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Self-medication prevalence and associated factors among adult population in Northern India: A community-based cross-sectional study

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Abstract

Objectives: This study aimed to determine self-medication prevalence and its associated factors.

Methods: A community-based cross-sectional study was conducted in the urban and rural catchment areas of Uttar Pradesh, India, among 440 adults using a pretested, semistructured questionnaire. The Chi-square test and logistic regression were used to determine the association of self-medication prevalence with various independent variables. The associations were reported as adjusted odds ratios and 95% confidence intervals.

Results: The prevalence of medication use was 66.4%. The majority of participants (45%) took medicine for fever, cough (40.1%), and cold (31.8%). Allopathy (83.2%) was the most common medicine system used for self-medication. More than half reported taking medicine such as paracetamol (52%), followed by cough syrup (21%) and antihistaminic (17%). Convenience (46%) and lack of time (35.3%) were commonly cited reasons for self-medication. Also, 64.4% of the respondents practiced self-medication on the pharmacist's recommendation. Urban participants (adjusted odds ratio: 9.85, 95% confidence interval: 5.32–18.23), females (adjusted odds ratio: 2.32, 95% confidence interval: 1.18–4.57), skilled workers (adjusted odds ratio: 5.62, 95% confidence interval: 1.80–17.5), and those who completed primary school (adjusted odds ratio: 2.48, 95% confidence interval: 1.16–5.25) were more likely to self-medicate than rural, male, unemployed, and illiterate participants, respectively. Also, participants whose income was 30,000 Indian rupees (adjusted odds ratio: 3.21, 95% confidence interval: 1.00–10.21) were more likely to self-medicate than those whose income was less than 4000.

Conclusions: A high prevalence of self-medication was found, particularly in urban areas. Convenience and lack of time were commonly cited reasons for self-medication. Allopathy was the most widely used medicine system for self-medication. Antipyretics, cough syrups, and antiallergics were most commonly self-medicated. Gender, education, and income were associated with self-medication. The study highlighted the increased usage among females which could be further explored and role of pharmacists' recommendation as a major driver for self-medication.

Keywords

Adults, prevalence, self-medication, India

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Introduction

According to the World Health Organization, self-medication (SM) is the "use of medicinal products by the consumer to treat self-recognized disorders or symptoms, or the intermittent or continued use of a medication."[1] SM is an alarming public health concern globally and has deleterious effects on consumers. It may lead to an incorrect diagnosis, mask underlying illness, antimicrobial resistance, drug dependence, drug abuse, and severe adverse effects due to excessive drug dosage and drug reactions.[2,3] A meta-analysis reported SM in approximately 38.8% (95% CI: 29.5–48.1) of the 31,340 participants from developing countries.[4] This study reported a wide variation of SM prevalence across developing countries.[4] In India, the SM prevalence was approximately 53.57% (95% CI: 36.92–70.21), with high heterogeneity across various populations.[5] Most commonly, the SM was indicated for headache, cough, cold, and fever.[5] Most commonly used SM drugs were nonsteroidal anti-inflammatory and antiallergic drugs, and minor ailments were the primary reason for SM practice in India.[5] Besides this, factors such as education level, socioeconomic status, gender, access to healthcare facilities, health-seeking behavior, and drug advertisement can also affect SM practice.[1,6–8]

