

Urban-Rural Differences in Self-medication Practices, Determinants, and Perceptions among Adults in Central Gujarat: A Cross-Sectional Study¹Dr. Monica B Parmar, Senior Resident, Department of Community Medicine, Medical College Baroda²Dr. J R Damor, Professor and Head, Department of Community Medicine, Medical College Baroda³Dr. Kalpita Shringarpure, Assistant Professor, Department of Community Medicine, Medical College Baroda**Corresponding Author:** Dr. Monica B Parmar, Senior Resident, Department of Community Medicine, Medical College Baroda. Orcid <https://orcid.org/0009-0009-4422-0420>**How to citation this article:** Dr. Monica B Parmar, Dr. J R Damor, Dr. Kalpita Shringarpure, “Cannabinoid-Opioid Combination Therapy for Chronic and Cancer Pain”, IJMACR– October– 2026, Volume – 9, Issue – 5, P. No. 231 – 242.**Open Access Article:** © 2026 Dr. Monica B Parmar, et al. This is an open access journal and article distributed under the terms of the creative common’s attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non - commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract****Introduction:** Self-medication has emerged as an important component of self-care worldwide; a double-edged sword for patients, as it has both beneficial and harmful effects. This research aims to estimate the prevalence and identify urban-rural differences in determinants and perception of self-medication among adults of Vadodara.**Methodology:** A community-based analytical cross-sectional study was conducted among 340 adults selected using multistage stratified systematic random sampling from urban and rural field practice areas of a tertiary care teaching hospital in Central Gujarat between October 2023 and March 2024. Data were collected using a pretested, interviewer-administered semi-structured questionnaire that was developed by the investigators, validated by subject experts, and pilot-tested among 30 adults (excluded from the final

analysis). Data were analysed using Microsoft Excel 365, MedCalc 12.5.0, and Jamovi 2.3.28. Chi-square test, odds ratios, and multivariable logistic regression were used to identify factors associated with self-medication.

Results: A total of 340 participants (170 urban and 170 rural) were included. Self-medication was significantly more prevalent among urban than rural participants (53.5% vs. 25.8%; OR 3.56, $P < 0.001$). In bivariate analysis, age, gender, education, socioeconomic status, residence, and proximity to healthcare facilities were significantly associated with self-medication. However, proximity to a pharmacy was the only independent predictor in multivariable analysis (adjusted OR 13.10, $P < 0.001$). Minor illnesses were the commonest indication, while analgesics, antipyretics, and antibiotics were the most frequently used medicines. Awareness of

adverse drug reactions and safe medication practices was suboptimal.

Conclusion: Self-medication was common and significantly more prevalent in urban than rural communities of Central Gujarat. Proximity to a community pharmacy was the only independent determinant, despite higher prevalence among males, middle-aged adults, and the middle socioeconomic class.

Keywords: Self-Medication, Self-Care, Community Health, Antimicrobial Resistance, Urban Population, Rural Population.

Introduction

According to WHO, Self-medication (SM) is the practice of individuals treating their symptoms and conditions using medicines that are approved and available without a prescription and are safe and effective when used as indicated². The Declaration of Alma-Ata in 1978 witnessed people's involvement in obtaining optimal health. In addition, the Ottawa Declaration on Health Promotion, issued in 1986, emphasised the importance of individuals and communities in contributing to health through practising SM³. The WHO advocates safe and responsible SM so that patients can obtain the intended benefits without taxing the healthcare delivery system, particularly in rural and isolated locations⁴. SM is a widespread health-seeking behaviour found all over the world. It is a critical factor to consider in the healthcare system, particularly in a developing country like India. Almost every pharmacy in India would offer a medicine to the customer without first obtaining a prescription¹.

