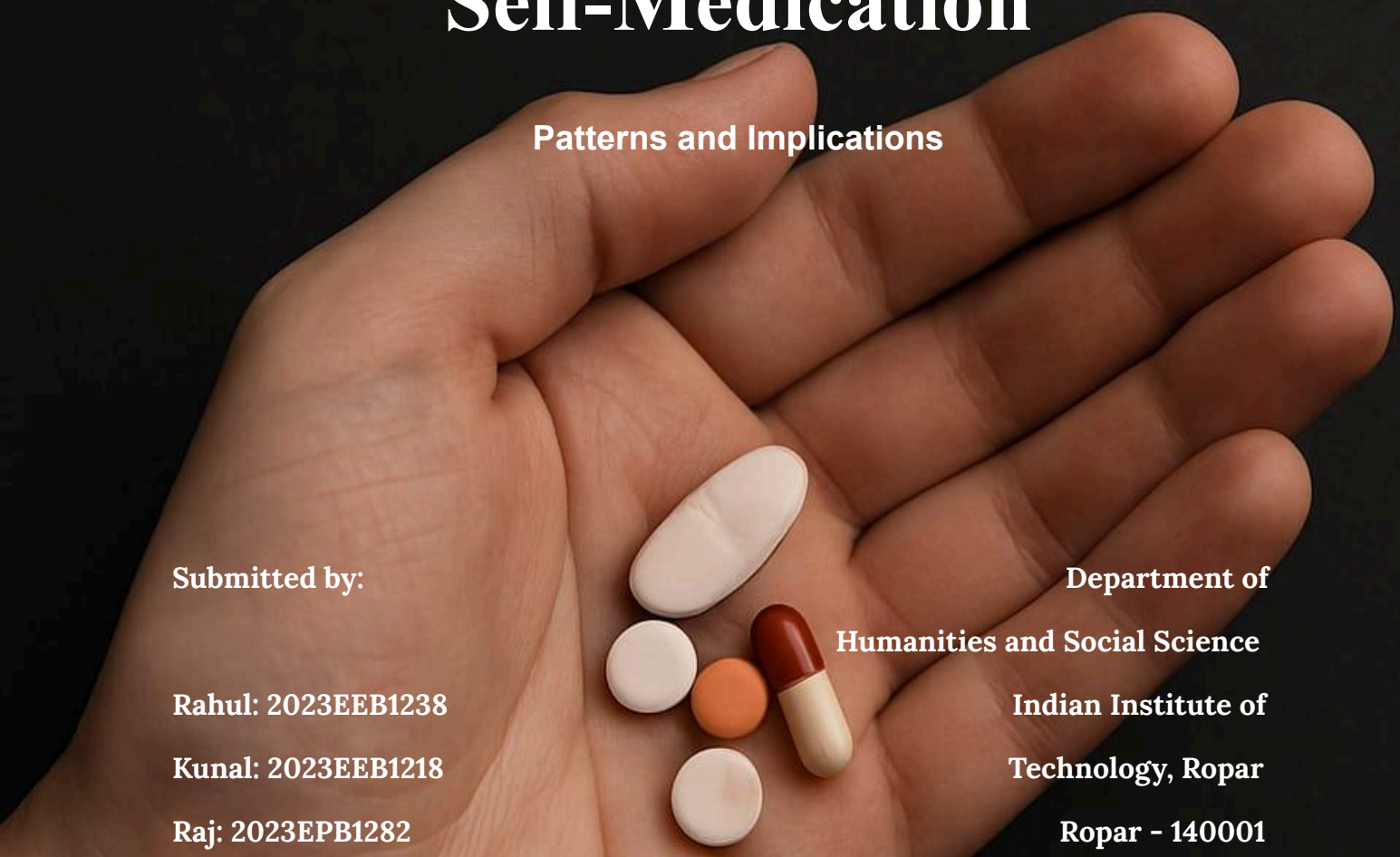
INDIAN INSTITUTE OF TECHNOLOGY, ROPAR

Human Geography and Societal Needs

(HS202)

Self-Medication

Patterns and Implications



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1. Abstract

Self-medication is a key component of self-care and is defined as the selection and use of medications – legally classified as drugs specifically designed and labeled for use without medical supervision and approved as safe and effective if used as directed for such use—by individuals to treat self-recognized illnesses or symptoms. Self-medication nowadays is quite common in today's busy healthcare era because of its ease of use and economy. Although self-medication helps in the case of some small illnesses, it also has severe consequences on a person's health in the shape of inappropriate dose, drug interactions, antibiotic resistance, and delay in diagnosis of serious disease.

This project presents these very major challenges and encourages more cautious, safer self-medication practice. Successful medication management needs to be attentive and technologically aided as medical systems continue to advance. Recognition and response to the risks of unmonitored medication are paramount to public health. This project involves a survey that investigates relationships between demographic variables and self-medication practices, and suggests an innovative AI-based mobile platform. This platform incorporates symptom screening, pharmacogenomic information, wearable health records, and real-time feedback to guide individuals toward safer options. By involving individuals in special awareness programs, workshops, and coordination with health workers, individuals can learn the information and skills to reduce risks. At last, promotion of safe self-medication is important in maintaining health and limiting unnecessary clinic visits. By giving importance to education and using up-to-date technology, individuals can walk self-care more confidently, reducing risks linked with uncontrolled use of drugs in a more independent healthcare setup.

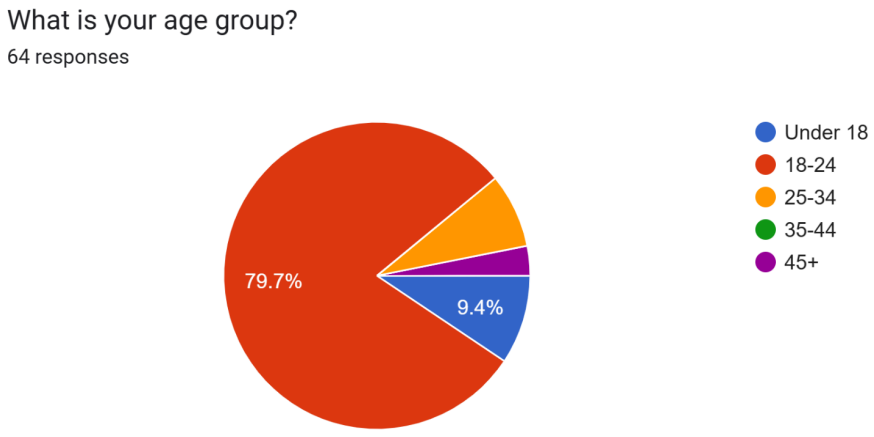
2. Definition of the Problem

1) Problem statement

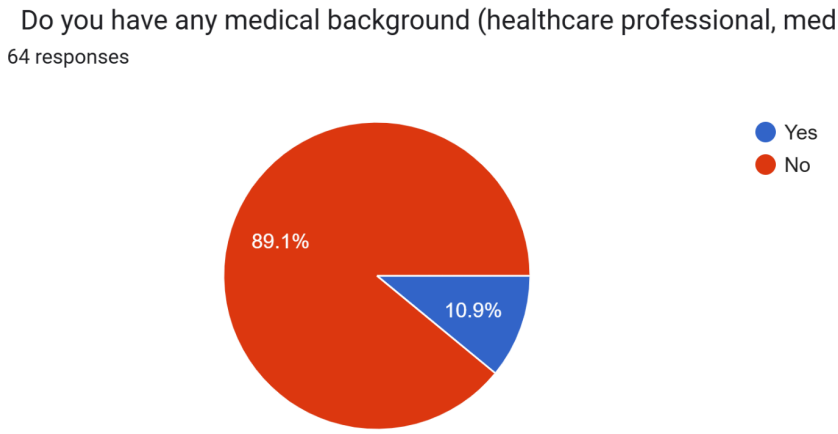
With today's healthcare system, limited availability of the medical services compels people to self-medicate with limited information and direction. This most likely results in inappropriate drug use, misuse of dosing, and lack of attention to underlying conditions. Low public knowledge and ready availability of drugs in the community are exacerbating factors, particularly in vulnerable populations. These issues serve to emphasize the importance of having a safe, well-informed, and easily accessible self-medication environment supplemented by technology and the expert advice.

