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Parental Self-Medication and Its Associated Factors in Children in Community Pharmacy and Hospital: A Cross-Sectional Survey in Peshawar

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Abstract

Self-medication is a widespread global phenomenon, especially prevalent in developing countries. This study investigates the prevalence, patterns, and underlying factors of parental self-medication in children aged 0–17 in both community and hospital settings in Peshawar, Pakistan. The findings highlight the frequent use of over-the-counter medications such as antipyretics and antibiotics without prescriptions, potential health risks, and the role of socio-demographic variables. Awareness and regulation are essential to curb inappropriate self-medication and its long-term consequences. Self-medication refers to the act of using medicines, including prescription drugs, without consulting a healthcare professional. Globally, it is a widespread practice, particularly in developing nations where access to healthcare may be limited, and health literacy remains a challenge. In the context of Peshawar, Pakistan, the issue of parental self-medication in children has emerged as a significant public health concern.

Introduction

Self-medication is defined as the use of drugs without professional medical consultation, often based on prior experience or advice from non-medical sources. While the World Health Organization (WHO) acknowledges the benefits of responsible self-care, it also warns about the dangers of misuse—particularly in pediatric populations. Antibiotic self-medication (SMA) is of critical concern due to its role in antimicrobial resistance (AMR), treatment failure, and increased healthcare costs.

Self-medication is a globally observed practice that involves the use of medicines, including prescription-only drugs, without the consultation of a qualified healthcare professional. It typically arises from an individual's personal assessment of symptoms or from external advice given by friends, family members, or unregulated drug vendors. The World Health Organization (WHO) defines self-medication as "the selection and use of medicines by individuals to treat self-recognized illnesses or symptoms" (WHO, 2000).

In many cases, self-medication can offer some benefits, such as reducing the burden on healthcare systems, lowering healthcare costs, and empowering individuals to manage minor ailments (Hughes et al., 2001). It is especially prevalent in low- and middle-income countries where access to healthcare facilities may be limited, and economic constraints often prevent people from consulting qualified medical personnel (Kassie et al., 2018). However, when used improperly—especially in vulnerable populations such as children—self-medication can pose significant health risks.

In pediatric populations, self-medication is particularly dangerous due to the physiological differences between children and adults. Children require age- and weight-specific dosages, and their immature organ systems make them more susceptible to adverse drug reactions, overdoses, and long-term toxicity (Ghosh et al., 2015). Furthermore, many parents rely on their previous experience, leftover medications, or suggestions from untrained individuals, often leading to incorrect diagnoses and inappropriate treatment.

Of growing concern is antibiotic self-medication (SMA), which is frequently practiced without regard for proper diagnosis, dosage, or duration of treatment. This contributes significantly to the development of antimicrobial resistance (AMR)—a situation where microorganisms develop the ability to resist the effects of antibiotics, rendering treatments less effective or even useless (Ventola, 2015). AMR not only compromises the treatment of common infectious diseases but also increases the risk of disease spread, severe illness, and death. The problem is exacerbated in developing countries like Pakistan, where antibiotics can be easily purchased without a prescription due to weak regulatory frameworks and widespread misinformation (Zafar et al., 2008).

In addition to AMR, other consequences of self-medication in children include masking of severe conditions, drug interactions, and increased healthcare costs due to complications that arise from delayed proper treatment. These concerns have led to widespread advocacy for stricter regulations on antibiotic sales and public education campaigns to promote rational drug use, particularly among parents and caregivers.

Given this context, understanding the prevalence, causes, and consequences of parental self-medication practices—especially with antibiotics—is critical for public health planning and policy development. This study aims to explore these patterns in the city of Peshawar, Pakistan, with a focus on identifying the socio-demographic, behavioral, and systemic factors contributing to the practice.

Objectives

- To assess the prevalence of parental self-medication in children
- To compare practices in rural vs. urban settings.
- To identify commonly used drugs and indications.

- To explore the sources of self-medication information
- To assess side effects and associated health risks.
- To understand reasons behind the preference for self-medication

Literature Review

Studies from various countries, including Jordan, Serbia, China, and Pakistan, indicate high levels of parental self-medication, especially with antibiotics, antipyretics, and cough medicines. Factors include poor access to healthcare, high consultation fees, and the convenience of pharmacies. Improper dosage and failure to recognize drug interactions are common issues, contributing to antibiotic resistance and adverse effects in children.