However, it might be a double-edged sword for users, as it has both good and detrimental consequences. For example, irrational antibiotic usage without professional supervision may increase the likelihood of improper,

inaccurate, or unnecessary medication; missed diagnosis, delays in appropriate treatment, adverse drug effects, drug resistance, and increased mortality.⁵ The most important issues with SM are pathogen resistance and serious health risks such as unpleasant responses and extended pain.⁶ Lack of time, a lack of health care facilities, the desire for self-care, sympathy for sick family members, financial constraints, misconceptions, extensive advertising, and easy drugs available in drug stores at a lower cost than physician consultation are all factors contributing to the growing trend of SM.⁵

In India, the concept of SM is widely accepted. Various community-based research in India indicated that the prevalence of SM ranged from 11.9% to 73% (7,8). The socio-demographic component, level of education, cultural practices in the community, and economic standing all have an impact on SM practices^{9,10}.

Rural and urban contexts have varied socioeconomic and demographic factors, which may result in significantly different predictors of SMA. The identification of such indicators is critical in customizing therapies to the two situations. Hence, the study sought to determine the frequency and urban-rural variations in factors of SM behaviors among adults in Central Gujarat, India.

Methods

Study design, setting, and population criteria

Community-based analytical cross-sectional research was carried out. After receiving the ethics committee's permission, the study was done over six months. Adults living in the urban and rural health training center areas of a tertiary care hospital in Vadodara, Central Gujarat, were taken as the research group. Urban Health Training Centre (UHTC) had 11,082 homes with 55,654 people, while Rural Health Training Centre (RHTC) had 38,082 people in 7,413 households. Respondents were 18 years

or older having permanent residence in the area under study and they were included after getting informed consent for participation. Healthcare workers, i.e., Doctors, Staff nurses, Pharmacists, and other healthcare providers having sufficient knowledge of medications were excluded from the study.

Sampling technique and sample size

Assuming an expected difference of 20% in the prevalence of self-medication in urban and rural areas.¹¹ Considering a power of 80% and a confidence interval of 95%, the estimated sample size was 170 in each group, a total of 340. Data collection was carried out till the sample size was achieved.

Selected RHTC and UHTC served as representative strata for Vadodara's rural and urban populations. In the multistage stratified systematic random sampling technique, three villages from RHTC and three areas from UHTC were chosen by lottery method in the first stage. For the second step, households in the chosen strata were divided into four zones: north, south, east, and west. In 2023, RHTC had around 7,413 households and a population of 38,082, while UHTC had 11,082 dwellings and a population of 55,654. In each zone, the first home was chosen at random, followed by the fifteenth household. An adult aged 18 or older was picked at random from each home to participate after informed consent. Priority was given to the head of the family or any other person functioning in a comparable position at that time, regardless of gender, when more than one adult was present in the household.

Operational Definitions

- Self-Medication: It is defined by WHO guidelines as "medication taken by the patient on his/her initiative or the advice of the chemist or any other lay person."¹² Self-medication encompasses the

use of over-the-counter medications as well as a variety of complementary and alternative therapies, including herbal products, dietary supplements, and conventional goods. Self-medication will only be evaluated with allopathic medications in this study.

- A recall period of the last 3 months was taken in the study to estimate the prevalence.
- BG Prasad classification: Updated B G Prasad Classification for the year March 2022 was used to measure socioeconomic status in both the rural and urban areas.¹³

Data Collection and Analysis

A semi-structured questionnaire comprised of a total 21 questions including the following sections was used for data collection

- Section A: Socio-demographic information (7 Questions)
- Section B: Self-medication history (14 Questions)

The English questionnaire was translated into Gujarati for easy comprehension among respondents and data collectors and its suitability had been tested in a pilot study before its use in the study. The questionnaire included both closed-ended and semi-open questions about the respondents' sociodemographic information (age, gender, education, socioeconomic status, area of residence), their history of self-medication in the previous three months, conditions prompting self-medication, knowledge, and sources of medicines, and households with health care facilities (hospital/health care center) or pharmacy/drug outlets nearby. The questionnaire also contained questions about safe practices, such as being aware of adverse effects, reading medicine labels, checking expiry dates before consuming drugs, and so on. All participants received a thorough

description of the Gujarati-translated permission form and information sheet.