2) Origin and identification of the problem

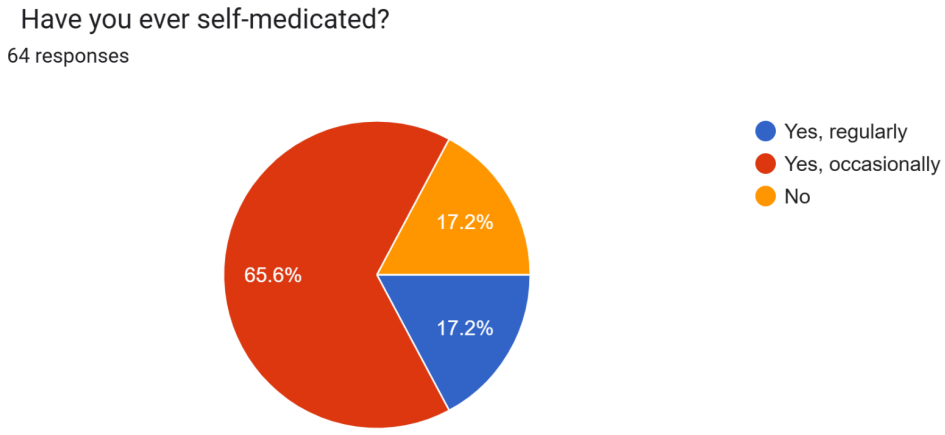
Surveys



Most people who answered the survey are between 18 and 24 years old, an age when most people are starting to manage their health decisions. A couple of respondents were either younger or older, but this survey is primarily the viewpoint of young adults managing their health in the system.

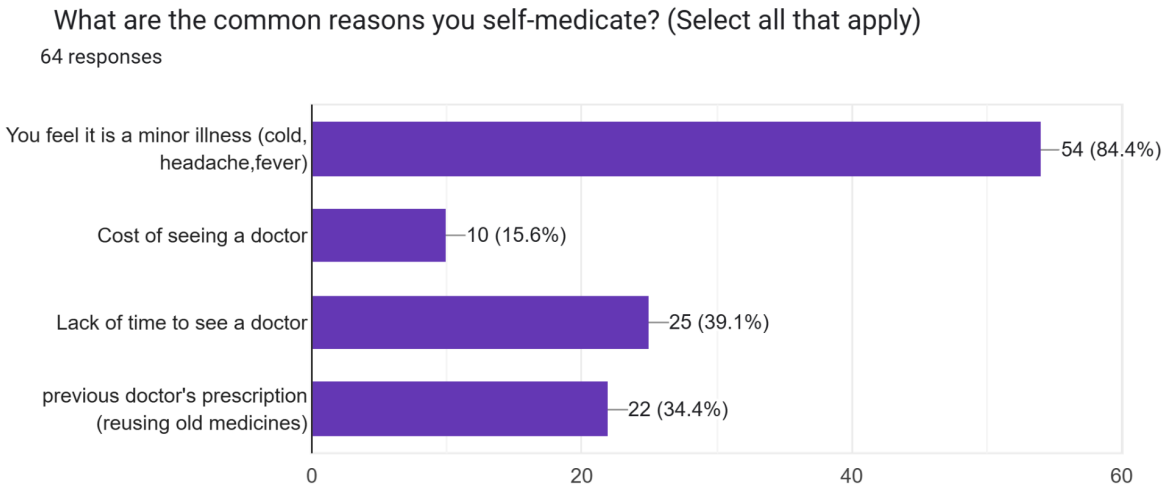


There is a huge imbalance in who is giving prescriptions and who is taking them. The vast majority—89 percent—of the people doing the pill-popping have no medical training. You could say we're living in an age of self-medication, steered by individual decisions that often amount to guesswork and that sometimes go very wrong.

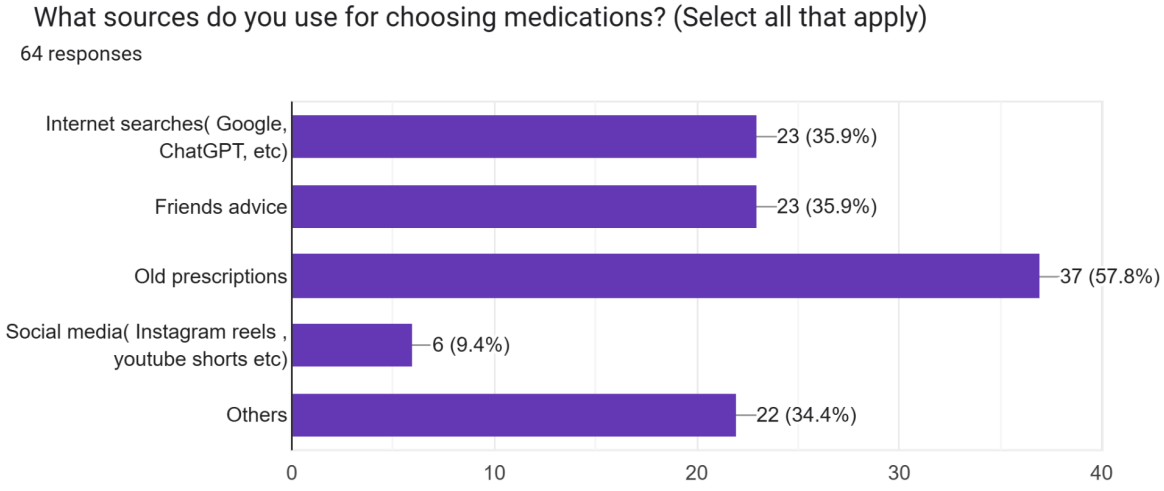


The majority of the subjects have participated in self-medication, with a good number of them doing so sometimes and a few doing it often. This indicates that self-treatment is a widely

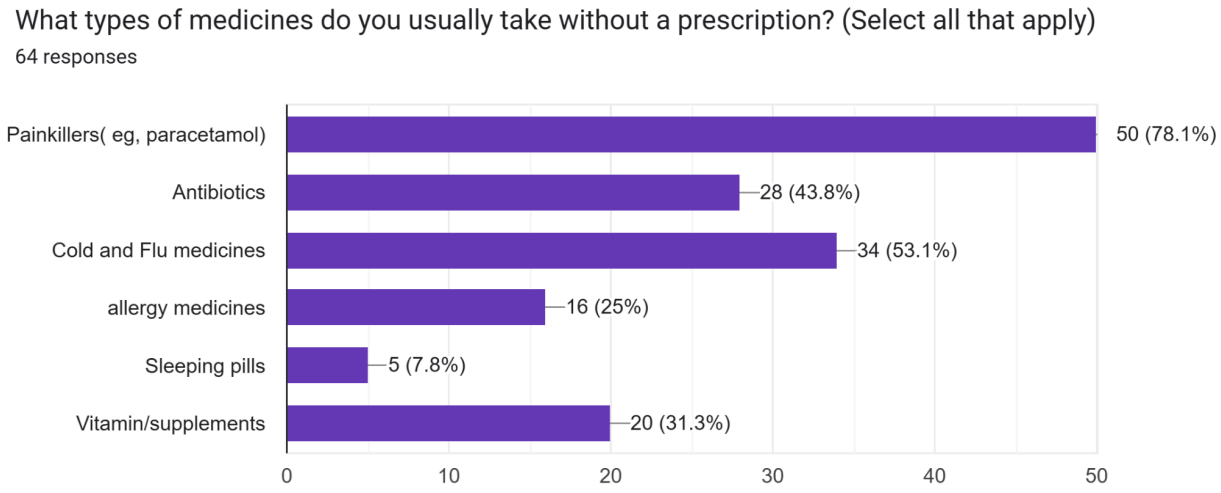
accepted practice and may be seen as a normative way to handle everyday health complications.



