strengthening the reporting of cohort, cross-sectional and case-control studies in surgery (STROCSS)<sup>17</sup>.

## Results

### Sociodemographic characteristics of the study participants

Data were collected from 404 households with a response rate of 95.7%. Approximately half (52.0%) of the respondents were male and 46.0% of the study participants were between 30 and 45 years of age. Almost three-quarters (72.0%) of participants were married. With respect to their level of education, 212 (52.5%) respondents had completed their first degree and above and 43.3% were government employees. Approximately 3/5th (60%) of the households had to have 4–6 family members. The majority of the respondents (54.2%) were in the middle-income category earning 5000–10 000 Ethiopian birr per month. One hundred ninety-eight (49.0%) of the respondents had children below 6 years of age, and 52 (12.9%) were older than 65 years. Of the surveyed households, 71 (17.6%) had health workers in their families and 80 (19.8%) had chronic diseases. Sociodemographic characteristics of the participants are presented in Table 1.

### Householder perspective toward nondrug therapy

As evidenced by the overall studied households, 280 (69.3%) stated that they would accept nondrug therapy such as sole advice. Two hundred and forty-eight (61.4%) patients did not have a clue regarding the preferred number of drugs per prescription (Table 2).

### Information exchange experience between drug users and healthcare providers

Regarding patient communication with health professionals, 294 (72.8%) respondents did not ask about the side effects of the prescribed medications. Twenty-eight (6.9%) and 22 (5.4%) participants stated that they did not ask how and when to take drugs (before or after a meal), respectively. Additionally, 233 (57.7%) respondents were not asked how to store drugs at home (Fig. 2).

### Information obtained from respondents about drug use

Of the total households visited, 290 (71.8%) knew that all drugs had side effects, and a large proportion of participants 312 (77.2%) had experience checking the expiration date of drugs before using them. A significant proportion (57.2%) of respondents had experience buying drugs from pharmacies without consulting a physician. A total of 166 (41.1%) participants took drugs that were recommended by relatives when they became sick, and 199 (49.3%) of the study participants recommended drugs to their relatives. With respect to drug discontinuation

**Table 1**  
Socio-demographic characteristics of the study participants, (n = 404)

Socio-demographic characteristics	Category	Frequency (N)	Percentage (%)
Age	18–29	124	30.7
	30–45	186	46.0
	46–60	79	19.6
	> 60	15	3.7
Sub-city	Atse Tewodros	214	53.0
	Dagmawi Minitilik	99	24.5
	Fasilu	91	22.5
Sex	Male	210	52.0
	Female	194	48.0
Marital status	Married	291	72.0
	Single	98	24.3
	Divorced	15	3.7
Education level	Primary education	39	9.7
	Secondary education	75	18.6
	College diploma	78	19.3
	First degree and above	212	52.5
Occupation	Government employee	175	43.3
	Nongovernment employee	154	38.1
	House wife	38	9.4
	Retired	12	3.0
	Other	25	6.2
Number of family members	1–3	129	31.9
	4–6	242	59.9
	7–10	33	8.2
Monthly income	< 5000	94	23.3
	5000–10 000	198	49.0
	> 10 000	112	27.7
Children below 6 years of age	Yes	198	49.0
	No	206	51.0
Elder above 65 years of age	Yes	52	12.9
	No	352	87.1
Availability of health workers in the home	Yes	71	17.6
	No	333	82.4
Availability of patient with chronic disease	Yes	80	19.8
	No	324	80.2

practice, 146 (36.1%) study participants quit medication when they felt better or when their symptoms disappeared (Fig. 3).

#### Availability of stored medicines in households (currently in use or leftover)

Of the total participants, 234 (57.9%) kept medicines at home during the study period, of which only 46.6% were due to their current treatment. One hundred and ninety-nine (50.9%) of the respondents received their medicine from a private pharmacy, and 69 (29.5%) were from the leftover of past treatment. Among the participants who stored medications, 129 (55.1%) knew about their use, 123 (52.6%) knew about their frequency of administration, and only 21.8% understood the duration of

**Table 2**  
Acceptance rate of nondrug therapy by householders (n = 404)

Characteristics	Frequency	Percent
Acceptance of nondrug therapy		
Yes	280	69.3
No	124	30.7
Total	404	100.0
Number of drugs preferred per		
One type prescription	108	26.8
Two types	39	9.7
Three types	7	1.7
> Three types	2	0.5
Cannot decide	248	61.4
Total	404	100.0

therapy. Of the stored medicines, 171 (73.1%) were not expired (Table 3).

