A community-based survey on the prevalence of drug resistance to misuse or abuse of self-medication

Dr. Vanita Somasekhar[1*,] Dr. P. V. Murali Krishna[2], J. Kuber Singh[3], Taaniya Javalkar[4], Chandana.C[5], Nimisha Niranjan[6], Samima Ahmed[7]

[1]Professor & HOD, Department of Pharmaceutical Analysis, KLE College of Pharmacy, Bengaluru- 560 010, Karnataka, India

[2]Associate Professor, Department of Pharmaceutical Analysis, KLE College of Pharmacy, Bengaluru- 560 010, Karnataka, India

[3,4,6,7]KLE College of Pharmacy, Bengaluru - 560 010, Karnataka, India

[5]Aditya Bangalore Institute of Pharmacy Education & Research, Bengaluru - 560 064, Karnataka, India

[*]**Corresponding author**- Dr. Vanita Somasekhar, Professor & Head of Department, Department of Pharmaceutical Analysis, KLE College of Pharmacy, Bengaluru, India

E-mail: vanitasom@gmail.com

Abstract

Background: Self-medication is a public health concern because of drug misuse/abuse and its medical, social and psychological problems.

Aim: Given the growing prevalence of self-medication, the present study aims to determine the prevalence and causes of self-medication among the age group from 25 to 45 years.

Method: This cross-sectional study was conducted from 24 December 2022 to 18 April 2023, it was carried out by household survey. For this cross-sectional study, we performed in-person interviews in both urban and rural locations. Both urban and rural regions of Karnataka, Andhra Pradesh, Uttarakhand, Maharashtra, Tamil Nadu, Delhi, Kerala, Mumbai, Assam, Meghalaya and Dubai were used for the study.

Results: The majority of subjects (32.3%) are between the ages of 25 to 36, followed by the age groups of 36 to 45(22.1%), 36 to 35 years (3.4%), 18-25 years (26.5%) and those over 45 years (8.0%). Out of all the volunteers, 60.5% were females and rest were males. 9.2% were housewives, 9.8% engineers, 20.4% students, 9.4% teachers, 7.6% professors, 5.8% IT workers. 80.3% of people stay at home while the rest in

6669

hostel. 78.4% of the subjects had no prior medical history, 8.0% had diabetes, and 4.6% had hypertension. Out of which, 6.2% of people purchase their own medications, 24.8% contact a chemist, 64.7% consult a doctor, and 0.2% take a nap when they are ill.

Conclusion: Due to the adverse effects of self-medication, drug dependency, and microbial resistance and the relatively high prevalence of self-medication among students in this study, it would be advisable to organize awareness campaigns to further educate students about self-medication.

Keywords: prevalence, self-medication, drug therapy.

Introduction:

The World Health Organization (WHO) defines self-medication as the act of a person taking medications based solely on their own diagnosis of a disease without seeking the advice of a doctor or using any clinical tests to corroborate their conclusions. Self-medication encompasses both the recurrent self-administration of medications for chronic diseases as well as the use of medications to treat acute symptoms. Evidence suggests that those who self-medicate themselves regularly also counsel their friends, family members, and acquaintances to do the same. Self-medication is a significant healthcare concern because it can have a variety of negative consequences, including an incorrect diagnosis of the illness, development of antimicrobial resistance, unfavorable drug interactions, or even a delay in the detection of a serious disease. Self-medication is now a widespread practice, with people typically purchasing over-the-counter medications based solely on symptom mapping. Self-medication has been identified as a global public health concern due to its active and passive effects on health management. According to studies, at least 21% of the population in Europe uses self-medication. In Asia and Africa, the prevalence rates for self-medication were found to be 38.8% and 75.7%, respectively. Given the onset of any health abnormality, such as fever, nausea, fatigue, etc., it is now quite common for people in Bangladesh to consume and re-use prescription medications. In previous studies, self-medication rates among urban populations in Bangladesh ranged from 16.0% to 81.4%, and self-medication rates with antibiotics were reported at 26.7%. The prevalence rates for self-medication were found to be 12.0%–78.6% in India, 38.2%–82.0% in Nepal, 35.3%–78.0% in Sri Lanka, and 83.0% in Iran. Similar observations were made in neighboring countries. According to studies, past sickness exposure, a lack of accurate knowledge about the condition, difficulty in affording medical care, a lack of time, and the easy availability of pharmaceuticals are the most prominent causes of self-prescribed medication.