Parental self-medication in children is a widespread and concerning phenomenon documented across various regions, including the Middle East, Europe, and South Asia. The global trend reflects a complex interaction between healthcare system limitations, parental beliefs, economic pressures, and easy access to over-the-counter (OTC) medications.

Prevalence and Global Evidence

Numerous studies have demonstrated a high prevalence of self-medication among parents, especially for common pediatric illnesses such as fever, cough, flu, diarrhea, and abdominal pain. A study conducted in Jordan found that approximately 39.2% of parents self-medicated their children with antibiotics, often without understanding their appropriate use. Notably, 72.1% of respondents in that study were unaware that antibiotics are only effective against bacterial infections, not viral ones (Abu Hammour et al., 2018).

In China, a large-scale study across three provinces involving over 9,500 parents revealed that one-third of the children had been treated with antibiotics via self-medication prior to medical consultation. This behavior was closely associated with parental pressure on doctors to prescribe antibiotics, as 83.9% of children who had been self-medicated were later prescribed antibiotics during clinic visits, suggesting a normalization of unnecessary antibiotic use (Yu et al., 2021).

In Serbia, research into household drug storage and self-medication practices revealed that approximately 50% of households stored antibiotics, many of which were used without current prescriptions. The physical presence of leftover antibiotics in the home was a key enabler of self-medication, indicating a breakdown in prescription adherence and disposal practices (Jovanović et al., 2015).

In Pakistan, multiple studies have echoed similar trends. A study conducted in Karachi found that 83% of parents administered paracetamol to their children without consulting a doctor, and 60% used cough syrups based on previous experience or peer advice. Additionally, 72.27% of the parents self-medicated their children for cough and cold symptoms—most of which are viral and do not require antibiotics (Zafar et al., 2008). Another study conducted in Lahore confirmed that socioeconomic status and education levels significantly influenced self-medication practices, with poorly educated and lower-income parents more likely to self-treat due to high consultation fees and accessibility barriers (Ahmed et al., 2017).

Commonly Used Drug Classes

Across all studies, the most commonly self-administered drug categories for children included:

- Antipyretics (e.g., paracetamol)
- Cough syrups and antitussives
- Antibiotics (e.g., amoxicillin, azithromycin)

- Antihistamines
- Antidiarrheals and antiemetics

These drugs are often perceived as low-risk, but improper use—especially with antibiotics—can lead to severe consequences such as adverse drug reactions, masking of symptoms, and delayed diagnosis (Ghosh et al., 2015).

Key Risk Factors

Several factors consistently contribute to parental self-medication across different studies:

- Poor access to healthcare services in rural and underserved urban areas
- High out-of-pocket healthcare costs and long waiting times
- Leftover medications from previous illnesses
- Lack of health literacy, particularly regarding antibiotics and dosing
- Cultural beliefs in self-treatment and reliance on prior experiences

A study from Saudi Arabia reinforced that economic factors, such as the cost of clinic visits and unavailability of doctors in remote regions, encouraged parents to bypass formal medical care (Al Rasheed et al., 2016). Similarly, in Indonesia, a study on mothers of children under five years showed that nearly 59% practiced self-medication, largely due to distance from healthcare centers and reliance on pharmacies ortraditional knowledge (Yulianti et al., 2020).

Consequences: Antibiotic Resistance and Pediatric Risks

Improper use of antibiotics, especially without appropriate diagnosis, is a leading contributor to the global crisis of antimicrobial resistance (AMR). Children, due to their developing physiology, are especially vulnerable to the side effects of incorrect medication, including allergic reactions, toxicity, and drug interactions. Furthermore, incomplete courses or incorrect dosages can promote mutant bacterial strains, leading to treatment failures and recurrent infections (Ventola, 2015).

In countries like Pakistan and China, where antibiotics are easily accessible and often sold without prescriptions, there is mounting evidence of antibiotic-resistant pathogens among community-acquired infections (Zafar et al., 2008; Yu et al., 2021). This situation threatens not only individual patients but also public health at large.

