

# Drug Storage and Self-medication Practices in Kashmir, India: A Cross-sectional Study

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## ABSTRACT

**Introduction:** Among the various potential health risks, self-medication and inappropriate storage of medicines at home are found to be very important. Inappropriate storage conditions and irrational use of medication without medical consultation may result in serious health problems. Worldwide there has been an increase in the self-medication rate, which can lead to waste of resources and serious adverse reactions.

**Aim:** To assess the practice of self-medication and household storage of medicines amongst the study population.

**Materials and Methods:** This was a cross-sectional and questionnaire based study conducted in the southern district of Kashmir, India from 1<sup>st</sup> September 2021 to 28<sup>th</sup> February 2022. A total of 471 households were included and interviewed to determine the practice of home storage of medicines and self-medication pattern. Quantitative data was presented as means

and standard deviation (mean±SD) and qualitative data as frequency and 95% Confidence Interval (CI).

**Results:** Almost three quarters of the households were having monthly income of less than 20,000 INR whereas 219 (46.50%) of them were illiterate. Proton pump inhibitors, minerals and vitamins, antibiotics and analgesics were the most common medicines stored at home. Drawer was the most common place used for storage of medicines whereas the refrigerator was used in less than 1% of cases for the same. Solid dosage forms were mostly used by the householders and the injectables were least used for household storage purposes.

**Conclusion:** The study revealed that the studied householders stored large amount of medicines in homes, often under inappropriate storage conditions. There is a need for better public knowledge and information about the risks of reuse of prescribed medications.

**Keywords:** Households, Medicine prescription, Utilisation pattern

## INTRODUCTION

In self-medication practices, individuals use medicinal products to treat self-recognised diseases or symptoms. It also involves the intermittent or continuous use of medication which were prescribed by physician for chronic or recurrent disease or symptoms [1]. Self-medication has turned out to be a global concern involving both developed as well as developing countries [2]. According to one estimate, about 60-80% of health problems are treated by self-medication [3]. In recent years, medicine consumption pattern has been changed, resulting in larger purchasing volumes of medicine. Hence the excessive amount of these medicines are being stored at home [4]. Accumulation of medicine may lead to increased costs and can prove harmful to both patients as well as to other family members [5]. Among the various factors that influence the practice of self-medication, increasing disease burden especially in developing countries, desire for quick recovery from illness and the acceptance of self-medication among communities are the commonest ones [6].

One of the reasons for irrational drug use can be related to the easy availability of drugs at home. The undesired storage of these drugs may affect the drug stability which increases the risk of unwanted effects as well as leads to ineffective drug therapy among its users [7,8]. Many studies have been carried out previously that have identified a relationship between medicine storage and self-medication practices [9,10]. In a study carried out by Kiyangi KS and Lauwo JAK, it was found that the presence of medicines in households is one of the risk factors for encouraging inappropriate drug use such as the use of the antimicrobial drugs in illnesses when they are not indicated mainly due to the ease of access [10]. This includes medications stored intentionally while they are being used or medications that are incompletely used. Storing medicines at home have been found to increase the risk of self-medication and some authors have reported a high frequency of exchange of self-medication between family members [11]. The much needed information on the access and use of medicine can be obtained from pattern, extent, source and

storage conditions of medicines kept at household level. Studies on household use and storage of medicines have been conducted world over. Among the studies conducted, several studies revealed that significant proportions of households stored medicines whereas in some cases, all of them were keeping medicines at home [12,13]. Only a couple of studies have been conducted to enlighten the facts about the drug storage in Kashmir [14,15]. So the current study was carried out to enhance the knowledge regarding the practice of self-medication and household storage pattern of various medicines in the Kashmir province of Union territory of Jammu and Kashmir, India.