The most "vulnerable, disadvantaged, and marginalized people," in the words of the UN, are indigenous people. In Bangladesh, 3 million indigenous people live in 54 separate indigenous groups and speak 35

6670

different languages, making up around 2% of the country's overall population. They are predominantly found in the isolated CHT (Chittagong Hill Tracts) region of the country's south, where the Chakma, Marma, and Tripura tribes make up the large majority. Since the bulk of the indigenous population lives in rural regions far from cities, they frequently lack access to quality healthcare services. Additionally, studies have shown that, compared to mainstream populations, indigenous communities experience a greater burden of communicable illnesses and health disparities.

In self-medication, the person, caregiver(s), or guardian(s) are responsible for the individual choice of the drug to be used and the dosage method for a particular disease without seeking a doctor's advice. Self-medication includes sharing prescribed medications with friends and family members who haven't received that medication's prescription, using leftover medications from previous prescriptions, and not taking the prescribed medication as directed by extending the time it's taken or changing the dosage. According to studies, some of the variables influencing self-medication include not having enough time to see a doctor, believing that drugs are safe, collecting and keeping outdated prescriptions at home, having easy access to drugs, and the sale of drugs without a prescription.

We hypothesize that widespread medicine abuse occurs in India, with a variety of supply-side (government policy, business interests, and provider characteristics) and demand-side (consumer impacts) elements among the reasons. This seeks to define the scope of pharmaceutical abuse in India and comprehend the underlying causes. In particular, we want to know what medical professionals, pharmaceutical companies, and consumers know, feel and do about using medications.

Method:

Study Design

For this cross-sectional study, we performed in-person interviews in both urban and rural locations. From 24 December 2022 to 18 April 2023, it wascarried out by household survey.

Study setting

Both urban and rural regions of Karnataka, Andhra Pradesh, Uttarakhand, Maharashtra, Dubai, Tamil Nadu, Delhi, Kerala, Mumbai, Assam, and Meghalaya were used for the study. The investigation was conducted using the provided questionnaire both online and offline. More than 500 participants took part in the study.

Study questionnaire

An English-language structured research questionnaire was created and a copy is available upon request from the relevant author. A skilled and certified translator translated it into the native languages of Marathi and Hindi. To guarantee consistency in the text, another translator performed back translations from

6671

Marathi and Hindi into English. Sociodemographic, general self-medication practices, and antibiotic self-medication practices made up the three components of the study questionnaire.

The respondents' demographic, socioeconomic, and usage of self-medication during the previous three months were all covered by the inquiries. We gathered specific information on the participant's origins, motivations, and underlying justifications for self-medication. The study questionnaire included additional questions concerning any chronic illnesses that individuals may have, the occurrence (s) of adverse drug events during self-medication, and if subjects read and comprehended the information in the patient booklet about the medicine used for self-medication. Those surveyed were asked if they had used antibiotics on their own in the previous three months. For example, data on indications, sources of information for dose decision, adherence to dosage, and practice of switching antibiotics during self-medication were reviewed in this section.

Participants

Inclusion standards

The research was open to participants who could understand English and could provide address for verification.

Exclusion standards

The study excluded participants with communication issues or mental disabilities.

Data collection

A link to a Google Form survey with a questionnaire was created. Both online and offline surveys were conducted using this questionnaire.

A telephone interview was used to conduct the survey and collect the data. A paper copy of the survey and a google form were used for the offline survey.

RESULT

A total of 506 people consented to take part as volunteers in the research. Age, marital status, employment, level of education, and other demographic factors levels, a job, health condition, etc. were collected. The outcomes are shown in Table 1.