Few studies have been done in India to assess the SM practice. A study among 124 households in urban Puducherry reported SM prevalence to be approximately 11.9%, with males, participants over 40 years, and moderate occupation having a significantly higher SM prevalence.[9] Approximately two-fifths of the participants procured the drug by sharing their illness with pharmacists, and approximately two-thirds believed that SM practice was harmless.[9] The most common indications for SM use were fever, headache, and pain in the abdomen.[9] Another study on 10 retail private pharmacies in Berhampur, Odisha, reported SM prevalence at approximately 18.72%.[10] In this study, younger people, males, and those with lower income and poor lifestyles had a significantly higher prevalence of SM.[10] Also, those with multiple symptoms, perception of difficulty accessing healthcare services, and chronic disease had a significantly higher prevalence of SM.[10] Another study in central India's urban areas revealed an SM prevalence of 60%.[11] Unlike other urban studies, females were more likely to self-medicate.[11] Also, a higher level of education was associated with SM.[11] Most common indications were fever, body ache, cold, and cough. A study in a rural town in Northern India revealed an SM prevalence of 50%, with the majority seeking SM for headache, fever, and urinary and respiratory problems.[12] Like other studies, nonsteroidal anti-inflammatory drugs were the most commonly used SM. Other drugs for gastrointestinal ailments and antimicrobials were also used.[12] All these studies showed a wide range of prevalence and disparities across various sociodemographic characteristics in urban and rural areas of India. Also, a meta-analysis revealed high heterogeneity across various studies conducted in India.[5] Additionally, fewer studies have been done in rural areas. There are a lot of risk factors, both at the individual and community level, which warrant in-depth exploration. This study was conducted with the objectives to estimate the prevalence of self-medication, to assess the knowledge and practices of self-medication among the study population and to find the association of self-medication with sociodemographic characteristics.

Methods

Research hypothesis

There is significant association between the prevalence of self-medication practices and sociodemographic variables including age, gender, educational level, occupation, income, and urban/rural residence.

Study design

This cross-sectional study was conducted in the urban and rural field practice areas of the Department of Community Medicine, School of Medical Sciences and Research, Sharda University in Gautam Buddh Nagar, Uttar Pradesh, India.

Study population

District Gautam Buddha Nagar is situated in the west of Uttar Pradesh, India. The district has area between the two main rivers of India, namely Ganga and Yamuna. On its North is district Ghaziabad and borders of Delhi, on the South is Aligarh, on the east is Bulandshahar, and on the west is the border of Haryana state.

The study population included residents of eight villages of rural and four colonies of urban field practice areas of the Department of Community Medicine, School of Medical Sciences and Research, Sharda University in Gautam Buddh Nagar, Uttar Pradesh, India.

Inclusion criteria

All residents of urban and rural field practice areas of the Department of Community Medicine, School of Medical Sciences and Research, Sharda University in Gautam Buddh Nagar, Uttar Pradesh, India, who aged 18 years and above and were willing to participate in the study were included in this study.

Exclusion criteria

Residents who lived in the study area for less than 1 year and people with severe mental disabilities were excluded from the study population.

Sample size and sampling technique

The prevalence of SM practices was 50% in a similar study conducted in Sahaswan, Uttar Pradesh, India by Ahmad

et al.[12] This was used to determine the minimum sample size for this study using the formula, $n = z^2 PQ/d^2$, where n = minimum sample size; $z = 1.96$ at 95% confidence interval (CI) obtained from the standard statistical table of the normal distribution; P = estimated prevalence of SM in each population (50%); q = precision that is, $(1-p)$ and d = absolute error of 5%. Using this formula, the minimum sample size calculated was 400. With a 10% nonresponse rate, the final sample size was 440. The participants were selected by convenient sampling from the respective areas.

Data gathering

A pretested, semistructured questionnaire (Supplemental File 1) was used to collect the data. A pilot study was conducted among 30 participants. Following pretesting, the questionnaire was revised and reconstructed. The participants from the pilot study were not included in the study.

We did door-to-door visits, and those who fulfilled the eligibility criteria were interviewed at their respective households using the semistructured pretested questionnaire. Before conducting the study, written informed consent in English and Hindi was provided to the participants. Participants were allowed adequate time to read, understand, and complete the consent form. Illiterate participants were informed verbally and thumb impression was taken. Following this, the respondents were questioned about indulging in SM practice in the past 1 year, and responses were recorded in the questionnaire. The participants were allowed to withdraw at any study stage to promote autonomy.

Variables studied

We considered age, residence, gender, education, occupation, income, and health insurance as subject variables. The outcome variable was SM prevalence.