#### Self-medication

Of the households visited, 180 (44.6%) admitted that they practiced self-medication. Among these, more than half 99 (55%) chose self-medication based on pharmacists' advice. Approximately 94 (52.2%) of the respondents practiced self-medication at least once in the past 3 months and analgesics were the most self-medicated, 96 (53.3%) followed by cold medications (23.9%). Among dosage forms, tablets were the most widely used (60.0%). Regarding the sharing of drugs, 91 (22.5%) of the study participants admitted to sharing or exchanging medicines with others (Table 4).

#### Storage place and disposal practice of medicines

As shown in Table 5, 143 (35.4%) patients stored their medications in drawers. Around two-thirds of the study participants 265 (65.6%) shake their bottles before use when necessary, yet the same number of respondents did not read any medicine disposal instructions, and 1.2% of respondents used expired drugs. Fifty-seven (14.1%) participants kept expired drugs but did not use them, whereas 342 (84.7%) of the respondents disposed of expired drugs. Regarding their disposal mechanism, about 247 (61.1%) of the respondents throw expired drugs into waste, and 92 (22.8%) flushed into the toilet. Two hundred and sixty-nine (66.6%) respondents knew that the improper disposal of drugs could affect the environment and health status of the community. Regarding leftover medications, only three (0.7%) returned to the pharmacy and 272 (67.3%) of the respondents were disposed of by themselves (Table 5).

#### Predictors of home drug storage

Using univariate binary logistic regression analysis, all covariates, including age, sub-city, sex, marital status, level of education, occupation, number of family members, monthly income, availability of children below 6 years of age and older than 65 years of age, availability of health workers at home, and availability of patients with chronic disease were examined for association with drug storage practice at home. Variables with a  $P < 0.2$  were considered for multivariate binary logistic regression analysis to look for associations. Accordingly, home drug storage was

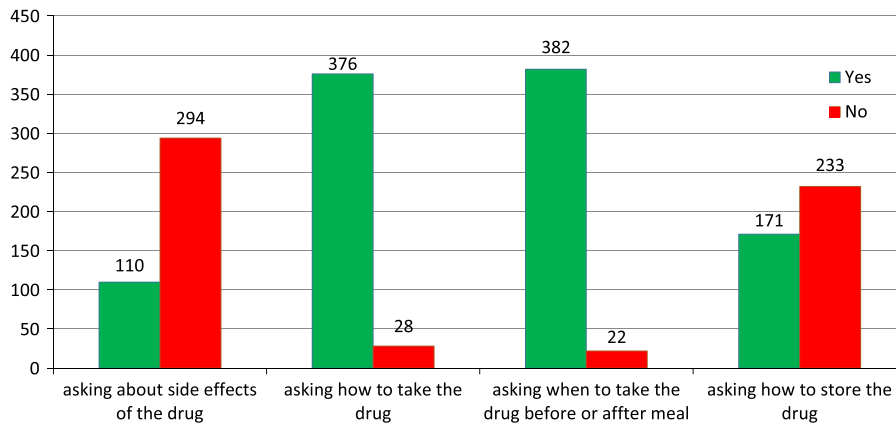


Figure 2. Information exchange experience between drug users and healthcare providers.

significantly associated with educational status, occupation, monthly income, and the presence of chronic patients in the family (Table 6). The multivariate logistic regression showed that households without chronic patients were 3.2 (95% CI: 1.7–5.9) times less likely to store medication in their home compared with households who have chronic patients. With respect to the level of education, the odds of drug storage in households with degrees and above were found to be 3.8 times (95% CI: 1.6–9.1) lower than primary education with a 0.002 level of significance. Middle-income households had 1.73 times lower probability of drug storage than high-income households (AOR = 1.73, 95% CI: 1.01–3.0). Housewives had 2.9 times lower probability of storing medicines than government employees did.