The majority of subjects (32.3%) are between the ages of 25 to 36, followed by the age groups of 36 to 45 (22.1%), 36 to 35 (3.4%), 18-25 (26.5%) and those over 45 (8.0%). Out of all the volunteers, 60.5% were females and rest were males. 9.2% were housewives, 9.8% engineers, 20.4% students, 9.4% teachers, 7.6% professors, 5.8% IT workers. 80.3% of people stay at home while the rest in hostel.

78.4% of the subjects had no prior medical history, 8.0% had diabetes, and 4.6% had hypertension. Out of

6672

which, 6.2% of people purchase their own medications, 24.8% contact a chemist, 64.7% consult a doctor, and 0.2% take a nap when they are ill.

Statistical Analysis

The questionnaire included the following details, which helps to reach a conclusion. The Statistical information is as follows:-

Table -1: Factors associated with neck pain due to smartphone over usage

S No.	Factor	Options	No. of Participants in percentage
1	Profession	IT workers	5.8%
		Professor	7.6%
		Doctor	9.0%
		House wife	9.2%
		Student	20.4%
		Teacher	14.2%
		Engineer	9.8%
2	Past medical history if any?	No past medical history	78.4%
		Hypertension	5.6%
		Diabetes	8.0%
		Others	8.0%
3	What is the reason for self-medication?	Easy Accessibility	3.0%
		Time Saving	32.9%
		Easy Accessibility, Low cost	2.2%
		Easy Accessibility; Time Saving, Low cost	2.6%
		Low cost	15.6%
		Others	43.50%
4	How many times have you purchased medicines without consulting a doctor in the past 6 months?	0 (none/never)	81.6%
		1-5 times	3.4%
		5-10 times	8.0%
		More than 10 times	7.0%
5	For which health condition do you take	Cough, Vomiting	1.0%
		Fever, Vomiting	15.0%

6673

		Cold & headache	2.0%
	medicines on our own (self-medication)?	Cold & headache	2.0%
		Headache	1.0%
		Fever & Acidity	6.40%
		Cough & Headache	1.20%
		Cold & headache	3.40%
		Fever, Cough, Cold & headache	2.80%
		Fever & Headache	28.10%
6	What type of medicines do you frequently take?	Cough, Cold & allergy	8.6%
		Pain Killer & Vitamin Tablets	21.8%
		Antibiotics, Cough, cold & allergy	2.0%
		Antibiotics, Vitamin tablets, Cough, cold & allergy	1.2%
		Vitamin tablets, Cough, cold & allergy	1.0%
		Pain Killer, Cough, cold & allergy	9.8%
		Vitamin tablets	5.2%
		Pain Killer, Antibiotics, Cough, cold & allergy	1.0%
		Antibiotics	3.2%
		Pain Killers	34.9%
		Others	1.4%
7	How do you get information about self-medication?	Previous doctors consultation	4.0%
		Friends, Relatives & Previous doctors consultation	2.4%
		Online (Google etc..)	1.2%
		Online (Google etc.) Friends, Relatives & Previous doctors consultation	1.2%
		Pharmacists & Previous doctors consultation	2.6%
		Friends & Relatives	41.9%
		Friends, Relatives & Pharmacist	4.0%
		Previous doctors consultation	26.9%
		Pharmacist	3.8%
		Friends, Relatives, Pharmacist & Previous doctors consultation	3.6%