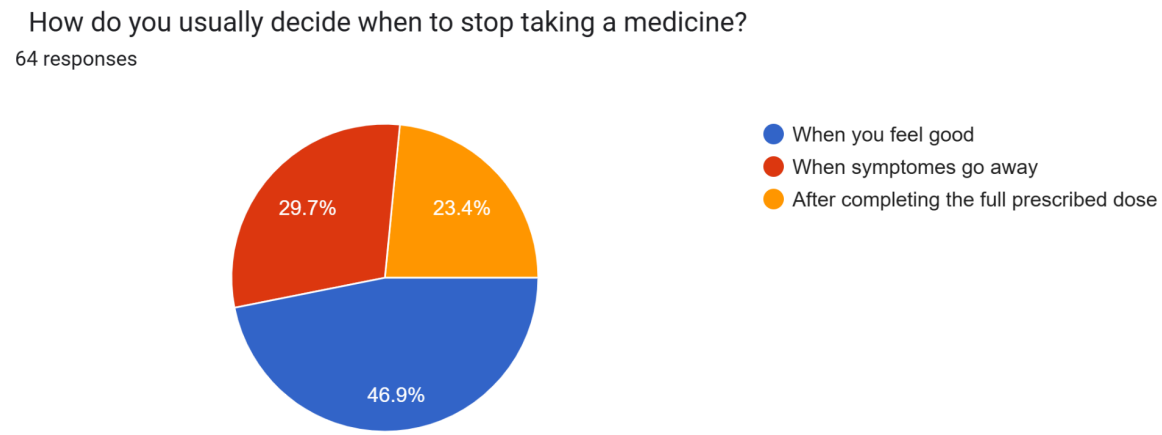
The foremost reason is that people believe their illness is "minor," like a cold, or fever. It's one thing to want immediate relief when you're feeling unwell, but the underlying mindset that drives this is concerning. It indicates that a person believes the symptoms they're currently experiencing aren't significant enough to warrant a healthcare visit but instead are significant enough to drive them to an urgent care or primary care location. Thankfully, urgent care and primary cares are open. Unfortunately, this doesn't always equate to accessible healthcare.



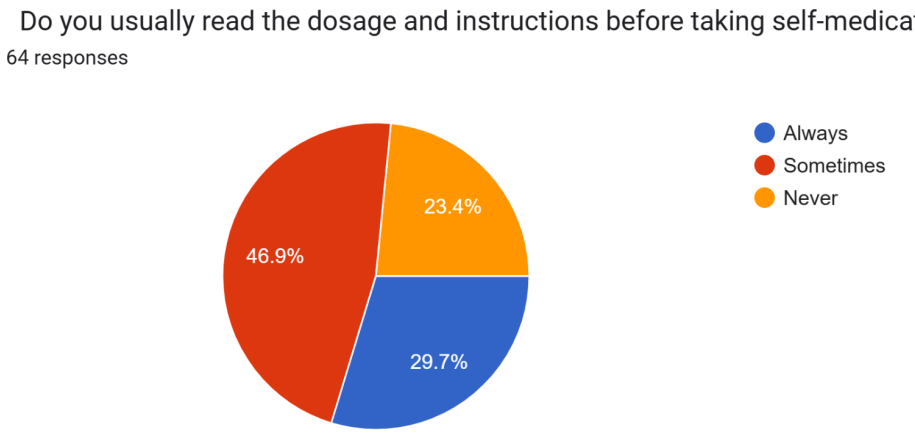
Numerous respondents depend on outdated prescriptions, internet searches (including AI tools like ChatGPT), and the counsel of friends. A lesser number cited social media. This mix of practical, digital, and social influences shows how people are self-diagnosing and treating themselves, without always having a firm grasp on the reliable, mostly-random basis of the judging-presence mix of these unqualified tools.



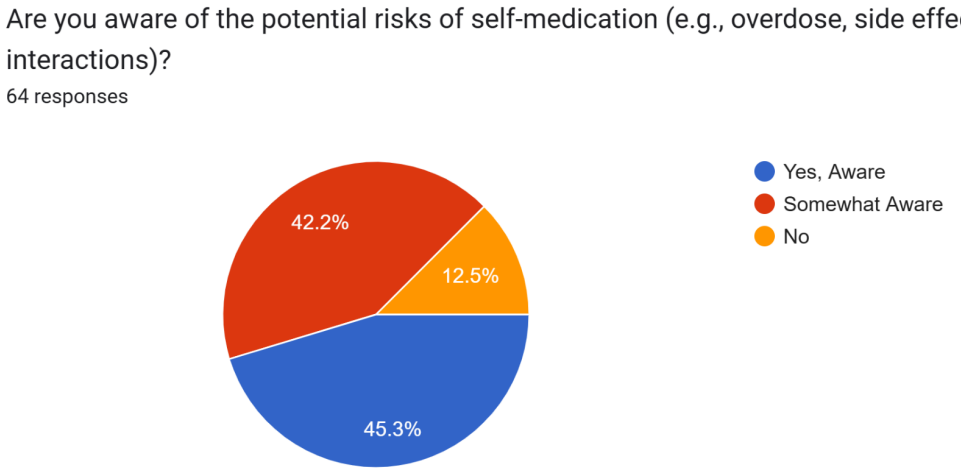
Respondents most commonly self-medicate with painkillers (like paracetamol), cold and flu medications, and notably, antibiotics. This is concerning because unsupervised use of antibiotics can contribute to antibiotic resistance, a serious public health issue. Some also reported taking vitamins, allergy medicines, and in rare cases, sleeping pills.



The majority stop medication when they feel better or when symptoms go away, rather than after completing the full recommended course. While this is a natural instinct, it's not always the safest approach—especially for medications like antibiotics, which require a full course to be effective and to prevent resistance.



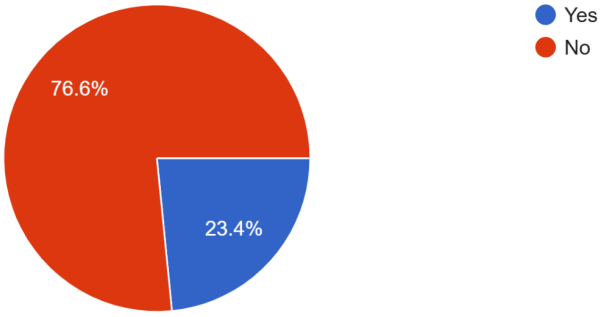
Responses were mixed: some always read instructions, others sometimes, and a few never do. This reflects varying levels of caution, and suggests that improving awareness around proper medication use could reduce unintentional misuse.



Most respondents reported being aware or somewhat aware of the potential risks—like overdose, side effects, and interactions. However, their behaviour remains careless, hence they need to be educated.

Have you ever misused a prescription drug (e.g., using antibiotics without prescription, taking higher doses than recommended)?

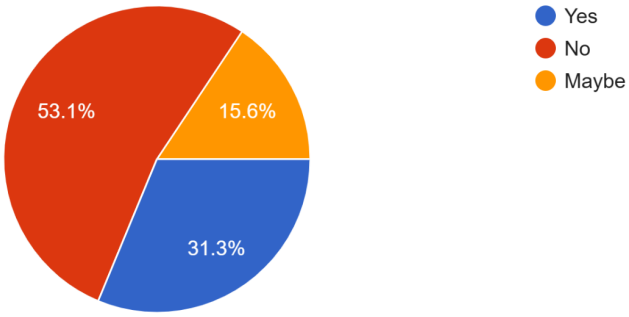
64 responses



Individuals admitted to misusing prescription drugs, such as taking antibiotics without a prescription or exceeding recommended doses. This underlines the importance of better guidance on what constitutes safe vs. unsafe self-medication.

Would you use a website or app that provides safe self-medication guidance?

64 responses



Opinions were split: many were not open to using such a tool, though a notable number said yes or maybe. This signals an opportunity to build trust in digital health platforms, provided they are reliable and user-friendly.

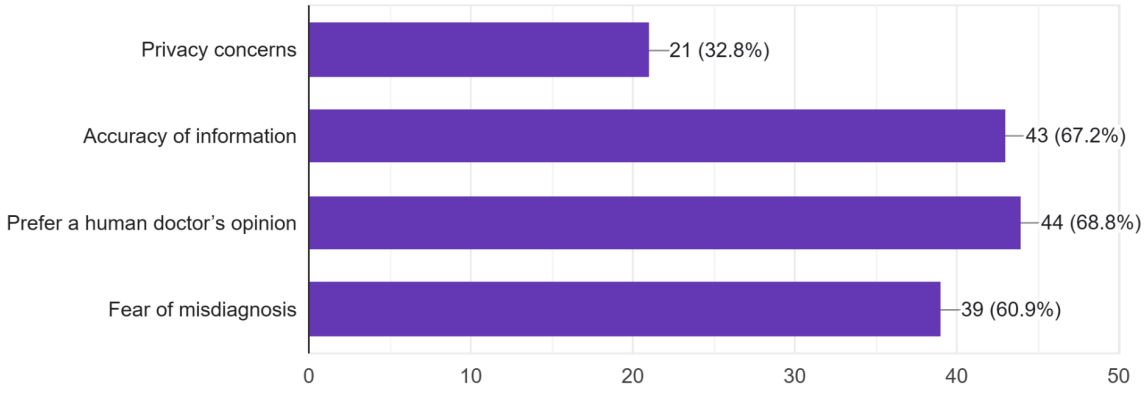
Do you think self-medication is generally safe if done correctly?