**Discussion**

Information obtained on the prevalence of home drug storage can help healthcare professionals and the community at large, as drugs kept at home could increase the practice of self-medication, which, in turn, might increase the risk of drug interaction. This study revealed that more than half (57.9%) of the study participants had stored medicines during the study period, which was comparable to the studies conducted in South Gondar, Nekemte, and Gondar towns of Ethiopia (44.6, 49.9, and 44.2%,

respectively)<sup>[10–12]</sup>. However, it was found to be much higher than that in a study conducted in Tigray, Ethiopia, in 2015 (29%). This might be explained by the progressive advancement in pharmaceuticals and the increased prevalence of both acute and chronic diseases over the past few decades, which has increased medication consumption<sup>[18,19]</sup>. However, this finding was much lower when compared to the studies conducted in the Southeast Islamic Republic of Iran and Greece (100%), Northern United Arab Emirates (99%), and Illinois in the USA, where there was an 80.5% prescription and 92.4% nonprescription medication storage prevalence<sup>[20–23]</sup>. This difference might be attributable to socioeconomic differences between Ethiopia and the aforementioned countries.

It is clear that medicine storage is unavoidable for a number of reasons, such as the death of patients while on therapy, treatment failure, and/or discontinuation of therapy owing to side effects and poor medication adherence<sup>[2]</sup>. Therefore, educating the public about the proper disposal of unused medications is crucial<sup>[18]</sup>. Moreover, as pharmacy practice mainly focuses on the dispensing process, information on the storage and organization of various medications is lacking. Hence, sufficient information should be provided to maximize public awareness of proper storage conditions, rational drug use, and medication-related hazards<sup>[20]</sup>.

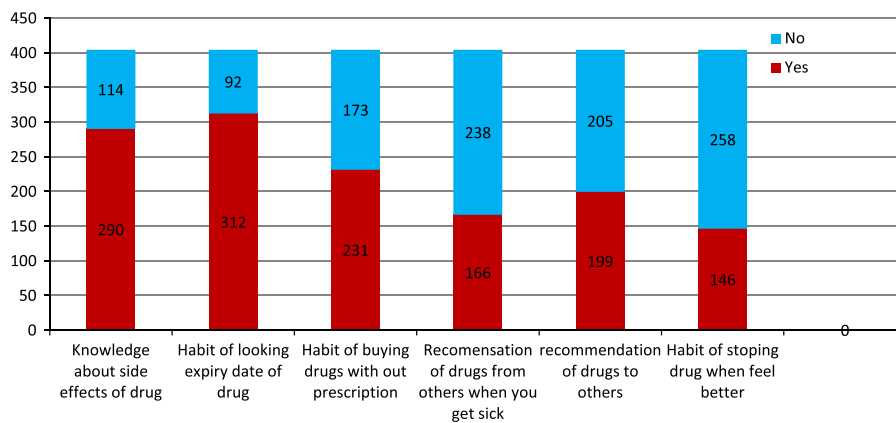


Figure 3. Information obtained from respondents about drug use.



**Table 3**  
**Availability of medicine in the respondents home, (n = 404)**

Variable	Frequency	Percent
Do you have any medicines available at home today		
Yes	234	57.9
No	170	42.1
Total	404	100.0
From where did you get the medicine		
Family or friend	12	5.1
Clinic/Hospital	103	44.0
Private pharmacy	119	50.9
Total	234	100.0
In home because		
Current treatment	109	46.6
Left from past treatment	69	29.5
Stored in home for future need	56	23.5
Total	234	100.0
Knowledge on drug use		
Yes	129	55.1
No	105	44.9
Total	234	100.0
Knowledge on frequency of administration		
Yes	123	52.6
No	111	47.4
Total	234	100.0
Knowledge on duration		
Yes	51	21.8
No	183	78.2
Total	234	100.0
Knowledge on side effect		
Yes	50	21.4
No	184	78.6
Total	234	100.0
Situation of expiry date		
Not expired	171	73.1
Expired	17	7.3
Not known	46	19.6
Total	234	100.0

The present study found 22.5% drug-sharing practice, which was in line to the findings of the South Gondar Zone (26.3%) and Nekemte (24.9%) of Ethiopia<sup>[11,12]</sup>. A study conducted in North Carolina, USA, also showed results similar to those of the current study (20%)<sup>[24]</sup>. In contrast, medication sharing practices in the United Arab Emirates, Nigeria, South Korea, and Iraq have been reported to be much higher than the current findings (86, 52.7, 52.4, and 37%, respectively)<sup>[20,25–27]</sup>. Typically, medications are prescribed individually for a particular condition. Therefore, drug-sharing is considered a risky behavior, although patients manifest similar symptoms. Treatment regimens that work for one person may not work for another due to a number of inter-personal differences, such as patient weight and age, pre-existing diseases, potential drug-drug interactions, and the development of allergies if the prescription is not tailored according to their needs<sup>[28]</sup>.