6674

Eur. Chem. Bull. 2023, 12(Special Issue 4),6669-6680

8	Do you combine allopathic medicines with ayurvedic or homeopathic or other medicines?	Always	14.8%
		Sometimes	53.5%
		Never	29.8%
9	Do you discuss the health problems with your pharmacist before taking medication	Never	29.8%
		Always	14.8%
		Sometimes	53.5%
10	What do check when you buy a pharmaceutical product?	Expiry Date	48.0%
		Name of the medicine, Dose & Expiry Date	18.8%
		Dose	5.8%
		No, I did not check anything	1.4%
		Dose & Expiry date	9.8%
		Name of the medicine & Expiry Date	9.6%
		Name of the Medicine	3.0%
11	Which are the most used self-medications?	Paracetamol	3.0%
		Azithromycin	2.0%
		Diclofenac	2.8%
		Azithromycin & Diclofenac	3.2%
		Citrizine & Azithromycin	1.4%
		Cetirizine & Diclofenac	7.6%
		Paracetamol & Ibuprofen	1.0%
		Paracetamol & Diclofenac	27.8%
		Citrizine	1.6%
		Paracetamol	13.8%
		Paracetamol & Citrizine	7.0%
		Paracetamol, Citrizine, Ibuprofen & Diclofenac	1.0%
		Paracetamol, Citrizine & Diclofenac	0.8%
		Paracetamol, Citrizine & Azithromycin	2.4%
		Paracetamol & Azithromycin	s
		Paracetamol, Azithromycin & Ibuprofen	0.4%

6675

Eur. Chem. Bull. 2023, 12(Special Issue 4),6669-6680

Discussion:

Given the high rate of self-medication among medical students, it is important to spread awareness of this problem and change students' attitudes and behaviors by creating and implementing preventive programs. These initiatives could take the form of public awareness campaigns and educational workshops on proper medication usage and the negative effects of self-medication. Additionally, it's critical to recognize and manage the variables affecting students' behavior. According to this study, using non-OTC pharmaceuticals excessively can have dangerous negative effects. These include dietary supplements, energizing drugs, antibiotics, gastrointestinal treatments, cold remedies, and opioids. Controlling and regulating the sale of these medications is essential, as is obtaining a valid prescription from a doctor. Since pharmacies and the drugs left over from prior prescriptions were the primary sources of drugs for self-medication, the amount of medication provided by pharmacies without a prescription should be restricted. A drug quota may be effective to implement on individuals to prevent drug accumulation at home, in addition to improved pharmacy monitoring to stop the unchecked sale of OTC medication.

The recall bias of the students who reported the kind of medications they had taken for self-medication is one of the study's shortcomings.

Conclusion: Due to the adverse effects of self-medication, drug dependency, and microbial resistance and the relatively high prevalence of self-medication among students in this study, it would be advisable to organize awareness campaigns to further educate students about self-medication.

Authors contributions

all the authors contributed equally in design of the work, acquisition and interpretation of data, and manuscript preparation, all authors have read and approved the manuscript.

Conflict of interest

there is no conflict of interest from all the authors.

6676

Eur. Chem. Bull. 2023, 12(Special Issue 4),6669-6680

References

1. Llor, C. & Bjerrum, L. Antimicrobial resistance: risk associated with antibiotic overuse and initiatives to reduce the problem. Ter. Adv. Drug Saf. 5, 229–241. https://doi.org/10.1177/2042098614554919 (2014).

2. World Health Organization (WHO). Fact Sheet Antibiotic Resistance. https://www.who.int/news-room/fact-sheets/detail/antim icrobial-resistance. Accessed 31 Aug 2020 (2020).

3. Mazzon, D. Ethical use of antibiotics in the era of multiresistance: a common good for the individual or the society? Recenti. Prog. Med. 107, 71–74. https://doi.org/10.1701/2152.23268 (2016).

4. Gaynes, R. The Discovery of Penicillin—New Insights Afer More Than 75 Years of Clinical Use. Emerg. Infect. Dis. 23(5), 849–853. https://doi.org/10.3201/eid2305.161556 (2017).

5. Aminov, R. I. A brief history of the antibiotic era: lessons learned and challenges for the future. Front. Microbiol. 1, 134. https:// doi.org/10.3389/fmicb.2010.00134 (2010).

6. Gajdacs, M. & Albericio, F. Antibiotic Resistance: From the Bench to Patients. Antibiotics (Basel) 8, 1. https://doi.org/10.3390/antibiotics8030129 (2019).

7. Prestinaci, F., Pezzotti, P. & Pantosti, A. Antimicrobial resistance: a global multifaceted phenomenon. Pathog. Glob. Health 109, 309–318. https://doi.org/10.1179/2047773215Y.0000000030 (2015).