Summary of Trends Across Countries

Country	Key Findings	Source
Jordan	39.2% self-medicated children with antibiotics; low awareness of antibiotic use	Abu Hammour et al., 2018
China	One-third of children received antibiotics before consultation	Yu et al., 2021
Serbia	50% of homes stored antibiotics; used them without prescription	Jovanović et al., 2015
Pakistan	83% used paracetamol, 72.27% used cough syrup, antibiotics overused	Zafar et al., 2008; Ahmed et al., 2017

Saudi Arabia	High cost and poor access promoted self-medication	Al Rasheed et al., 2016
Indonesia	59% of mothers self-medicated due to distance and cost	Yulianti et al., 2020

The literature clearly indicates that parental self-medication is a significant and recurring problem across diverse global regions, especially in developing countries. This issue is not only shaped by limited access to professional care but is also driven by misperceptions, convenience, and cultural norms. The widespread misuse of antibiotics for non-bacterial infections and minor ailments significantly increases the risk of antibiotic resistance, creating long-term threats to child health and global healthcare systems. Therefore, targeted public education, regulation of pharmacy practices, and improvements in healthcare access are critical steps toward mitigating this issue.

Methodology

A cross-sectional study was conducted using a structured questionnaire among 40 parents visiting a community pharmacy and Hayatabad Medical Complex in Peshawar from October to November 2021. The study used non-probability convenient sampling. The questionnaire included demographic data, drug use patterns, sources of health information, side effects, and follow-up behavior after medication failure.

Study Design

This research employed a cross-sectional study design, which is widely used in public health and epidemiological studies to assess the prevalence and associated factors of health-related behaviors within a population at a single point in time. A cross-sectional approach is particularly suitable for exploratory studies like this, which aim to understand the extent and patterns of parental self-medication in children, especially in the context of limited local data.

Study Setting and Duration

The study was conducted in two distinct healthcare settings in Peshawar, Pakistan:

- A community pharmacy, which represents informal and direct access to medications without prescriptions
- The Hayatabad Medical Complex, a major tertiary care hospital that receives a diverse population from both rural and urban settings.

The data collection period spanned from October to November 2021, providing a snapshot of self-medication practices during that timeframe. Although brief, this period was sufficient for a preliminary assessment and baseline analysis of parental behavior.

Sampling Technique

The study utilized a non-probability convenient sampling method, which involves selecting participants based on their availability and willingness to participate. This technique is often used in field research due to its practicality, low cost, and ease of access—especially in settings like busy pharmacies or hospital outpatient departments.
While convenient sampling limits the generalizability of the findings (since the sample may not be fully representative of the broader population), it is still valuable for identifying key trends, forming hypotheses, and laying the groundwork for more robust future studies.

Study Population and Sample Size
The study targeted parents with at least one child aged 0–17 years. A total of 40 respondents were included. While the sample size is relatively small, it allowed for:

- Initial insights into behavioral patterns,
- Pilot-level validation of the questionnaire,
- Assessment of feasibility for larger-scale studies.

The respondents included parents from diverse backgrounds, capturing a mix of educational levels, occupational roles, gender, and urban vs. rural residence.

Data Collection Tool: Structured Questionnaire
A structured questionnaire was the primary tool for data collection. It was designed to be simple, clear, and interviewer-administered, ensuring consistency and ease of response, even for individuals with limited literacy.
The questionnaire was divided into three main sections:

Demographic Information
Collected details such as:

- Parental gender and age
- Educational and occupational status
- Number and age range of children
- Area of residence (rural or urban)

This data was critical for understanding the influence of socio-demographic factors on self-medication practices.

Drug Use Patterns
Included questions on:

- Whether the parent had ever self-medicated their child
- Common illnesses treated at home (fever, cough, flu, diarrhea, etc.)
- Specific medications used (antipyretics, antibiotics, cough syrups, etc.)
- Frequency and recurrence of self-medication

This section aimed to quantify the types of drugs used, their indications, and the extent of dependence on self-medication.

Sources of Health Information
Participants were asked where they typically got health-related advice, including:

- Friends, relatives, or neighbors
- Internet and social media
- Television, radio, or newspapers
- Community pharmacists

This helped identify the channels through which misinformation or inappropriate guidance might spread.