Data was collected in a physical questionnaire form and plotted into Microsoft Excel version 2403; later analyzed using Excel 2403, medcalc 12.5.0, and Jamovi standard 2.3.28 version. Data was expressed in frequencies, proportions, and percentages. The Chi-square test, odds ratio, and multiple logistic regression were used for analyzing the relationship between the variables. The study was conducted out with the consent of the Institutional Ethics Committee for Biomedical and Health Research at Medical College, Baroda. Before participating in the study, the individual provided informed permission via offline mode and informed regarding a choice to discontinue or withdraw from the study at any moment. The identities of participants and data were kept anonymous throughout the study and publishing process.

Results

The study comprised 340 participants, 170 from the rural and urban areas, and one from the chosen household. The overall prevalence of SM was 39.7% (135/340; CI

of 19.5% to 33.1%); of this prevalence of SM was 53.5% (91/170; CI of 45.7% to 61.2%) in the urban area, whereas in rural it was 25.8% (44/170). Of the total participants, 39.7% (135/340) used SM in the last three months.

The majority of the participants from urban 35.2% (32/91) and rural 43.2% (19/44) were in the age group of 31-45 years. In urban, the median age was 35 (SD=15.13) years, while that in the rural area was 40 (SD=16.26) years. In both urban and rural areas, male participants (58.2% and 81.8 %) were more prone to practice SM compared to females (41.8% and 18.2%). In the urban majority of the participants, 33.0% (30/91) practicing SM were educated till High school; whereas in rural 36.3% (16/44) of them had primary education only. In both urban and rural settings, it was found that SM-practicing participants were from the Lower middle socio-economic class (32.6%; 44/135). When reviewed, the majority of the urban participants 87.9% (80/91) had a drug outlet/pharmacy as a nearby facility, but in rural participants, 70.5% (31/44) had a healthcare facility or hospital as a nearby facility. (Table 1)

Table 1: Socio-demographic distribution of SMP participants: Urban-Rural Differences (N=135); Urban (n=91), Rural (N=44)

Variable	N (%)	Urban (%)	Rural (%)
Age			
18-30 years	32 (23.7)	28 (30.8)	04 (09.1)
31-45 years	51 (37.8)	32 (35.2)	19 (43.2)
45-60 years	31 (23.0)	21 (23.1)	10 (22.7)
>60 years	21 (15.6)	10 (11.0)	11 (25.0)
Gender			
Male	89 (65.9)	53 (58.2)	36 (81.8)
Female	46 (34.1)	38 (41.8)	08 (18.2)
Education			

Non-educated	17 (12.6)	08 (08.8)	09 (20.5)
Primary education (<8 standard)	41 (30.4)	25 (27.5)	16 (36.4)
High school	39 (28.9)	30 (33.0)	09 (20.5)
Post-high school/ Diploma	21 (15.5)	13 (14.3)	08 (18.2)
Graduated	17 (12.6)	15 (16.5)	02 (04.6)
Socio-economic scale			
Upper class (Class 1)	19 (14.1)	17 (18.7)	02 (04.6)
Upper middle (Class 2)	24 (17.8)	20 (22.0)	04 (09.1)
Lower middle (Class 3)	44 (32.6)	28 (30.8)	16 (36.4)
Upper lower (Class 4)	37 (27.4)	22 (24.2)	15 (34.1)
Lower class (Class 5)	11 (08.2)	04 (04.4)	07 (16.0)
Nearby available facility			
Drug outlet/Pharmacy	163 (82.2)	80 (87.9)	13 (29.6)
Healthcare / Hospital	177 (17.8)	11 (12.1)	31 (70.5)