Data analysis

The data from the questionnaire was entered into an Excel spreadsheet, followed by data cleaning. Data was exported into IBM SPSS 25.0 software, which was used for statistical analysis. Descriptive statistics were computed, and categorical variables were expressed as frequencies and percentages. The Chi-square test and logistic regression were used to determine the association of SM prevalence with various independent variables.

Ethical considerations

Ethical approval (Ref no. SU/SMS&R/76-A/2020/9) to conduct the study was obtained from the Institutional Ethics Committee of the School of Medical Sciences and Research, Sharda University, Uttar Pradesh, India. Personal identifiers such as name and contact number were not asked for due to respect for the participant's privacy. The study subjects were enrolled only after obtaining written informed consent. Participation in this survey was entirely voluntary, and participants could withdraw at any time before the completion of the study.

Table 1. Sociodemographic characteristics of the participants ($n = 440$).

Variables	Categories	Frequency	Percentage (%)
Age	18–37 years	271	61.6
	38–47 years	138	31.4
	⩾48 years	31	07
Place	Rural	210	47.7
	Urban	230	52.3
Gender	Male	245	55.7
	Female	195	44.3
Occupation	Unemployed	142	32.3
	Unskilled worker	230	52.3
	Skilled worker	68	15.5
Education	Illiterate	72	16.4
	Primary	124	28.2
	High school	163	37.0
	Graduate and above	81	18.4
Monthly Income (in Indian rupees)	<4000	89	20.2
	4000–9999	145	33.0
	10,000–29,999	166	37.7
	⩾30,000	40	9.1
Health insurance	No	403	91.6
	Yes	37	8.4
Total		440	100

Operational definitions

SM practice was defined as indulging in the use of nonprescription medicine in the past 1 year.

Results

Sociodemographic characteristics of the respondents

Among the 440 study participants, 271 (61.6%) were aged between 18 and 37 (Table 1). Around 230 (52.3%) belonged to Urban areas, and 245 (55.7%) were males. More than half (52.3%) were unskilled workers. Over one-third (37%) of participants were high school educated, while 81 (18.4%) were graduates. More than 50% of respondents' monthly income was less than 10,000. Most of the participants had no health insurance 403 (91.6%).

Prevalence and practices regarding SM

The prevalence of SM was approximately 66.4% in the last year, with allopathy (83.2%) being the most commonly used medicine system for SM (Table 2). About 29.1% never checked instructions before consuming the medicine. Most

participants (96.8%) did not report any adverse reaction during the treatment. Approximately three-fifths of the respondents (59.8%) believed SM was a safe practice.

Indications and reasons for SM

Fever (45%), cough (40%), and cold (39%) were the main indications for SM (Figure 1). Figure 2 shows that the majority of the respondents took paracetamol (52%), followed by cough syrup (21%) and antihistaminics (17%). Convenience (46%) and lack of time to visit the doctor (35%) were the most common reasons behind SM (Figure 3). Approximately two-thirds of the respondents (64 %) practiced SM on the pharmacist's recommendation.

Table 2. Self-medication practices among the respondents ($n = 440$).

Questions	Responses	Frequency	Percentage (%)
Ever treated yourself	Yes	292	66.4
	No	148	33.6
System of medicine for self-medication	Allopathy	243	83.2
	Homeopathy	35	12.0
	Ayurvedic	14	4.8
Check the instructions that come with the medicine	Yes, always	66	22.6
	Yes, sometimes	141	48.3
	Never	85	29.1
Switch medicine during the self-treatment course	Yes, always	69	23.6
	Yes, sometimes	183	62.7
	Never	40	13.7
Adverse reactions following self-medication	Yes	9	3.2
	No	274	96.8
Ever used home remedies	Yes	347	78.9
	No	93	21.1