Another factor assessed in this study was how people dealt with leftover medications that remained at home. The most common method of disposal in the current study was the disposal of trash (67.3%), which was in line with studies conducted in Kuwait (76.5%), Malaysia (73.2%), and rural areas of Serbia (74.5%)<sup>[3,4,8]</sup>. However, in a study conducted in Sweden, only

**Table 4**  
**Self-medication practice of the respondents, (n = 404)**

Variable	Frequency	Percent
Self-medication for the past 3 month		
Yes	180	44.6
No	224	55.4
Total	404	100.0
Reason for self-medication		
Previous experience	56	31.1
Advice from other	20	11.1
Promotion	5	2.8
From pharmacy advice	99	55
Total	180	100.0
Frequency of self-medication		
One times	94	52.2
Two times	54	30
Three times	16	8.9
> Three times	16	8.9
Total	180	100.0
Therapeutic class of self-medication		
Analgesic	96	53.3
Cold remedies	43	23.9
Antibiotics	34	18.9
Other	7	3.9
Total	180	100.0
Formulation		
Tablets	108	60.0
Capsule	26	14.5
Sirup	40	22.2
Other	6	3.3
Total	180	100.0
Exchange medication with others		
Yes	91	22.5
No	313	77.5
Total	404	100.0

3% of participants affirmed throwing into dustbins, and 43% returned to a nearby pharmacy, which was barely 0.7% in our study<sup>[29]</sup>. This might be attributable to the fact that Sweden is one of the world's most highly developed, postindustrial societies that understand the hazards of improper medication on both the environment and people's health.

It is important to check the expiration date when receiving or before using any medicine. In our study, approximately one-fifth of the participants did not check the expiry date of the drugs before their use. This result is in line with a study from Saudi Arabia, where 17% of respondents never checked the expiry date of a medication while being stored at home<sup>[28]</sup>. The probable reason for this may be the lack of information about the hazard of using expired medications on user well-being.

The widespread use of self-medication was observed in the current study, accounting for nearly half (44.6%) of the study participants, which was comparable to studies conducted in South Gondar (43.8%), Gondar town (44.2%), and Oman (43%)<sup>[9–11]</sup>. In contrast, lower rates of self-medication have been observed in studies conducted in Malaysia (16.2%), Spain (22%), Pakistan (15.7% in urban areas and 8.3% in rural areas), and Jimma town in Ethiopia (27.6%)<sup>[30–33]</sup>. A higher prevalence than that in the current study was observed in studies conducted in Syria (67.3%), Nigeria (69.4%), and Uganda (76%)<sup>[34–36]</sup>.

**Table 5**  
**Medication storage and disposal practice of respondents, (n = 404)**

Variables	Frequency (n)	Percentage
Storage area		
Bed room	110	27.2
Box	43	10.6
Shelf	79	19.6
Fridge	26	6.4
Drawer	143	35.4
Other	3	0.7
Action done when drug deposited at the bottom of a bottle		
Shaking and use	265	65.6
Adding some water	10	2.5
Avoid using it	129	31.9
Do you ever read medicines disposal instructions		
Yes	140	34.7
No	264	65.3
How do you deal with expired drugs		
Use it	5	1.2
Save it but not used	57	14.1
Dispose it	342	84.7
How do you dispose expired drugs		
Throwing in waste	247	61.1
Flushing in toilet	92	22.8
Return to pharmacy	3	0.7
Burying in backward	48	11.9
Other	14	3.5
Improper disposal of expired drugs can affect the environment and health		
Yes	269	66.6
No	135	33.4
How do you deal with leftover drugs		
Keep future use for self	121	30.0
Keep it for future use for others	8	2.0
Return to pharmacy	3	0.7
Throw it	272	67.3

The prevalence of self-medication has increased in recent years owing to a number of factors such as socioeconomic factors, inefficiency of healthcare systems, and uncontrolled drug distribution. It is widely used because it provides advantages such as decreased healthcare costs, enhanced access to medicine, and a reduced number of referrals to physicians. However, some major problems are also associated with it, such as increased drug resistance to pathogens, masking of latent symptoms of diseases that complicate disease conditions, prolonged duration of dosage regimen, and increased drug interactions<sup>[37,38]</sup>.