*SMP: Self-medication Practiced in last 3 months

†Parameters are measured as Frequency and Relative frequencies

Age ($p=0.002$), gender ($p=0.01$), education ($p<0.0001$), socioeconomic scale ($p=0.0002$), residency ($p<0.0001$), and nearby available facilities ($p<0.0001$) were all significantly linked with SM practices. While using multivariate analysis, only nearby accessible facilities ($p<0.001$; adjusted OR=13.10) were significantly associated with SM. **(Table 2)**

Table 2: Socio-demographic distribution contributing to the self-medication practices among adults (N=340)

Variable	Self-medication n (%)	No self-medication n (%)	p-value*
Age			
18-30 years	32 (09.4%)	69 (20.3%)	p=0.0026
31-45 years	51 (15.0%)	41 (12.1%)	
45-60 years	31 (09.1%)	49 (14.4%)	
>60 years	21 (06.2%)	46 (13.5%)	
Gender			
Male	89 (26.2%)	105 (30.9%)	p=0.0102
Female	46 (13.5%)	100 (29.4%)	
Education			
Illiterate/<8 standard	58 (17.1%)	108 (31.8%)	p<0.0001
High school	39 (11.5%)	78 (23.0%)	
Post-high school/Graduate	38 (11.2%)	19 (05.6%)	
Socio-economic scale			

Upper class (Class 1)	19 (05.6%)	15 (04.4%)	p=0.0002
Upper middle (Class 2)	24 (07.1%)	67 (19.7%)	
Lower middle (Class 3)	44 (13.0%)	32 (09.4%)	
Upper lower (Class 4)	37 (11.0%)	70 (20.6%)	
Lower class (Class 5)	11 (03.2%)	21 (06.2%)	
Residence			
Urban	91 (26.8%)	73 (21.5%)	p<0.0001
Rural	44 (13.0%)	126 (37.1%)	
Nearby available facility			
Drug outlet/Pharmacy	111 (32.6%)	52 (15.3%)	p<0.0001
Healthcare / Hospital	24 (07.1%)	153 (45.0%)	

*Chi-square test

†P value: <0.05 is considered as Statistically significant

The variables associated with SM practices in bivariate analysis were analyzed through Multivariate analysis with Logistic Regression. Multivariate analysis revealed that individuals with nearby drug outlets/pharmacies had 13.10 (OR=13.6; Adjusted OR=13.10; p-value <0.001) times higher odds of practicing SM compared to those with nearby hospitals/healthcare facilities. (Table 3)

Table 3: Multivariate analysis of socio-demographic details associated with Self-medication Practices (N=135)

Variable	Characteristics	Self-medication Yes (%)	Chi-square (Significance level)	Odds ratio (p-value) [†]	Adjusted Odds ratio (p- value) [†]
Age Group (Years)					
	18-30	32 (23.7)	14.2 (p<0.05)	-	1.4 (0.4)
	31-45	51 (37.8)			Reference
	45-60	31 (23.0)			0.84 (0.7)
	>60	21 (15.6)			1.8 (0.2)
Gender					
	Male	89 (66.0)	6.6 (P=0.01)	1.8 (p<0.05)	1.1 (0.8)
	Female	46 (34.0)			
Education					
	Illiterate	17 (12.6)	20.8 (p<0.0001)	-	Reference
	<8 standard	41 (30.4)			1.81(0.3)
	High school	39 (28.9)			1.60 (0.4)
	Post high school	21 (15.6)			0.32 (0.2)
	Graduate	17 (12.6)			0.48 (0.3)

Residence					
	Urban	91(53.5)	29.2	3.6	1.8 (0.07)
	Rural	44(25.9)	(p<0.0001)	(p<0.0001)	Reference
Socio-economic classification					
	Upper class (Class 1)	19 (14.1)	22.5 (p<0.001)	-	1.9 (0.2)
	Upper middle (Class 2)	24 (17.8)			Reference
	Lower middle (Class 3)	44 (32.6)			1.4 (0.47)
	Upper lower (Class 4)	37 (27.4)			0.7 (0.44)
	Lower class (Class 5)	11 (8.2)			0.6 (0.50)
Nearby facility					
	Drug outlet/Pharmacy	111(82.2)			
	Healthcare / Hospital	24(17.8)	103.2 (p<0.0001)	13.6 (p<0.0001)	13.10 (p<0.001)