## MATERIALS AND METHODS

This was a cross-sectional and questionnaire based study that was undertaken in the southern district of Kashmir, India from 1<sup>st</sup> September 2021 till 28<sup>th</sup> February 2022. Chief Medical Officer of the Anantnag district was contacted to obtain formal permission to conduct the study and householders were informed in advance about the study to ensure their agreement to participate in the study. Selected households were visited and the data collection supervisors explained the objectives of the study.

**Inclusion criteria:** Heads of households were asked to consent for their home to be included in the study and for them to participate in filling the questionnaires.

**Exclusion criteria:** Only respondents with any known emotional, psychiatric, and intellectual disturbances were excluded because these conditions could affect the reliability of their response.

A sample of 471 householders were recruited by stratifying the local regions of the district (north, south, east, west and central) into different sections to cover families of different socio-economic status. Householders from each section were selected through a systematic, random sampling technique to cover all parts of the Anantnag district. The requisite sample size was achieved based on the previous study carried out and the Department of Social and Preventive Medicine provided the statistical assistance for the study

[16]. Each household was given a code and considered as a unit. If a householder was not willing to participate, the next household in the sampling frame was taken until the sample size was reached (n=471).

## Procedure

An instrument composed of a structured interviewer-administered proforma was used for data collection [Proforma/Questionnaire]. It was developed by adapting tools used in previous studies and guidelines [16,17] and was validated by subject experts. Household respondents to the instrument which collected data about their demographic characteristics including education status of head of family, their occupation and monthly income. During the interview, medication storage locations were directly inspected and all the medications found in the household were recorded. The medicine name, dosage form, source of the medicine, reason for storage, expiry date and storage place were taken into consideration. The reason for drug storage was not highlighted in final data as no specific reason was given by the respondents for the same and all the stored medicines were within the expiry date.

## STATISTICAL ANALYSIS

The data was reviewed, organised, tabulated and analysed using Microsoft Excel, 2010 version. Quantitative data was presented as means and standard deviation (mean±SD) and qualitative data as frequency and 95% CI.

## RESULTS

Out of the total participants, majority of them 219 (46.50%) were illiterate and 90 (19.11%) could only read and write. Although 69 (14.65%) had completed their primary education and 66 (14.01%) had completed their secondary education and only 27 (5.73%) had completed their studies at college level. When the nature of occupation of the heads of householders was considered, a good number of them were labourers 102 (21.66%), followed by businessmen 81 (17.19%), drivers and farmers 72 (15.29%). Majority of households 207 (43.95%) had the monthly income of less than 10,000 INR, followed by those which had monthly less than 10,000-20,000 INR, 141(29.94%). Only 3 (0.64%) households had monthly income of 50,000-60,000 rupees [Table/Fig-1].

Variables	Number, n=471	Percentage
<b>Education</b>		
Illiterate	219	46.50
Read and write	90	19.11
Primary	69	14.65
Secondary	66	14.01
College	27	5.73
<b>Occupation</b>		
Labourer	102	21.66
Businessmen	81	17.19
Driver	72	15.29
Farmer	72	15.29
Shopkeeper	51	10.83
Others	93	19.74
<b>Monthly family income (thousand)</b>		
<10,000	207	43.95
10,000-20,000	141	29.94
20,000-30,000	69	14.65
30,000-40,000	36	7.64
40,000-50,000	15	3.18
50,000-60,000	3	0.64

[Table/Fig-1]: Demographic characteristics of participants.

All the households reported that they kept medicines at home. Total numbers of medicines stored by the studied population were 1674, as most of the households stored more than one medicine. Most common place to store the medicine was found to be drawer 894 (53.41%), followed by cupboard 366 (21.86%). Only 12 (0.72%) of householders used to store their medicines in refrigerator. The results of the present study showed that tablets were the most common drug formulation used 978 (58.42%), which was followed by capsules 318 (19%) and oral liquids 267 (15.95%). Injectables were used only in 15 (0.90%) instances. Proton pump inhibitors were the most common reported therapeutic category of drugs used by the householders 228 (13.62%). Minerals and vitamins were the next therapeutic category of drugs commonly used 186 (11.11%). Antibiotics and analgesics were equally used by 165 (9.86%) of the total householders questioned during the study [Table/Fig-2].