## Conclusion

A significant number of study participants stored medications at home and bought them from pharmacies without consulting a physician. Utilization of drugs without checking the expiration date, disposing medications into waste, and the practice of medication sharing was found to be high in the current study, suggesting that there is a certain level of lack of awareness and poor home drug utilization practices by the general public. Therefore, the Ethiopian Food and Drug Administration (EFDA) along with NGOs that work on drug disposal should create public education programs on the appropriate use and storage of medicines, optimization of community pharmacy services, and strengthening the health regulation system.

## Limitations of the study

The main problem with the current study emanates from the study design itself as cross-sectional studies cannot establish a cause-and-effect relationship or analyze behavior over a period of time.

**Table 6**  
**Logistic regression results of the predictor variables for home storage of drugs**

Variables	Drug storage		Crude OR	Adjusted OR	P
	Yes	No			
Educational status					
Primary education	29	10			
Secondary education	41	34	2.41 (1.03–5.63)	1.6 (0.6–3.98)	0.32
College diploma	39	39	2.90 (1.25–6.75)	3.2 (1.3–8.1)	0.013
> = Degree	104	108	3.00 (1.4–6.5)	3.8 (1.6–9.1)	0.002
Occupational status					
Government employee	98	77			
Nongovernment employee	80	74	1.18 (0.76–1.8)	1.33 (0.8–2.2)	0.26
House wife	13	25	2.45 (1.17–5.1)	2.9 (1.2–7.2)	0.02
Retired	10	2	0.26 (0.05–1.2)	1.33 (0.17–10.2)	0.78
Others	12	13	1.38 (0.6–3.2)	1.17 (0.4–3.2)	0.76
Monthly income					
Income <5000 EtB	45	49	1.81 (1.04–3.2)	1.826 (0.89–3.7)	0.098
Income 5000–1000 Etb	98	100	1.70 (1.06–2.7)	1.732 (1.01–3.0)	0.046
Income > 10 000 EtB	70	42			
Presence of chronic disease at home					
Yes	62	18			
No	151	173	3.95 (2.23–6.97)	3.2 (1.7–5.9)	0.000

## Ethical approval

The study was approved by Institutional Review Board of Bahir Dar University, College of Medicine and Health Sciences (unique identifier of phar03/04/06/2015 E.C), and was conducted according to the Declaration of Helsinki and Good Clinical Practice. <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>. Informed consent was obtained from all subjects and/or their legal guardian(s).

## Consent

Written informed consent was obtained from the patient for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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This study was self-funded by the authors.

## Author contribution

T.C., D.G.D., K.B., and B.B.: led the inception, data collection, supervision, and data analysis; Y.A., Y.A.T., F.K., Y.M.B., D.Z., A.E., S.E.A., B.K., K.B., and Y.Z.: participated in data collection, analysis, writing the original draft, reviewing, and manuscript editing.

## Conflicts of interests disclosure

The authors declare no conflicts of interests.

## Research registration unique identifying number (UIN)

This research was retrospectively registered at [www.researchregistry.com](http://www.researchregistry.com) with unique identifying number [researchregistry9644](https://www.researchregistry.com/browse-theregistry#_home/registrationdetails/653ab954f0ec3400276694be/) and reported according to STROCCS(15) [https://www.researchregistry.com/browse-theregistry#\\_home/registrationdetails/653ab954f0ec3400276694be/](https://www.researchregistry.com/browse-theregistry#_home/registrationdetails/653ab954f0ec3400276694be/).

## Guarantor

Chernet Tafere.

## Data availability statement

The datasets generated and/or analyzed during the current study are available and will be provided by the corresponding author whenever requested.

## Provenance and peer review

Not commissioned, externally peer-reviewed.

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