Association between sociodemographic characteristics and SM

Table 3 depicts the associations of SM practice with sociodemographic characteristics. Chi-square analysis shows that age, place of residence, occupation, education, and income were significantly associated with SM. According to bivariate logistic regression, urban participants were 9.85 times more likely than rural participants to practice SM (adjusted odds ratios [AOR]: 9.85, 95% CI: 5.32–18.23). The likelihood of SM in females was twice as high as in male participants (AOR: 2.32, 95% CI: 1.18–4.57). Also, unskilled workers (AOR: 2.21, 95% CI: 1.08–4.49) and skilled workers (AOR: 5.62, 95% CI: 1.80–17.5) were 2.3 and 5.62 times more likely to self-medicate themselves compared to unemployed participants, respectively. SM was 2.48 times more likely among participants who completed primary school than those who did not (AOR: 2.48, 95% CI: 1.16–5.25). Participants whose income was 30,000 Indian rupees or more were more likely to go for SM than participants whose income was less than 4000 (AOR: 3.21, 95% CI: 1.00–10.21).

Discussion

Prevalence of SM

The SM prevalence was 66% in this study, which is higher than the pooled prevalence (53.57%) reported in a meta-analysis by Rashid et al.[5] Other studies done in Andhra Pradesh (68.1%), Delhi (92.8%), Rajasthan (73.6%), and Maharashtra (81.5%) reported high SM prevalence,[13–16] while studies done in Uttar Pradesh (50%), Puducherry (11.9%), and Chennai (32.5%) reported a relatively lower prevalence.[12,13,17] This difference in SM prevalence may be attributed to recall periods employed for SM practice, with some studies using 1 month and others using 1 year.

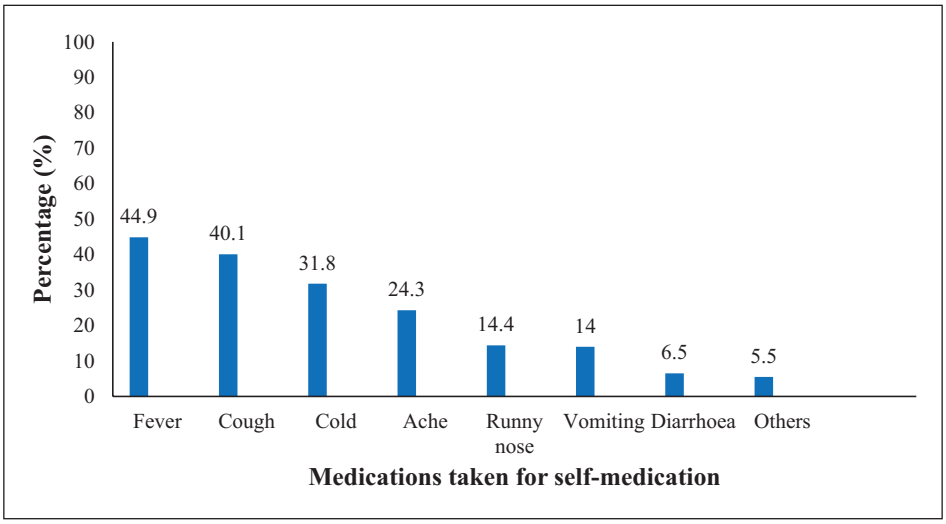

Figure 1. Indications for self-medication.