*Chi-square test

†p-value: <0.05 is considered as Statistically significant

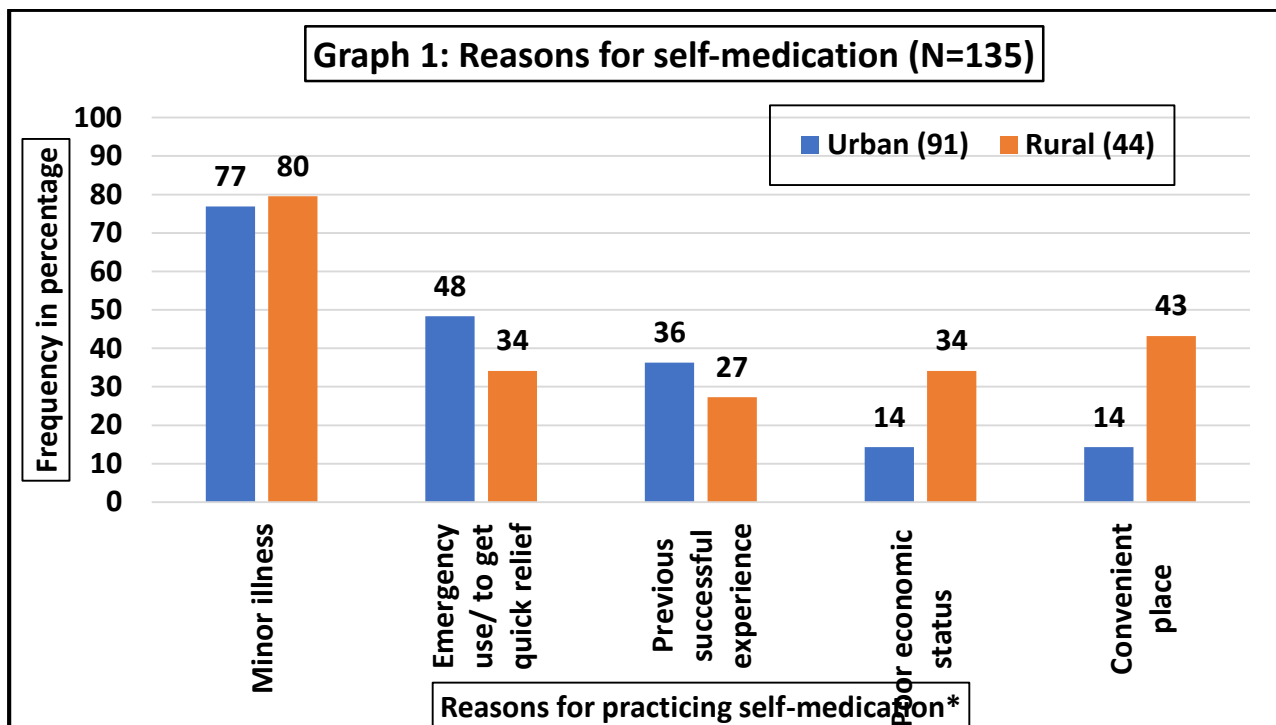
‡Adjusted Odds ratio: Multivariate analysis using logistic Regression

§Reference: A particular group is taken into consideration as a reference

^{||}B G Prasad's classification for March 2022 used for socio-economic classification