64 responses

Responses reflect a balance of confidence and caution. While some feel comfortable managing their own health, others are concerned about making mistakes—even if they believe self-medication can be safe when done properly.

What concerns would stop you from using an online self-medication tool? (Select all that apply)

64 responses



Top concerns included a preference for real doctors, doubts about accuracy, fear of misdiagnosis, and privacy worries. These are all valid reservations, showing that while technology has a role, many still value the reassurance of human expertise.

Discussion

In our exercise, we conducted an open discussion among members where some expressed opinions concerning different health routines. One overriding issue that appeared was the overuse of self-medication. Most participants reflected on instances when individuals tend to use over-the-counter(drugs that can be purchased without a prescription from a doctor) drugs in the absence of medical advice owing to convenience or ignorance. Our discussion brought into perspective the gravitas of such a problem as well as how it poses harm to public health.

Focus Group Discussions

To further examine the issue of self-medication, we conducted a Focus Group Discussion (FGD) with participants from diverse backgrounds. The formal setting allowed for a serious exploration of cause, effect, and personal experience in relation to self-medication. Issues of concern raised by the participants were easy availability of medicines, poverty, long waiting times at hospitals, and increased dependence on online sources of health information. Peer pressure and cultural attitudes were also mentioned as reasons for self-medication with no experts involved. Although some felt capable of managing minor sickness on their own, others were not aware of the risk of drug abuse. Misconceptions and ignorance were revealed in the debate, prompting the need for community sensitization campaigns and tougher control of drug availability. It also illustrated how behaviors vary across age groups and socioeconomic status and presented information of value to interventions.

3) Detailed Description of Problem

In today's world, the widening gap in accessible healthcare compels many individuals to rely on self-medication, often without adequate knowledge or professional guidance. This practice, while offering convenience and immediate relief for minor ailments, carries significant risks that can escalate minor health issues into major crises.

Impact on Different Stakeholders

General Public: People frequently turn to over-the-counter (OTC) drugs, home remedies, or unverified online advice to manage common conditions such as colds, fevers, and allergies. Without proper medical consultation, this can lead to incorrect medication choices, dosage errors, masking of serious underlying conditions, and even substance dependence or abuse. The risk of dangerous drug interactions and adverse reactions is heightened, particularly when individuals self-prescribe multiple medications or use leftover prescriptions.

Low-resource Communities: The prevalence of self-medication is especially high in low-resource settings, where healthcare access is limited by financial constraints, long wait times, and inadequate health infrastructure. In these communities, lack of public awareness and unregulated drug sales further exacerbate the risks, leading to irrational drug use, increased antibiotic resistance, and higher rates of morbidity.

Vulnerable Groups (Elderly, Poor, Illiterate): Elderly individuals and those with limited education or low socioeconomic status are particularly vulnerable to the dangers of self-medication. These groups may lack the knowledge needed to recognize drug interactions or contraindications, increasing the likelihood of adverse outcomes. Illiteracy and poor health literacy are strongly linked to higher rates of self-medication and misuse of medicines.

Healthcare Systems: Rampant self-medication places a hidden burden on healthcare systems. Incorrect or delayed treatment can result in complications that require more intensive medical intervention later, increasing healthcare costs and straining limited resources. Additionally, widespread misuse of antibiotics contributes to the global crisis of antimicrobial resistance, undermining the effectiveness of essential medicines.

Societal Consequences: At the community level, improper self-medication can fuel cycles of misinformation, perpetuate health disparities, and erode trust in healthcare systems. The normalization of self-treatment without expert input can lead to increased drug-induced diseases, tolerance, and the spread of resistant pathogens.

Key Drivers of the Problem

- Limited access to affordable healthcare and long waiting times
- Socioeconomic barriers and lack of health insurance
- Easy availability of OTC drugs and unregulated pharmacies
- Low health literacy and inadequate public awareness
- Cultural practices and previous experiences with illness

Summary

The unchecked rise of self-medication is a complex public health challenge with far-reaching consequences for individuals, families, and society. Without targeted interventions—such as public education, regulatory oversight, and technology-driven guidance—self-medication will continue to pose significant risks, especially among vulnerable and underserved populations. There is a critical need for a safe, guided, and accessible self-medication ecosystem that leverages technology, expert knowledge, and public engagement to ensure people make informed and responsible health decisions.

4) Current development In The Domain

Recent technological advancements are transforming how individuals approach self-medication, aiming to reduce associated risks and improve health outcomes. Key developments include:

1. Pharmacogenomics and Personalized Medicine: Pharmacogenetic (PGx) testing enables tailored medication therapy by predicting a patient's likelihood of adverse or therapeutic responses to specific drugs. Studies have shown that pharmacogenomics-informed care can improve medication adherence and reduce unnecessary drug switching, especially in psychiatry, while also lowering healthcare utilization and costs. This approach supports safer self-medication by aligning drug choices with individual genetic profiles, thus minimizing adverse reactions and enhancing treatment efficacy
(Study 1, Study 2).

2. AI-Driven Symptom Checkers: AI-powered symptom checkers, such as Ada Health, Buoy Health, WebMD Symptom Checker, and Microsoft's HealthBot, use artificial intelligence to interpret user symptoms, suggest possible causes, and guide next steps. These tools help minimize inaccurate self-diagnoses, prompt users to seek medical care when needed, and provide safe OTC recommendations with misuse alerts. While these apps are growing in popularity, research highlights the need for improved support for comprehensive medical history and more flexible, user-friendly interfaces
(arXiv study, Ada Health example).

3. Wearable Health Monitoring: Wearable devices like smartwatches, fitness bands, and smart rings now offer advanced health monitoring features. For example, Oura's Symptom Radar analyzes metrics such as heart rate, heart rate variability, temperature trends, and breathing rate to detect early signs of illness. These devices provide users with real-time alerts about potential health issues, enabling data-driven decisions before self-medicating
(Trend Hunter, ZDNet).

4. Government Health Portals & Regulations: Governments across various nations are enhancing online drug regulation and digital health literacy. In India, the Ayushman Bharat Digital Mission (ABDM) is developing an integrated digital health ecosystem that bridges gaps between various healthcare stakeholders. The e-Sanjevani platform offers free online doctor consultations, serving between 500-700 patients daily, with over 4,727 doctors providing services at no cost7. The Central Drugs Standard Control Organization (CDSCO) is working on stricter regulations for OTC drugs and online sales, with recent developments including show-cause notices to online pharmacies operating without proper compliance

5.Smart Packaging & IoT Integration: Pharmaceutical companies are testing QR-coded packaging and IoT-enabled pill dispensers that remind users about medication schedules, alert them to expiration dates or overuse, and enable remote monitoring by physicians. These innovations enhance medication safety and adherence by providing automated guidance and oversight during self-administration.

5) Need and Significance of Resolving the Problem

Solving the problem of unguided self-medication is crucial for making public health stronger and providing safer healthcare. Self-medication by people without the right information can lead to taking the wrong medication, the wrong dosage, or ignoring critical illnesses. All these can have negative effects like allergic reactions, drug toxicity, delayed diagnosis, and even permanent damage to organs. Particularly worrisome is the increase in antibiotic resistance because of uncorrected antibiotic use, and it has now emerged as an important global health threat.

In rural and remote areas, where professional healthcare is scarce, individuals tend to use old prescriptions or consult laymen, exposing them to health problems. Hence, creating a systematic and guided model of self-care is essential. This system not only avoids medical emergencies but also improves health literacy, makes the individual self-dependent with informed choices, and minimizes unnecessary hospitalization.

By making use of digital innovations—mobile health apps, AI-driven symptom checkers, and cloud-monitoring—healthcare can become safer, more accessible, and more efficient. Addressing the issue of unguided self-medication also is consistent with broader public health objectives, lowers the cost of healthcare, and conforms to the international drive towards digital health transformation. Finally, an organized solution will benefit individuals as well as communities, leading to a healthier, better-informed society.

3. Aims/Objectives/Goals pertaining to minimizing/removing the Problem

Primary Objective

Develop a smart digital space that reduces the health risks of unguided self-medication by closing the knowledge gap between patients and caregivers, especially in underserved populations.