8. Gandra, S., Barter, D. M. & Laxminarayan, R. Economic burden of antibiotic resistance: how much do we really know?. Clin. Microbiol. Infect. 20, 973–980. https://doi.org/10.1111/1469-0691.12798 (2014).

9. Pokharel, S., Raut, S. & Adhikari, B. Tackling antimicrobial resistance in low-income and middle-income countries. BMJ Glob. Health 4, e002104. https://doi.org/10.1136/bmjgh-2019-002104 (2019).

10. Pokharel, S. & Adhikari, B. Antimicrobial resistance and over the counter use of drugs in Nepal. J. Glob. Health 10, 010360. https://doi.org/10.7189/jogh.10.010360 (2020).

11. Manyi-Loh, C., Mamphweli, S., Meyer, E. & Okoh, A. Antibiotic Use in Agriculture and Its Consequential Resistance in Environmental Sources: Potential Public Health Implications. Molecules 23, 1. https://doi.org/10.3390/molecules23040795 (2018).

12. Destoumieux-Garzon, D. et al. Te one health concept: 10 years old and a long road ahead. Front. Vet. Sci. 5, 14. https://doi.org/10.3389/fvets.2018.00014 (2018).

13. McEwen, S. A. & Collignon, P. J. Antimicrobial resistance: a one health perspective. Microbiol.

6677

Eur. Chem. Bull. 2023, 12(Special Issue 4),6669-6680

Spectr. 6, 1. https://doi.org/10.1128/ microbiolspec.ARBA-0009-2017 (2018).

14. Hogerzeil, H. V. et al. Field tests for rational drug use in twelve developing countries. Lancet 342, 1408–1410. https://doi.org/10.1016/0140-6736(93)92760-q (1993).

15. Gebeyehu, E., Bantie, L. & Azage, M. Inappropriate Use of Antibiotics and Its Associated Factors among Urban and Rural Communities of Bahir Dar City Administration, Northwest Ethiopia. . PLoS ONE 10, e0138179. https://doi.org/10.1371/journal.pone.0138179 (2015).

16. Holloway, K. & van Dijk, L. WHO: Te World Medicines Situation 2011. Rational use of medicines, 3rd edition (Geneva, 2011).

17. Chem, E. D., Anong, D. N. & Akoachere, J. K. T. Prescribing patterns and associated factors of antibiotic prescription in primary health care facilities of Kumbo East and Kumbo West Health Districts, North West Cameroon. PLoS ONE 13, e0193353. https://doi.org/10.1371/journal.pone.0193353 (2018).

18. Gurung, S. et al. Detection of OXA-48 Gene in Carbapenem-Resistant Escherichia coli and Klebsiella pneumoniae from Urine Samples. Infect. Drug Resist 13, 2311–2321. https://doi.org/10.2147/IDR.S259967 (2020).

19. Raut, S. et al. Trend and Characteristics of Acinetobacter baumannii Infections in Patients Attending Universal College of Medical Sciences, Bhairahawa, Western Nepal: A Longitudinal Study of 2018. Infect. Drug Resist. 13, 1631–1641. https://doi.org/10.2147/IDR.S257851 (2020).

20. Kayastha, K. *et al.* Extended-spectrum beta-lactamase-producing Escherichia coli and Klebsiella species in pediatric patients visiting International Friendship Children's Hospital, Kathmandu, Nepal. . Infect. Dis. (Auckl) 13, 1178633720909798. https://doi.org/10.1177/1178633720909798 (2020).

21. Rijal, K. R. *et al.* Methicillin resistance Staphylococcus aureus in patients visiting Western Regional Hospital, Pokhara. J. Inst. Med. 30(1), 21–25 (2008).

22. Guragin, N. *et al.* Extended spectrum β-lactamase producing Gram Negative bacterial isolates from urine of patients visiting Everest Hospital, Kathmandu, Nepal. TUJM 6(1), 26–31. https://doi.org/10.3126/tujm.v6i0.26575 (2019).