Adverse Outcomes and Follow-Up Behavior
This section addressed:

- Any side effects or adverse events experienced due to self-medication
- Actions taken when medications failed (e.g., visiting a doctor, consulting a pharmacist, or seeking advice from non-medical sources)
- Habits such as storing leftover medicines, reading usage instructions, and checking expiry dates

It provided a risk assessment of current practices and gauged awareness about safe medication use.

Ethical Considerations
Participants were informed about the purpose of the study and verbal consent was obtained. The questionnaire was administered anonymously, ensuring confidentiality and voluntary participation. Parents were given the freedom to refuse or skip any question without consequence.
The methodological framework used in this study is appropriate for a preliminary investigation into the issue of parental self-medication in Peshawar. While limited by sample size and non-probability sampling, the structured design allowed for comprehensive data collection across multiple domains—demographics, behaviors, sources of information, and potential health outcomes. These findings can serve as baseline data for future larger-scale studies and inform community health interventions aimed at reducing the risks of self-medication among children

Results and Key Findings (Detailed Discussion)
The analysis of data collected from 40 parents in Peshawar reveals critical insights into the prevalence, patterns, and underlying drivers of parental self-medication practices for their children. The findings reflect behavioral tendencies, systemic healthcare challenges, and gaps in knowledge that contribute to this practice.

Prevalence of Self-Medication
Out of the total sample, 35% of parents (14 out of 40) reported that they had administered medications to their children without professional medical consultation. This is a significant figure considering the health risks involved in pediatric self-medication and highlights the need for immediate public health intervention.

Types of Drugs Used
The most frequently self-administered medications were:

- Antipyretics and Analgesics (30%): Drugs like paracetamol and ibuprofen were commonly used to treat fever and pain. These drugs are perceived as safe and are easily available, but inappropriate dosages may lead to liver or kidney damage in children.
- Antibiotics (7%): A concerning proportion of parents administered antibiotics without prescriptions, often for conditions such as cough, cold, or diarrhea—many of which are viral and do not require antibiotic treatment. This misuse directly contributes to antimicrobial resistance.

Knowledge and Practices Related to Drug Use

- 3% of parents admitted that they did not check dosage instructions or expiry dates, increasing the risk of underdosing, overdosing, or toxic effects.
- 61% of parents kept leftover medications at home, which were often reused during subsequent illnesses without professional advice. This practice encourages recurring self-medication and may lead to inappropriate drug use or expired medicine consumption.

Common Illnesses Treated via Self-Medication
The illnesses most frequently prompting self-medication were:

- Fever
- Flu and cold
- Cough
- Vomiting
- Diarrhea

These symptoms, although often mild, can indicate underlying infections that require medical evaluation. Treating them at home without diagnosis may mask serious conditions or delay appropriate treatment.

Sources of Health Information

Parents were influenced by various non-professional sources in deciding on medications:

- Friends and relatives
- Internet and social media
- Chemist shops
- Old prescriptions from previous illnesses

These sources are not reliable for medical decisions and may lead to misinformed treatment choices, especially when antibiotics are involved.

Reasons for Self-Medication

The major motivating factors for parental self-medication were:

- High consultation fees in private clinics
- Long waiting times in public hospitals
- Easy availability of OTC medications, especially antibiotics
- Distance from primary healthcare centers, especially in rural areas

These findings suggest that structural deficiencies in healthcare access and affordability play a crucial role in encouraging self-medication behavior.

Summary Table: Key Findings

Category	**Key Data / Findings**
Prevalence	35% of parents self-medicated their children
Types of Drugs Used	- 30% used antipyretics/analgesics - 7% used antibiotics
Knowledge & Practices	- 3% unaware of correct dosage or expiry date - 61% stored leftover meds
Common Illnesses	Fever, flu/cold, cough, vomiting, diarrhea
Sources of Information	Friends, internet, chemists, previous prescriptions
Reasons for Self-Medication	- High consultation fees - Long hospital wait times - Drug accessibility - Distance from health centers

Conclusion of Findings

These results reflect a concerning trend where economic pressures, healthcare inaccessibility, and misinformation are leading parents to medicate their children

without professional input. While some drugs like antipyretics may seem harmless, their misuse—especially in children—can be dangerous. The inappropriate use of antibiotics is even more alarming due to its implications for antimicrobial resistance, which poses long-term threats to public health.
This data forms a strong basis for intervention strategies, including public education, policy enforcement, and healthcare reforms, aimed at improving parental awareness and reducing reliance on unsafe self-medication practices.