- **Build an AI-Based Safety System:** Develop a cutting-edge mobile application that offers tailored medication suggestions based on symptom evaluation, drug interaction warnings, and dosage suggestions, lowering the rate of adverse events.
- **Improve Health Literacy and Decision Making:** Create interactive educational modules that promote medication safety training, allowing users to learn when they can effectively self-medicate and when professional assistance is needed.
- **Close Healthcare Access Gaps:** Add functionalities that close care gaps in underserved populations, such as multilingual capability, offline access, and integration with local health resources.
- **Empower Data-Driven Public Health Intelligence:** Gather anonymized usage patterns to recognize trends in self-medication, enable evidence-based interventions and policy formulation while maintaining user anonymity.
- **Promote Responsible Medication Practices:** Support a culture of empowered self-care through prompt notifications, personalized guidance, and vital information on potential risks such as antimicrobial resistance and drug interactions.

4. Tools and techniques (Interventions) perceived to be effective.

Informative Newsletters: Empowering the People with Simple and Clear Communication: Routine distribution of educational newsletters is a foundational strategy in combating the risks of self-medication. These newsletters—delivered via email, websites, or printed copies in clinics, schools, and workplaces—simplify complex medical knowledge and promote safe medication practices for everyday injuries and illnesses. Content may include:

- Guidance for managing minor injuries (cuts, bruises, muscle strains, minor burns)
- First aid tips and safe OTC medication lists
- Warnings against misuse of antibiotics and painkillers
- Real-life case studies highlighting dangers of self-medication
- Weekly health tips and myth-busting sections

By translating medical jargon into plain language, newsletters help bridge the gap between the public and healthcare professionals. They foster informed decision-making, encourage readers to seek expert advice when necessary, and enhance overall health literacy—especially in areas with limited access to healthcare.

AI-Based Mobile Application: Intelligent Solution for Instant Advice

- **AI-Based Smartphone Application:** Smart Solution for Immediate Guidance
- In the era of digital technology, a mobile application developed using AI is a revolutionary tool for safe self-medication guidance. As demonstrated in the included image, the app has a simple interface with various modules, which are:
- **Chatbot Interface:** Users can explain symptoms or injuries in plain language and get immediate, evidence-based advice.
- **OTC Drug Database:** Detailed data on popular over-the-counter drugs, such as uses, dosages, and possible side effects.
- **Medication Guidelines:** Safe storage and use guidelines in easy-to-understand language, optimized for susceptible groups such as children and the elderly.
- **Reminders & Notifications:** Programmed reminders to remind users to visit a doctor if the condition persists or gets worse.
- **Integration with Local Healthcare:** In-app links to local doctors, hospitals, pharmacies, and telemedicine providers to enable easy escalation when necessary.

- **Health Tracking & Pill Identifier:** Functions for tracking health status, monitoring medication schedules, and identifying unknown pills.
- **Condition Recognizer & AI Health Query:** Features for recognizing common conditions and answering health-related questions in an instant.

This AI-driven platform enables users to make informed, safe decisions for minor complaints while guaranteeing escalation to expert care for more severe issues. Through anonymized usage data collection, the app also supports public health research, allowing for greater insight into trends in self-medication and guiding targeted interventions.These interventions—mobile apps, webinars, and AI-driven newsletters—act in concert to teach, engage, and empower citizens, substantially curtailing the risks of uncontrolled self-medication and fostering an ethos of judicious health control.

These interventions—newsletters, webinars, and AI-powered mobile applications—work synergistically to educate, engage, and empower the public, significantly reducing the dangers of unguided self-medication and promoting a culture of responsible health management.

5. Detailed work plan/ technological interventions

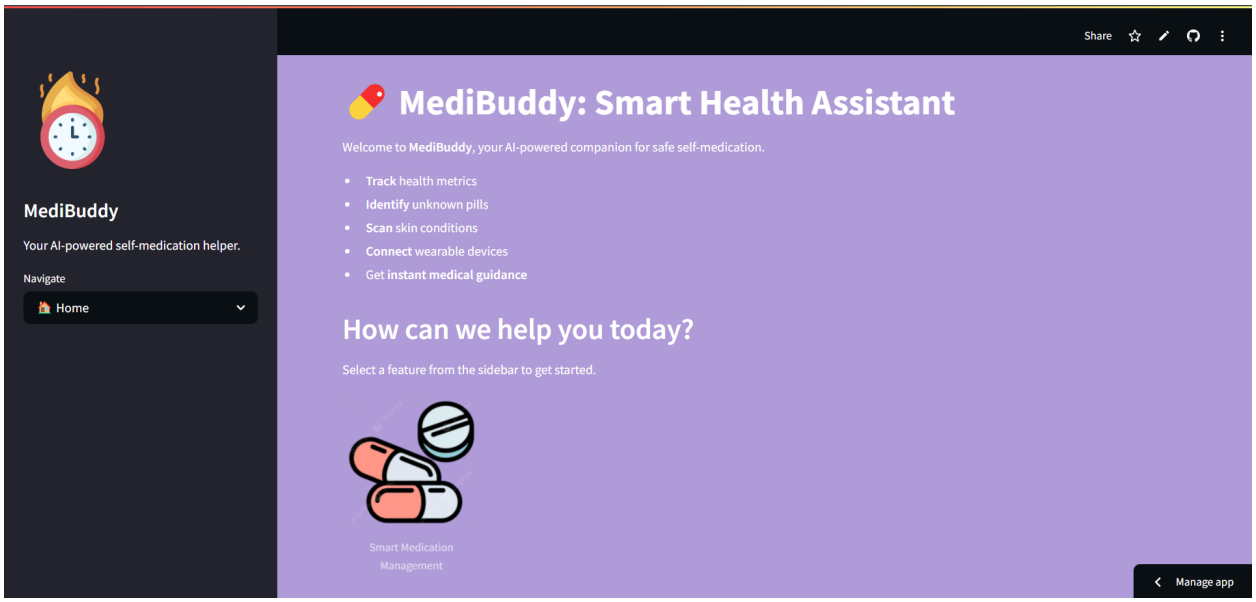
Surveys and literature reviewed indicate that the self-medication mechanism is a significant social issue, especially among students and youth, since it is associated with potential health risks like inappropriate use of drugs, drug interaction, antibiotic resistance and delayed professional treatment.
Surmounting this challenge requires an all-encompassing, multi-faceted approach involving awareness, education, technology, and community mobilization.

Need for assessment and planning

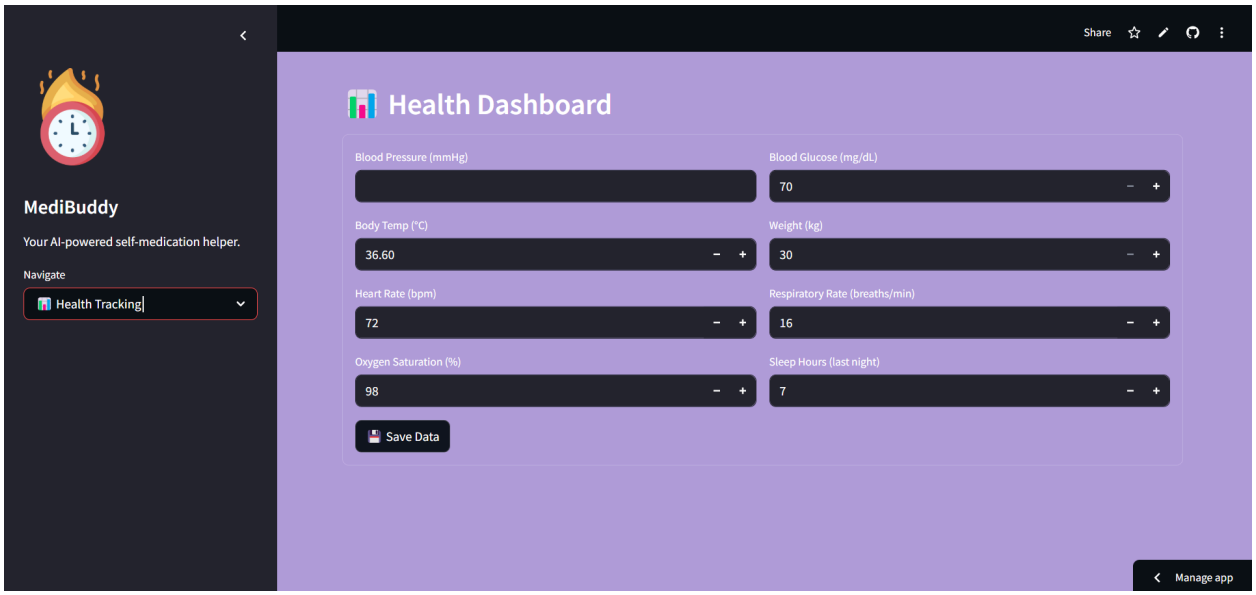
- **Community Surveys and Focus Groups:** Conduct student, parent, and health worker surveys to determine existing patterns of self-medication, levels of awareness, and prevalent myths. Focus groups assist in ascertaining cultural attitudes and barriers to professional help.
- **Review Current Resources:** Review current health education resources, local health facilities, and available online resources for self medication assistance.
- **Stakeholder Engagement:** Involve college administrators, community health workers, pharmacists, student organizations, and community leaders to receive diverse viewpoints and promote collaboration.