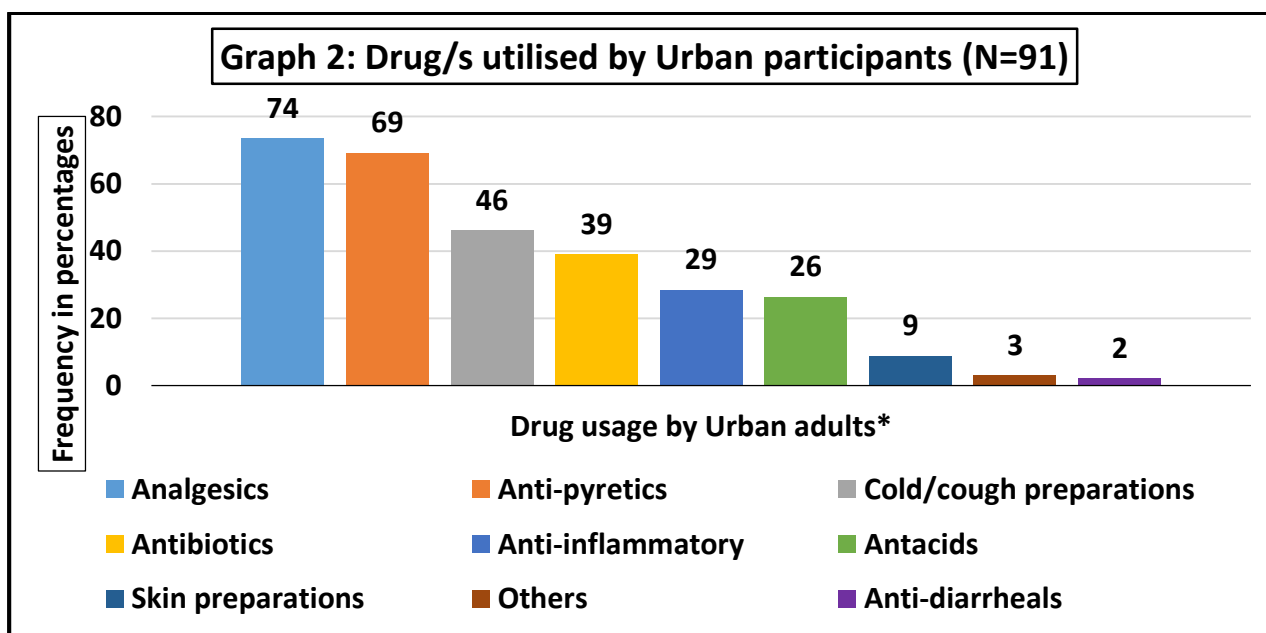
Minor illnesses were the most common cause for practicing SM among both urban and rural participants (77.8%, 105/135) (Figure 1) and the most common complaint was aches/pains (80.7%, 109/135). Antibiotic consumption through SM was 38.5% (35/91) in urban individuals; where in rural it was 25.0% (11/44). The majority of urban participants, 79.1% (72/91), were motivated by pharmacists/medical stores, whereas 77.3% (34/44) of rural individuals practiced SM based on previous prescriptions for themselves or others. Analgesics were the most regularly used by urban people at 73.6% (67/91) (Figure 2), whereas in rural areas, antipyretics were more usually utilized 68.0% (30/44) (Figure 3). In both urban and rural settings, the majority of individuals (80.0%; 108/135) quit taking medications when their symptoms were resolved.

Figure 1: Reasons for self-medication in urban v/s rural (N=135)