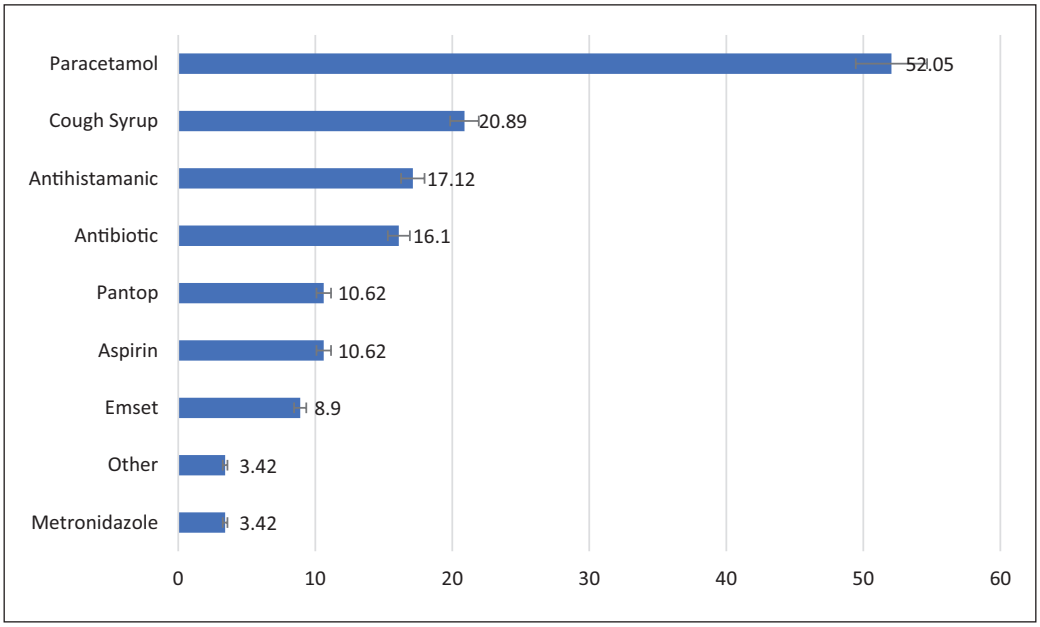

Figure 2. Medicines taken for self-medication.

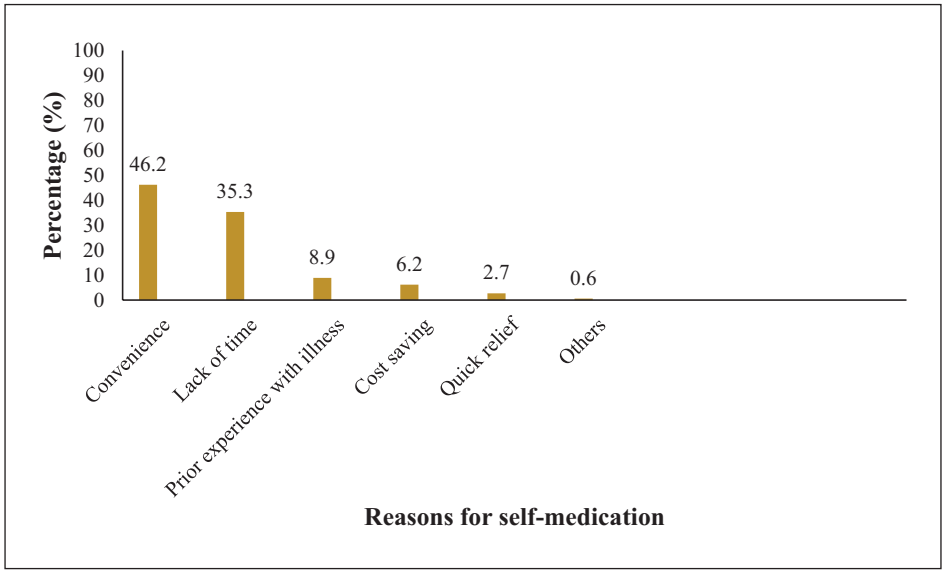

Figure 3. Reasons for self-medication.

In our study, the SM prevalence was much higher in urban areas compared to rural areas. Similarly, the majority of studies done in India reported a higher prevalence of SM in urban areas than in rural areas.[5] The higher SM prevalence in urban areas may be attributed to the easy accessibility to medicines and a lack of time to visit doctors in urban areas.[6–8]

Indications and reasons for SM

In this study, participants self-medicated most commonly for fever, cough, and cold. And paracetamol, cough syrup, and antihistamines were the most commonly used medications in the study. In a meta-analysis of studies done in India, headache was the most common indication for SM, followed by cough, cold, and fever.[5] Also, nonsteroidal anti-inflammatory drugs were the most commonly used drug for SM, followed by antiallergic medications.[5] Though there were wide variations among different studies in this meta-analysis, these findings are similar to ours. Cough syrup and antihistamines were the most popularly used medications in the study. One of the reasons being that the present study was conducted in the National Capital Region where cold and cough are more prevalent partly due to pollution.