Development of Technological Interventions

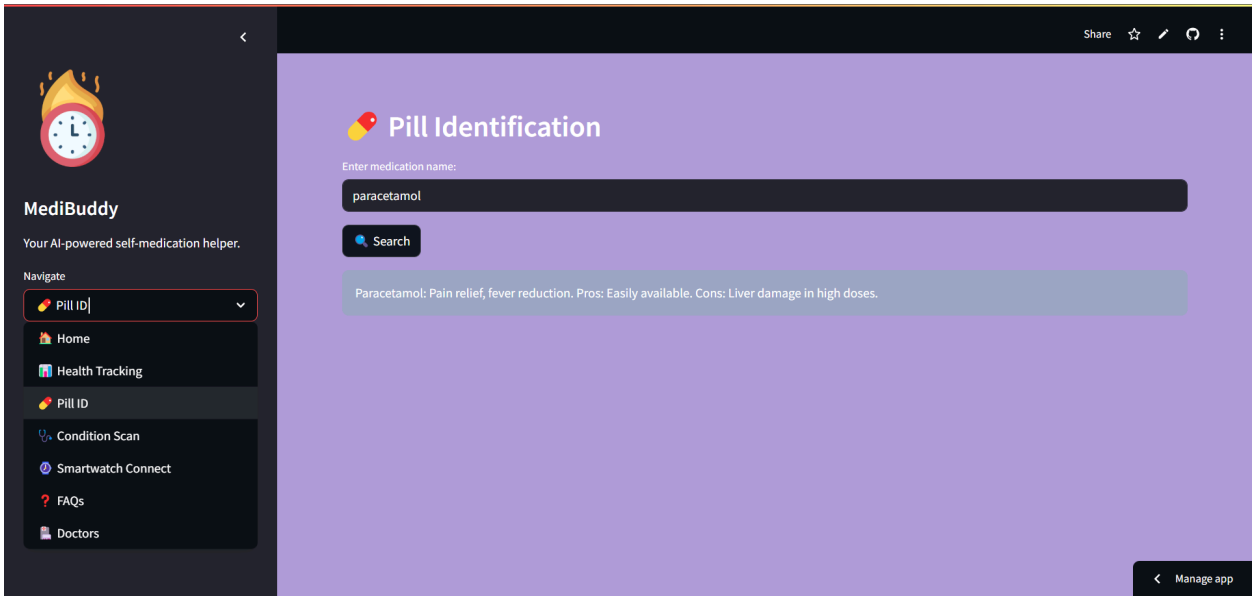
- **Educational Mobile Application and Website: Create an easy-to-use interface offering real information regarding medicines, risks of self-medication, and safe conduct. Features include:**
    - Health Tracking
    - Pill Identifier
    - Condition Analysis based on photograph
    - AI healthcare chatbot with additional FAQs
    - Local healthcare facilities
    - Wearable Integration of smart watches, etc.



    - **Health Tracking:** Let users monitor symptoms, medication, and health metrics. Monitors key health metrics like heart rate, blood pressure, sleep, and weight and allows users to create detailed health reports for medical consultations. This tracker employs real time database synchronization among devices and cloud storage to ensure that data is consistent across platforms.

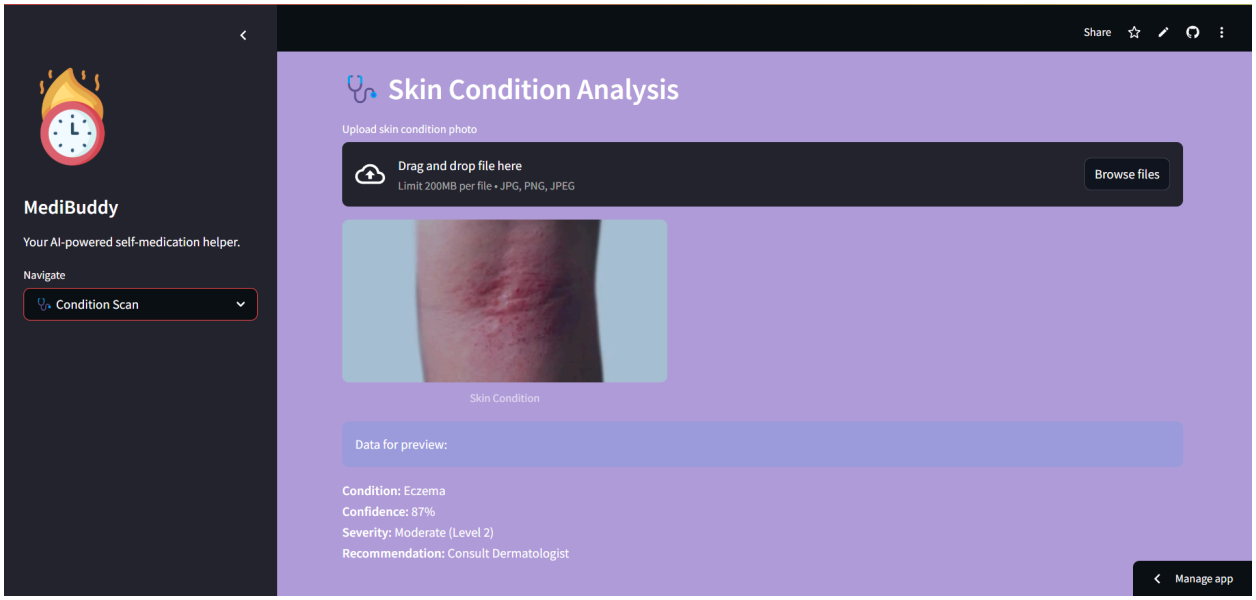


- **Pill Identifier:** Utilizes AI-based image recognition to assist users in identifying pills and their use. Analyzes pills based on shape, color, size, name, and imprinted text to ensure proper identification. Gives complete information such as generic/brand name, use, standard dose, and possible side effects and alerts users to possible drug interactions with other medications and medical conditions.

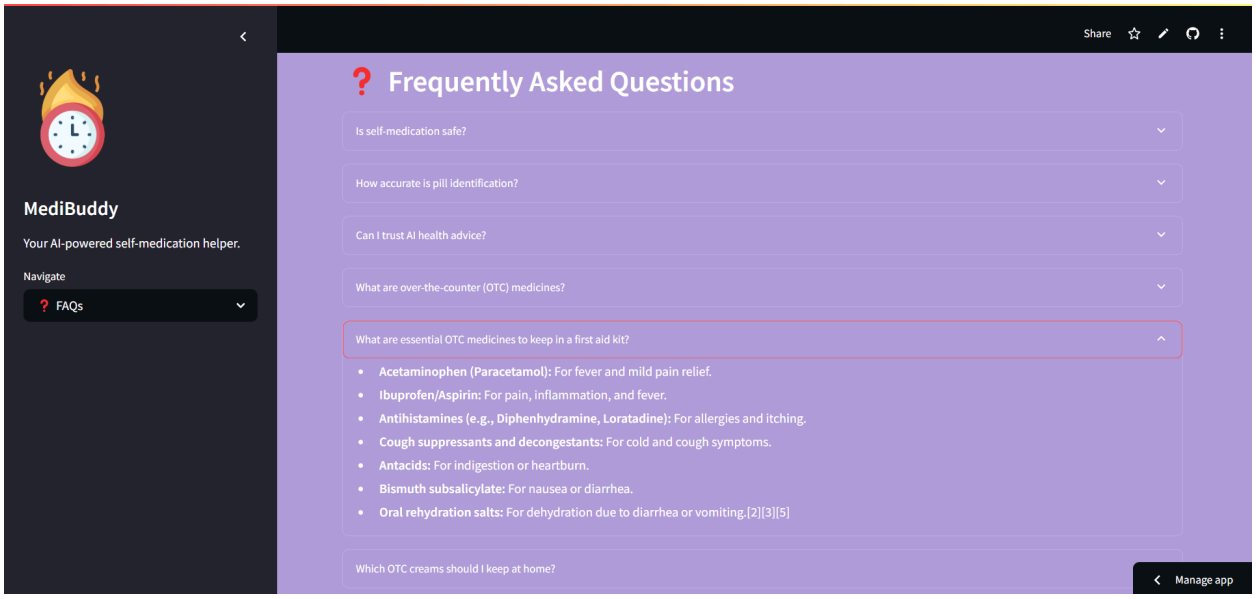


- **Condition Recognizer:** Allow users to upload symptom images (e.g., swelling, rashes) for preliminary AI-based diagnosis and advice. Supplements visual data

with targeted questions about other symptoms and suggests appropriate next steps, from self-care to consulting a professional.