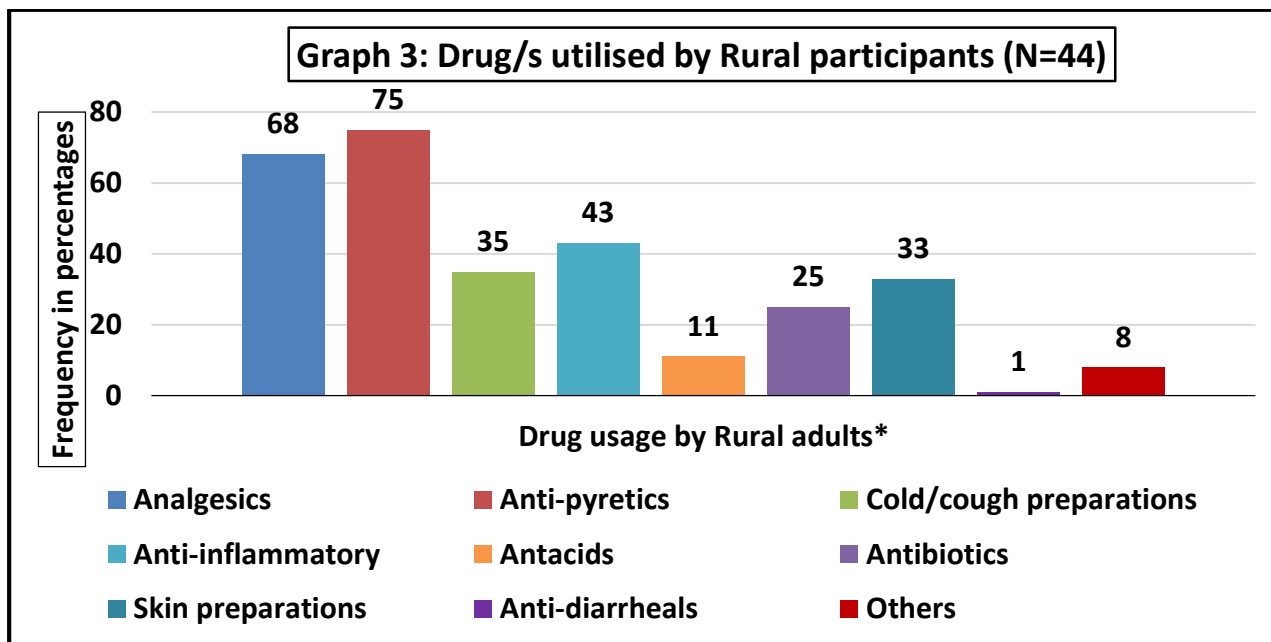
*Multiple answers were allowed in this question

Figure 2: Drug/s utilized by Urban participants for SM (N=91)



*Multiple answers were allowed in this question

Figure 3: Drug/s utilized by Rural participants for SM (N=91)



*Multiple answers were allowed in this question

In the past three months, urban persons practiced SM on 5-6 instances, 35.2% (32/91), whereas rural participants did on 3-4 occasions, 72.7% (32/44). The majority of urban (72.5%, 66/91) and rural (61.4%, 27/44) individuals were unaware of the adverse effects of using the drug. Of 135, 42 (31.1%) participants had side effects following SM; the majority being rural 70.5% (31/44). The majority of the urban participants 92.3% (84/91) used to check expiry dates; on the other side in rural 52.3% (23/44) were not checking it usually. Two-thirds of urban participants 59.3% (54/91) and 77.3% (34/44) rural participants did not read package inserts before use. Urban individuals 58.2% (53/91) were used to advise others to see doctors, but rural participants 63.6% (28/44) recommended the same prescription to others for the same symptoms. In both urban and rural SM practitioners, only a small proportion of participants (26.4% and 9.1%) perceived SM as a good practice. The majority of urban 92.4%

(73/79) and rural 85.7% (108/126) people disagreed with others' SM practices.

Discussion

The current rise in the anti-microbial resistance may be attributed to unsolicited SM. This study reveals the urban-rural pattern of SM in Vadodara district; one of the first in Central Gujarat. The overall prevalence of self-medication used in the last three months was found to be 53.5% in urban areas whereas in rural it was 25.9%; while in the study done by Wijesinghe PR et al¹⁴ reported 12.2% and 7.9% prevalence of SM to allopathic drugs from urban and rural areas, respectively. The prevalence of SM could not be compared among research due to the differences in the recall time considered for definition, the location chosen, and the methodology employed. The majority of the participants from urban and rural were in the age group of 31-45 years; in a study by Varadarajan et al¹⁵ found to be higher among the age group greater than 35 years of age and the association was statistically significant. This