Table 3. Association of self-medication prevalence with sociodemographic characteristics.

Variables	Category	Percentage (%)	Frequency	χ^2, *p*-value	AOR (95% CI)	*p*-Value
Age (in years)	18–37	69.7	271		Ref	
	38–47	63.8	138		0.575 (0.324–1.018)	0.058
	48 and more	48.4	31	6.290, 0.043	0.352 (0.129–0.964)	0.042
Place	Rural	41.9	210		Ref	
	Urban	88.7	230	107.66, <0.001	11.57 (6.03–22.17)	<0.001
Gender	Male	67.3	245		Ref	
	Female	65.1	195	0.239, 0.625	2.35 (1.18–4.69)	0.015
Occupation	Unemployed	43.7	142		Ref	
	Unskilled worker	73.0	230		2.28 (1.10–4.71)	0.025
	Skilled worker	91.2	68	56.137, <0.001	6.57 (2.01–21.39)	0.002
Education	Illiterate	36.1	72		Ref	
	Primary	66.1	124		2.39 (1.12–5.09)	0.023
	High school certificate	73.0	163		1.15 (0.48–2.78)	0.741
	Graduate and above	80.2	81	39.74, <0.001	1.05 (0.34–3.22)	0.924
Income	<4000	37.1	89		Ref	
	4000–9999	71.7	145		1.93 (0.96–3.89)	0.065
	10,000–29,999	74.7	166		1.60 (0.70–3.64)	0.258
	⩾30,000	77.5	40	43.45, <0.001	4.55 (1.34–15.38)	0.015
Health insurance	No	67.2	403		Ref	
	Yes	56.8	37	1.67, 0.196	0.18 (0.07–0.45)	<0.001

Convenience, lack of time, and cost-saving were our study's commonly cited reasons for SM. These findings are consistent with other studies done in India and highlight the need for more accessible and affordable health services.[5,9,11–14,16–18]

Beliefs and practices regarding SM

In our study, more than half of the participants (59.8%) considered SM as a safe practice. Similar to our findings, a study among the rural population of Karnataka reported that more than two-thirds of the participants felt that SM was a safe practice, and the majority were unaware of the abuse potential of these drugs.[13] Another study in an urban area of Delhi reported that more than half of the participants found SM acceptable.[14] Also, a study conducted in urban Puducherry found that most participants felt SM was safe.[9] These beliefs regarding SM and being unaware of the detrimental effects of SM need to be addressed. Awareness drives should be launched to provide information regarding the deleterious effects of SM.

Most of the study population (83.2%) indulged in allopathic medicine SM compared to other forms of medicine. A similar observation was made by Kumar et al.[14] in a study based in urban Delhi, where three-fourths of the participants preferred allopathic medicines for SM. A meta-analysis also found that Allopathic medicines were most commonly used for SM.[5] In our study, approximately two-thirds of the participants in rural and urban areas practiced SM by obtaining information from pharmacists. Also, in rural areas, old prescriptions were one of the essential sources of selection of drugs for SM. Similar to our findings, Jain et al.[16] found advice from local pharmacists, previous prescriptions from doctors, and information from family members and friends to be significant sources for people indulging in SM. Agrawal et al.[19] reported that students in his study got their information for SM from previous prescriptions, textbooks, advertisements, and lectures. Other studies also found that the pharmacies and prior prescriptions were major sources of SM.[5,9,13] Also, print and electronic media were sources for SM.[5,20] All these findings reveal a need to strengthen the drug procurement laws and educate the population regarding the various detrimental effects of SM.