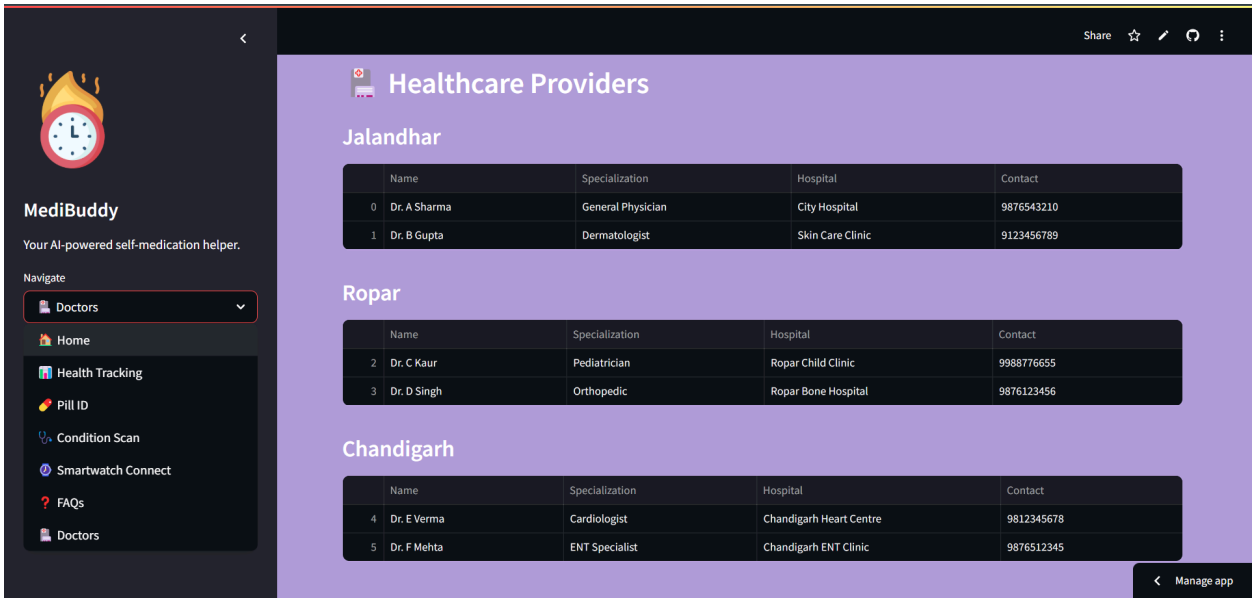


- **AI Healthcare Chatbot:** Provide natural, human-like interactions for healthcare inquiries from in-depth databases like DrugBank, DailyMed, and Sider. Remembers the medical history and past conversations of the user to provide personalized responses.

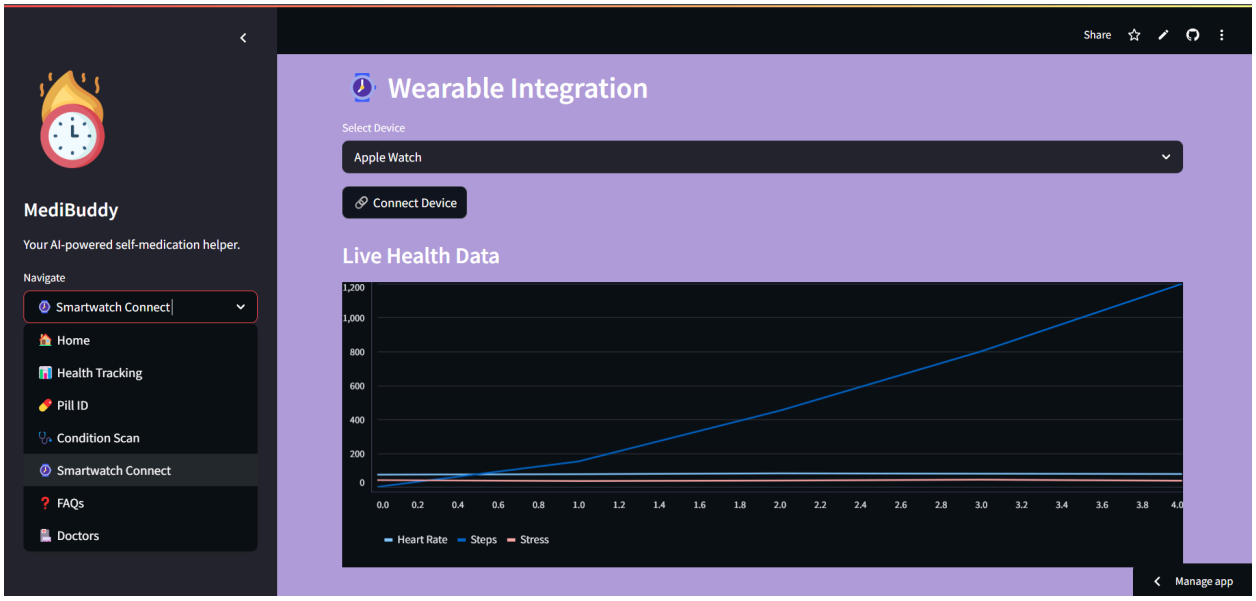


- **Local Healthcare Facilities:** Utilizes GPS information to locate nearby healthcare facilities. Enables users to filter by specialty, proximity, availability, and

insurance. Include local clinics, hospitals, and pharmacies, prompting users to visit healthcare providers when necessary.



- **Smart Device Integration:** Wearable device integration to track vital signs and provide reminders for medications to ensure adequate medication adherence. Compatible with leading smartwatch platforms such as Apple Watch, Samsung Galaxy Watch, and Fitbit. Provides haptic and visual alerts for medication times.



- **Awareness and Discussions:**
    - **Interactive Workshops and Seminars:** Conduct workshops in college campuses and community centers where the dangers of self-medication and safe behavior can be debated.
    - **Newsletter:** Periodically release a college newsletter with success stories, expert opinion, and new feature announcements and health tips. Contains evidence-based information on safe self-medication. Focuses on personal experiences and positive results of informed self-medication. Main distribution through email and in-app notifications
    - **Integration into Curricula:** Collaborate with schools to incorporate modules on appropriate use of medication into science and health education.
    - **Training Programs:** Conduct workshops for health care providers, student leaders, and teachers to encourage and effectively use the app and website.
    - **Community Outreach:** Plan health fairs, mobile clinics, and awareness drives in neighborhoods to reach greater numbers, such as underserved populations.
    - **Promotion and Engagement:** Encourage downloads and use of the app through posters, web banners, and peer ambassadors.
    - **Social Media Campaigns:** Utilize social media platforms like Instagram, Facebook, and WhatsApp to post stories, infographics, and videos about the risks and alternatives of self-medication.

Monitoring and Evaluation

- **Impact Evaluation:** Pilot test changes in attitudes, knowledge, and behavior toward self-medication using surveys and app metrics.
- **Feedback Gathering:** Collect users' feedback through in-app surveys and community threads to identify where you can better improve.
- **Data Analysis:** Analyze health monitoring data and chatbot usage to identify common misconceptions and health hazards.
- **Iterative Refinements:** Regularly update content, AI models, and features by following evaluation results to promote effectiveness

Scaling and Sustainability

- **Increase Reach:** Partner with other colleges, youth organizations, and local public health departments to enhance the platform's reach.
- **Policy Advocacy:** Work with policymakers to include responsible medication practices in health education policy and community programs.
- **Long-term Support:** Develop capacity building programs for health workers and community leaders to maintain awareness interventions.