Variable	Number, n=1674	Percentage
<b>Storage place of medications</b>		
Refrigerator	12	0.72
Cupboard	366	21.86
Drawer	894	53.41
Other (Kitchen, Bathroom, Bedroom)	402	24.01
<b>Formulation used for self-medication</b>		
Tablet	978	58.42
Capsule	318	19.00
Oral liquid	267	15.95
Semisolid	24	1.43
Injectable	15	0.90
Other (Inhalers, Lozenges, Respules)	72	4.30
<b>Therapeutic class used for self-medication</b>		
Proton pump inhibitors	228	13.62
Minerals and Vitamins	186	11.11
Antibiotics	165	9.86
Analgesic	165	9.86
Antihypertensives	156	9.32
Other (Calcium, Hormone pills, Anxiolytics, and Sleeping pills)	774	46.23

[Table/Fig-2]: Storage of medicines at home and self-medication practices of participants.

## DISCUSSION

This pragmatic study was conducted in rural areas in the southern part of Kashmir, India, revealed the socio-demographic profile of the participating householders and revealed the various facts about the home storage of medication. Majority of the heads of the households were illiterate 219 (46.50%) and only 27 (5.73%) of them were having the college level education. This was in contrast to a similar study carried out in Kashmiri population where 94% of the studied population was found to be literate [14]. This can be justified by the fact that the said survey was conducted in urban population where the majority population has access to educational institutes and the literacy levels are generally very high compared to rural areas where the current study was conducted. Majority of the studied cases 207 (43.95%) were having the monthly income of less than 10,000 rupees. These results were similar to the study carried out in Maharashtra, where the majority of households had monthly income of less than 15,000 INR [18]. This can be justified by the fact that since the study was conducted in the rural areas where heads of the household used to indulge in the low wage work at the earliest of their age and paying least attention for their academic carriers.

The present study revealed that nearly three-fourth of households stored medicines either in the drawer or cupboard whereas less than 1% of them used the refrigerator for storage purpose. The correct storage place of the medicine depends on the nature of the medicine itself. Most of the drugs can be stored at desired room

temperature whereas few medicines such as antibiotic suspensions after preparation must be kept cool but not frozen. These results were similar to the study conducted in Qatar, where most medicines were kept in the bedroom drawer [19]. The adequacy of household storage is influenced by the location of the medicine. One of the risk factors for the occurrence of accidental poisoning in children and suicide attempts have been found to be storing drugs at places which are easily accessible [20,21]. Criteria for adequate home storage of medications given by some regulatory agencies are to store medicines out of reach of children and to be protected from heat, humidity, light, and dust [22,23].

Tablets were the formulations most commonly used for self-medication 978 (58.42%). However, it should be emphasised that tablets might be the most frequently used dosage form in self-medication simply because most medicines for self-medication come in tablet form. This was followed by capsules formulation which was used in 318 (19%) cases. Solid dosage formulations (tablets and capsules) are commonly used drug formulations because of their ease of administration and acceptability in the community [24]. Similar results were reported by a study carried by Martins RR et al., [25].

The results of the current study showed that stored medicines belonged mostly to four categories: proton pump inhibitors, minerals and vitamins, analgesics and antibiotics. Almost similar results were reported in a study carried out on Iranian households where analgesics, adult cold remedies and antibiotics were the three most commonly used therapeutic drug categories [26]. The respiratory medicines (16.8%), Central Nervous System (CNS) agents (16.4%) and antibiotics (14.3%), were found to be most commonly reused medicines in a study carried out by Abou-Auda HS [27].