Factors associated with SM prevalence

In our study, the likelihood of SM in females was twice as high as in males and 2.48 times more likely among participants who completed primary school. A study conducted in a rural part of North India reported that the prevalence of SM was high, primarily among illiterate males above 15 years with a low income.[12] Contrary to our findings, a study conducted in a suburban area near Chennai found that the males were 1.5 times more likely to self-medicate than females.[17] A study conducted in an urban area of Delhi found that SM was more common among younger people, particularly graduates and postgraduates.[14] Contrary to our study, a cross-sectional study in the urban area of southern Rajasthan found a significant association between younger age groups and the male gender with SM.[16] Also, participants with a graduate or a postgraduate education were likely to engage in SM.[16]

In our study, unemployed workers were less likely to self-medicate. A study conducted in rural Andhra Pradesh reported a significant association between occupation and self-medication.[13] Unlike our study, an urban population-based study in Kerala found that SM was prevalent among skilled workers and those with a university-level education.[21] Our study found a lower prevalence of SM among illiterate participants, which could be due to a higher recall potential of past prescriptions and a higher likelihood of educated people conducting an internet search for symptoms and treatments. A notable trend which was apparent in the present study was that the employed people were more inclined toward SM. This tendency could be attributed to the fact that an around two-thirds (70%) of the study participants, were employed, facing challenges such as time constraints and potential loss of daily wages, which often prompts them to resort to SM rather than seeking a doctor's visit.

Strengths and limitations of the study

The strength of the present study lies in the fact that it was conducted both in urban and rural setting, which provides a comprehensive insight and captures a more complete representation of the population and thus has more relevance in context of policy making.

One of the limitations of this study was recall bias due to a longer recall period of 1 year, which might have affected the prevalence of SM. Also, we used a convenience sampling technique, so the results may not be generalized to the whole population.

Conclusion

SM is an important health issue in our study area. This study showed a high SM prevalence, particularly in urban areas. Fever, cough, and cold were the most common indications for SM. Allopathy was most commonly used, with paracetamol, cough syrup, and antihistaminic used for SM. Convenience, lack of time, and cost-saving were the commonly cited reasons for SM. Accessibility to healthcare services need improvement both in urban and rural areas aiming to mitigate financial constraints for individual seeking medical care. The most prevalent method of drug procurement was through a pharmacist's recommendation. This highlights the necessity to prioritize education and training programs for pharmacists, aiming to discourage such practices among the public and promote more informed and responsible medication procurement behaviors. Gender, level of education, and income categories were associated with SM. The likelihood of SM in females was twice as high as in male participants. This notable disparity warrants further exploration of health-seeking behavior and decision-making processes among women. A quantitative study is highly suggested for more comprehensive understanding of how sociocultural norms specifically influence a women's inclination toward SM. Since the study participants were in favor of using SM in future too for their personal use and to recommend for others, health education of the public and regulation of pharmacies may help in limiting the SM practices.

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Author contributions

Khushboo Juneja, Ambren Chauhan, and Tuhina Shree contributed to the conceptualization, design, data acquisition, data analysis, data interpretation, drafting the work, and critical revision of the work. Mainak Bardhan, Absar Ahmad, Amit Singh Pawaiya, Priyanka Roy, and Ayush Anand contributed to the data analysis, data interpretation, drafting the work, and critical revision of the work.

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Ethics approval

Ethical approval (Ref no SU/SMS&R/76-A/2020/9) to conduct the study was obtained from the Institutional Ethics Committee of the School of Medical Sciences and Research, Sharda University, Uttar Pradesh, India. Personal identifiers such as name and contact number were not asked for due to respect for the participant's privacy. The study subjects were enrolled only after obtaining written informed consent. Participation in this survey was entirely voluntary, and participants could withdraw at any time before the completion of the study.

Informed consent

Written informed consent was obtained from all subjects before the study.

Trial registration

Not applicable.

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Supplemental material

Supplemental material for this article is available online.

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