- **Financing and Partnerships:** Seek sponsorships, grants, and partnerships with drug companies and NGOs to offer long-term development and outreach**.**

Societal Impact and Key Takeaways

- **Empowering Communities:** The project seeks to create a health-literate community where people are health literate and aware of drug risks and make educated choices.
- **Decreasing Healthcare Burden:** Ethical self-medication can decrease unnecessary hospitalizations and medication mistakes.
- **Promotion of Responsible Behavior:** The website fosters a culture of responsibility, safety, and proactive health management.
- **Establishing Confidence in Health Care Systems:** By bridging patients with local health care providers and giving them access to credible information, the project fosters confidence and invites professional consultation.

This strategy is centered on social benefits, community participation, and moral health practices, supported by state-of-the-art technological tools. It aims to create a sustainable, informed environment where self-medication is performed in a safe and healthy way, reducing health risks and maximizing overall well-being.

6. Novelty and Innovation of the Proposed Self-Medication Assistance System

Holistic AI-driven Risk Mitigation

While apps like Ada Health or Buoy Health are symptom checking-based, this system melds medication use and physiological data with community education into a preventive feedback loop. The system combines four AI-based tools in one ecosystem, a new direction yet to be achieved in current apps

- **Pill Identifier through Visual Recognition**: Uses YOLOv8 object detection (trained on worldwide databases of medicines) to identify pills using smartphone cameras, reducing opportunities for misidentification.
- **Symptom-Condition Mapper**: Uses federated learning models to analyze user-symptom reports and images, providing initial advice while keeping the user anonymous.
- **Context-Aware Chatbot**: Uses the Retrieval Augmented Generation (RAG) architecture to offer accurate, timely medicine recommendations in real-time, making it neither general nor stale.

- **Predictive Reminders on Smartwatch**: Identifies abnormal health trends (e.g., increased heart rate) from wearables and cross-checks them with medication records to remind users of possible side effects

Privacy-Preserving AI for Sensitive Health Data

Visual Pill Recognition Identifier: Uses YOLOv8 object detection (trained on global databases of medicines) to identify pills using phone cameras, reducing chances of identification errors.
Symptom-Condition Mapper: Utilizes federated learning models to study user-reported symptoms and images and give initial advice without compromising privacy.
Context-Aware Chatbot: Employs Retrieval Augmented Generation (RAG) model to give accurate, real-time answers about drugs, without giving out-of-date or generic suggestions.

7. Approaches that can be taken to implement intervention plans

After the evaluation of evidence-based practices from international models, with an emphasis on social effect, the structural approach proceeds through various phases.
The intervention starts with a sample community survey, focus groups, and evaluation to determine why and how individuals self-medicate and to determine high-risk groups. A collaborative effort between a student-college staff-healthcare professional-local pharmacist will be made to guide the project and keep it responsive to the needs of the community.

With these results, we shall collectively create an easy-to-use app and site with pill finder, local GP finder, and AI symptom check. The platform will be usable, with voice assistance and offline mode for the less digitally capable or less-connected users. Augmenting with digital tools, we will also create posters, videos, and pocket guides featuring simple, easy-to-apply advice on proper medication use.

There will then be a pilot period when parents, students, and senior citizens will pilot the materials and tools. We will utilize their feedback to streamline the system. We will give rewards in terms of free health checkups in an effort to get people to participate.

The full launch will include workshops to parents and students, peer ambassador programs, and partnerships with pharmacies and clinics. The application will also offer the users telemedicine services that are low-cost as well as improve professional health consults.

In support of sustainability, we will promote integration of safe medication practices into college curricula and pursue funding collaborations. The progress will be tracked through statistics of

application use, workshop attendance rates, and questionnaires to users, and ongoing review and development based on feedback from the community.

By the integration of community education and outreach with applied technology, this plan will counteract the risks of self-medication and encourage healthier health behaviors positively and in an accessible form to all.

8. Possible constraints and barriers to implementation, design issues

- **Limited Access**: Limited smartphone or internet availability in certain zones means that most users, especially low-income or rural users, won't be able to reach the full value of the digital platform. There will be offline capabilities and printed guides, but they won't be able to participate..

- **Digital Literacy & Trust:** Others may not understand how to use apps or may not trust digital health advice, preferring tried and tested approaches or word of mouth. To address this, the app will be simple to use, have clear step-by-step instructions, and be backed up by trusted local healthcare professionals. Workshops and peer support will also assist those less comfortable with technology.

- **Privacy Concerns**: People will not like to provide health information because people do not like the information being used or revealed. The process will have sound data protection processes and notify individuals about privacy policy in plain words, but regular reassurance and transparency would have to be deployed to establish sustained trust.

- **Design Challenges:** The app should be accessible to all ages and abilities, with good text, readable icons, and local language content. Ongoing user feedback will be gathered in order to make usability better continually and make the platform accessible in order to ensure a wide range of needs is accommodated, including disabled people..

- **Cultural Attitudes**:Strong ingrained behaviors of self-medication or use of home remedies and advice from family or friends may hinder take-up of the intervention. Engaging recognized community leaders, telling compelling success stories, and Emphasizing the advantages of professional healthcare will be essential to facilitate positive behavior change.

9. Expected Outcome

Deployment of an Operational AI-Based Health Tool: A working prototype of the self-medication guidance app will be created and tested. It will give AI-assisted health guidance based on symptom entry, health information, and pharmacogenomic sensitivity.

Increased User Health and Knowledge: Early Detection and Quick Healing: our application review provides users with an opportunity to spot potential health issues early enough to take prompt action to prevent their worsening and accelerate healing**.**

Reliable Information: MediBuddy App provides access to vetted, evidence-based information regarding beauty and medical treatment, combating misinformation and promoting healthy behavior.

Decrease of Hazardous Drug Practice: Through highlighting proper dosage, safe interaction, and risks like antibiotic resistance, the campaign will reduce cases of abuse, over-medication, and self-diagnosis errors.

Increased Accessibility of Care: The app offers users with information and resources who are facing obstacles in accessing routine healthcare services due to geographical or financial constraints.
Distant Consultations: Telehealth service integration bridges gaps by allowing users to remain connected with healthcare providers.

10. Suggested Plan of Action for Utilization of Outcomes

Community-Level Health Awareness: The materials and strategies covered during the campaign—i.e., posters, workshops—will be utilized in all schools, colleges, community centers, and health camps, ensuring long-term awareness about safe practice of self-medication.

Increase in Workshops and Seminars: The seminar and training modules created for this project can be replicated both in rural and urban settings. These sessions would be employed to train additional individuals in appropriate use of OTC, first aid, and abuse risk.

Rollout and Ongoing Improvement of the App: The app prototype will go live with real user feedback in real time. It will offer healthier OTC drug suggestions from wearable health

information, symptom entry, and AI processing. It will learn and become more personalized with every update, including new research and user habits**.**

Publishing newsletters and Digital Resources: Simplified self-medication newsletters, first aid and medicine safety, and numerous others will be made available in electronic formats to everyone, especially the less literate.

11. Conclusion

Self-medication is a rising phenomenon fueled by convenience and accessibility but fraught with risks such as drug abuse, incorrect dosage, and antibiotic resistance. The project proposes a technology-based intervention that not only raises awareness in real time via campaigns and workshops but has an in-built smart platform that bridges professional and self-care. Artificial intelligence, human intervention, wearable health monitoring, and pharmacogenomic data combined, the project maximizes effect and innovation in one intervention.

Most unique in this approach is its multi-dimensional structure—where technology support is supplemented by actual educational activity within the environment and collaborative efforts of professionals. It gives the most adventurous confidence to manage minor illnesses safely and to visit a physician whenever necessary, reducing unnecessary visits to physicians' clinics and medicines abuses. Along with the individual product, the program offers a sustainable model of good self-care, community education, and expert health advice—a tool in greatest demand in today's modernized health environment.

12. Contribution and area of expertise of each student in the group.

Ekam Sandhu (2023EEB1198):

- Expertise in app development, security and database integration
- Developed the self-medication app - Medibuddy, with data integration and frameworks, ensuring cross-platform compatibility
- Integrated privacy protocols and encryption into the app for sensitive data

Rahul (2023EEB1238):

- Expertise in Project Management and Data Analysis
- Analysed survey data on self-medication and translated into meaningful insights
- Oversee the overall project execution and manage communication between team members

Kunal (2023EEB1218):

- Expertise in Data Collection and Communication
- Assisted in the conduct of surveys and group discussions
- Reviewed literature related to self-medication

Raj Sureka (2023EPB1282):

- Expertise in Content Creation and Stakeholder Engagement
- Drafted sample newsletter formats and other content
- Improved decision-making processes and fostered trust among stakeholders

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