23. Muktan, B. *et al.* Plasmid mediated colistin resistant mcr-1 and co-existence of OXA-48 among Escherichia coli from clinical and poultry isolates: frst report from Nepal. Gut. Pathog. 12(44), 2020. https://doi.org/10.1186/s13099-020-00382-5 (2020).

24. World Health Organization. Resource mobilization for antimicrobial resistance (AMR): Getting AMR into plans and budgets of government and development partners: Nepal country report. 2018:

6678

Eur. Chem. Bull. 2023, 12(Special Issue 4),6669-6680

1–34.

25. Shrestha, S., Yadav, R. S. & Deo, S. K. Burgeoning Irrational Antibiotics use in Primary Health Care in Nepal. J. Nepal Health Res. Counc. 16, 473–475 (2019).

26. Deo, S. K., Rijal, S., Kunwar, S. D., Dahal, A. & Gupta, S. Knowledge of Use of Antibiotic, its Resistance and Consequences among Students in Private Schools. JNMA J. Nepal Med. Assoc. 56, 740–744 (2018).

27. Nepal, A., Hendrie, D., Robinson, S. & Selvey, L. A. Knowledge, attitudes and practices relating to antibiotic use among community members of the Rupandehi District in Nepal. BMC Public Health 19, 1558. https://doi.org/10.1186/s12889-019-7924-5 (2019).

28. Nepal, G. & Bhatta, S. Self-medication with Antibiotics in WHO Southeast Asian Region: A Systematic Review. Cureus 10, e2428. https://doi.org/10.7759/cureus.2428 (2018).

29. FHI 360. FHI 360 Nepal – Consultancy Opportunities for Fleming Fund Country Grant for Nepal – Xplore International. 2018. https://ixplore.info/fi-360-nepal-consultancy-opportunities-3/.

30. Rijal, K. R. et al. Epidemiology of Plasmodium vivax Malaria Infection in Nepal. Am. J. Trop. Med. Hyg. 99, 680–687. https://doi.org/10.4269/ajtmh.18-0373 (2018).

31. Adhikari, B., Ozaki, A., Marahatta, S. B., Rijal, K. R. & Mishra, S. R. Earthquake rebuilding and response to COVID-19 in Nepal, a country nestled in multiple crises. J. Global. Health 10 (2), 020367. https://doi.org/10.7189/jogh.10.020367 (2020).

32. Central Bureau of Statistics. Statistical Yearbook of Nepal (Central Bureau of Statistics, 1997).

33. Adhikari, B. et al. Why do people purchase antibiotics over-the-counter? A qualitative study with patients, clinicians and dispensers in central, eastern and western Nepal. BMJ Glob. Health 6, e005829. https://doi.org/10.1136/bmjgh-2021-005829 (2021).

34. Widayati, A., Suryawati, S., de Crespigny, C. & Hiller, J. E. Knowledge and beliefs about antibiotics among people in Yogyakarta City Indonesia: a cross sectional population-based survey. Antimicrob. Resist. Infect. Control 1, 38. https://doi.org/10.1186/2047- 2994-1-38 (2012).

35. World Health Organization. Worldwide country situation analysis: response to antimicrobial resistance (WHO, 2015).

36. Shah, P. et al. Knowledge, Attitude, and Practice Associated with Antibiotic Use among University Students: A Survey in Nepal. Int. J. Environ. Res. Public Health 16, 1. https://doi.org/10.3390/ijerph16203996 (2019).

37. Greenwood, B. contribution of vaccination to global health: past, present and future. Philos. Trans. R. Soc. Lond. B Biol. Sci. 369, 20130433. https://doi.org/10.1098/rstb.2013.0433 (2014).

6679

Eur. Chem. Bull. 2023, 12(Special Issue 4),6669-6680

38. Adhikari, A. K., Acharya, H. N., Ahmad, T., Shrestha S. Innovative sanitation social movement: experiences from Nepal. Loughborough University. Conference contribution. https://hdl.handle.net/2134/31419 (2017).

6680

Eur. Chem. Bull. 2023, 12(Special Issue 4),6669-6680