Discussion
The study underscores the widespread misuse of medications among parents, primarily driven by financial constraints and healthcare accessibility issues. Antibiotic misuse contributes significantly to AMR, a growing concern globally and especially in Pakistan where "superbugs" have emerged. Self-medication in children is riskier due to weight-based dosing requirements and undeveloped immune systems.

Recommendations
- Public Awareness: Educational campaigns should be conducted to highlight risks associated with self-medication, especially in pediatric care.
- Healthcare Access: Improve primary healthcare outreach in rural and low-income areas.
- Regulation Enforcement: Control over-the-counter sale of antibiotics and other prescription drugs.
- Training: Pharmacists and community health workers should be trained to guide parents appropriately.

Conclusion
Parental self-medication is a prevalent practice in Peshawar, driven by economic, social, and accessibility factors. While some instances involve safe practices, many do not, especially when antibiotics are used without medical oversight. Targeted interventions including education, regulation, and improved healthcare services are essential to reduce the risks associated with this practice.
The findings of this study confirm that parental self-medication is a widespread and concerning practice in Peshawar, especially among families with limited access to affordable and timely healthcare. While some parents engage in self-medication with relatively safe, over-the-counter drugs such as paracetamol for fever or pain, the broader picture reveals a pattern of risk-laden practices, particularly in the unsupervised use of antibiotics and other prescription-only medications.

Drivers of the Practice
This behavior is shaped by a combination of economic, social, and systemic factors:
- Economic constraints: High consultation fees and out-of-pocket costs push parents to opt for self-treatment to avoid financial burden.
- Healthcare accessibility: In both urban slums and rural areas, parents may live far from reliable clinics or face long waiting times in public hospitals, discouraging professional consultations.
- Pharmacy culture: The ease of acquiring medicines—especially antibiotics—without a prescription encourages parents to bypass the healthcare system.
- Cultural norms and beliefs: Many parents rely on their own past experiences, advice from family or friends, and leftover medicines, reflecting a belief that minor illnesses can be managed at home without professional help.

Risks and Implications

While self-care can play a beneficial role in health systems when done responsibly, the findings suggest that irresponsible self-medication, particularly for children, carries serious health risks:

- Inaccurate dosing and use of expired or inappropriate medications can lead to toxicity, adverse reactions, or treatment failure.
- Antibiotic misuse—especially for viral illnesses like flu or cold—contributes to the escalating problem of antimicrobial resistance (AMR), which threatens to render standard treatments ineffective in the future.
- Delayed professional care often results when initial self-treatment fails, potentially worsening the child's condition and increasing healthcare costs.
- Lack of knowledge about drug interactions or pediatric pharmacology places children at a higher risk of complications than adults.

Need for Interventions

Addressing this issue requires a multifaceted and coordinated public health approach. The following interventions are necessary:

- Health education campaigns: Targeted programs should raise awareness among parents about the dangers of unsupervised medication in children. Educational efforts must be culturally sensitive and accessible in local languages, using both traditional media (TV, radio) and digital platforms.
- Stricter regulatory enforcement: Regulatory bodies must take action to limit over-the-counter sales of antibiotics and ensure that community pharmacies adhere to ethical practices. Licensed pharmacists should be required to verify prescriptions, especially when dealing with pediatric medications.
- Strengthening healthcare infrastructure: Improving access to affordable and quality pediatric care—especially in underserved areas—will reduce the dependency on self-medication. This includes increasing the number of qualified pediatricians, reducing wait times, and expanding mobile health clinics in rural regions.
- Pharmacist engagement and training: Pharmacists, as first-line healthcare providers in many communities, should be trained to offer accurate guidance to caregivers, advise against inappropriate drug use, and refer parents to qualified doctors when necessary.

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