might be attributed to the fact that individuals in this age group are financially independent and are well aware of health concerns and treatment options. In urban areas, the majority of SM practitioners were higher schooled once, whereas in rural areas, the majority of those who practiced SM were educated till primary school. In both urban and rural settings, it was found that SM participants were from the Lower middle socio-economic class. In the present research, over three-quarters of the participants used SM to treat minor diseases. Self-medication is widely recognized as a simple and efficient method for treating minor ailments. However, mistaken confidence can lead to improper SM and expose users to potential hazards.

Analgesics and Anti-pyretics have frequently conceived medications in both urban and rural. Antimicrobial usage was found to be high in both urban and rural locations. Urban individuals were more likely to ingest antimicrobials than rural adults. Irregular, incomplete, and illogical antibiotic usage adds to antibiotic resistance, another worldwide health issue. One-third reported adverse effects from SM, with the majority being rural. Three-fourths of urban and rural users were clueless about the drug's side effects. Efforts should be made to avoid the unwanted adverse effects of medicine caused by inappropriate use and waste of valuable resources.

The majority of the urban participants checked the expiry date before applying; whereas only half of the rural participants checked it; demonstrating that rural respondents were not cautious about utilizing outdated medications. The proportion of reading package inserts was just one-fourth in rural and one-third in urban areas. Participants who estimated a shorter distance to the pharmacies than a health care facility adopted SM 13

times higher than those with a hospital nearby. The majority of urban residents had a pharmacy/medical shop nearby, however in rural areas, health facilities/hospitals were accessible more than pharmacies in the vicinity. Pharmacies had an important role in encouraging participants for SM in urban areas; participants from rural areas practiced SM using prescriptions that had previously been supplied to themselves or others as 'left-over medications' and continued to purchase the same for the recurrence of symptoms/diseases.

The establishment of pharmacy take-back programs in which leftover medicines are submitted to pharmacies may be beneficial in disposing of them properly and solving the key indicator for SM. According to the study by Aiken et al, self-managed medication supplied via online telemedicine was extremely successful with low rates of significant side events, and it offered a safe and effective option for patients who cannot access clinical treatment(16). Proper information and education on telemedicine at pharmacies/medical shops may improve the community's knowledge attitude and perception of self-medication.

One-fourth of urban and very few rural accepted their SM as a good practice. Knowledge might improve the perception and responsible practice.

Conclusion

The research was comparable in urban and rural areas. According to the research, almost forty percent of the population utilized SM in the past three months, and many have shown a desire to self-medicate for multiple conditions. After using multivariate logistic regression age, gender, education, socio-economic scale, and residential area were not significantly associated with SM practices; whereas nearby available facilities played

a statistical significance. Minor illnesses like body aches and fever are the major contributors to SM. Antibiotics were widely used in urban as well as rural settings. Safety aspects such as checking expiry dates and reading package inserts were lacking more in rural participants with SM. To guarantee safe operation and enough information, one should promote reading package inserts as well as enacting laws to offer patient information pamphlets in the local language for easy comprehension. Proper information and education on telemedicine at pharmacies/medical shops may improve the community's knowledge attitude and perception of self-medication.

Acknowledgement

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Recommendations and Future Directions

Although the positive impact of SM on reducing the healthcare burden must be encouraged, it is necessary to strategize for appropriate SM

Further studies need to be done to assess Anti-microbial resistance with microbiological testing in adults practicing SM

Further studies need to be done to assess the improvement in safe SM practice after information and education on telemedicine at medical stores as pharmacists play an important role in SM practice

Educating the public about reporting side effects may boost awareness and prevent drug-related consequences

Limitation

The study results were based on self-reported data, which was subjected to the accuracy of the respondents. Furthermore, recall bias was present since the recall time was designed to be three months. Due to time

constraints, a causality analysis for the individual drug-related issues was not conducted.

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