The present study results were in contrast to the British study, 28.0% cardiovascular medicines, 19.1% CNS agents, 14.8% respiratory agents, 11.4% gastrointestinal agents and only 4.0% antibiotics were returned to pharmacies [28]. One of the risk factors for encouraging inappropriate drug use such as using the antimicrobial drugs in illnesses when they are not indicated is the ease of access to them. This inappropriate use of antimicrobials can potentially cause adverse drug reactions and lead to development of antimicrobial resistance, which is considered as the most serious challenge throughout the world [29]. Similar studies have been tabulated in [Table/Fig-3] [8,19,26].

S. No.	Authors name and year of publication	Place of study	Sample size	Parameters measured	Conclusion
Present study	Tabassum R et al., 2022	Kashmir, India	471	Education, occupation and income of head of household, storage places, formulation used, classes of medicine stored	Most of the participants were having low education and socioeconomic condition, drawer being the most common place of storage, tablets most commonly used and proton pump inhibitors, minerals vitamins and analgesics and antibiotics most commonly used.
1.	Kheir N et al., 2011 [19]	Qatar	49	Storage places and classes of drugs stored	Majority of drugs kept in bedroom and analgesics, antihistamines and nutritional supplements being most common drugs stored.
2.	Ocan M et al., 2014 [8]	Uganda	892	Demographic characteristics, drug name, quantity, source, formulation, legibility of drug labels and reasons for storage	One third of the household had drugs, analgesics and antibiotics were most common drugs stored, storage was high among educated class and self-medication was high among those who stored the medicine.

3.	Foroutan B and Foroutan R, 2014 [26]	Iran	500	Demographic profile, classes of storage medicine, places of drug storage, percentage of self-medication	Analgesics, cold remedies and antibiotics were most commonly used drugs, refrigerator was most common storage place and half the households used the self-medication.
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[Table/Fig-3]: Similar studies carried out previously have been tabulated below.

### Limitation(s)

Although the present study was a community based and was not based on a specific target group however an absence of a standard definition of self-medication and the study design which did not include a comparison group means the results should be interpreted with caution and many more studies are needed to authenticate the results.

### CONCLUSION(S)

The studied householders stored large amount of medicines in homes. Most common place to store the medicine was found to be drawer (53.41%) and tablets (58.42%) were the most common drug formulation used. Since the study was carried out in rural population, most of the households were having low education level and belonged to low socio-economic sectors. Most often the stored medicines were not stored under proper storing conditions which can lead to unauthorised use of these medicines by the family members. Since large amount of medicines belonging to various drug classes (Analgesic, Multivitamins, Antibiotics and Antihypertensive) were stored by the households, the prescribers have to take into account that their patients are likely to keep several prescription medicines in their homes. These patients are potential providers of these medicines to their relatives and friends which can lead to unsafe self-medication. There is a need for better public knowledge and information about the risks of reuse of prescription medications.

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**PROFORMA/Questionnaire**

**Drug storage and self-medication practices in Kashmir, India.**

**Household No:**

**Region of the district:** tick the appropriate one

North	South	East	West	Central
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**Education Qualification of Household head:**

1. Illiterate
2. Read and write only
3. Primary level
4. Secondary level
5. College level

**Occupation of Household head:**

1. Labour
2. Businessman
3. Driver
4. Farmer
5. Shopkeeper
6. Others

**Monthly income of household (in thousands K)**

1. Less than 10 K
2. 10-20 K
3. 20-30 K
4. 30-40 K
5. 40-50K
6. More than 50 K

**Storage place of medicine: tick the appropriate one**

1. Refrigerator
2. Cupboard
3. Drawer
4. Any other place

**Drug formulation stored: tick one or more drug formulations stored**

1. Tablet
2. Capsule
3. Oral liquid
4. Semisolid
5. Injectable
6. Other formulation

**Therapeutic drug class stored:**

1. Proton pump inhibitors
2. Minerals and Vitamins
3. Antibiotics
4. Analgesic
5. Antihypertensives
6. Other (Calcium, Hormone pills, Anxiolytics, and Sleeping pills)