Original

Self-Medication with Over-the-Counter Drugs in Children: Examining the Common Medications and Factors Influencing Mothers' Choices

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Abstract

Background: Self-medication with over-the-counter (OTC) drugs among children is widespread and crosses socioeconomic lines. Although OTC drugs offer convenience, their unregulated use can pose health risks, especially to children. Understanding these risks and the factors influencing self-medication practices is crucial for developing safer medication approaches. The aim of this study is to assess the attitudes and practices of mothers toward self-medication with OTC drugs for their children in Awka, Anambra State, Nigeria.

Method: A cross-sectional descriptive study was conducted among 300 randomly selected mothers with children <14 years in Awka, Anambra State. A structured questionnaire was used to collect data on sociodemographic factors, self-medication practices, sources of OTC medications, and attitudes toward self-medications. A three–point Likert scale was used to assess the attitude of mothers towards OTC. The data obtained were analysed using the Statistical Package for Social Sciences (SPSS) version 21.0. Sociodemographic variables and self-medication-related variables were summarized using frequency counts, percentages, ranges, means, and standard deviations. Test for association was done using Chi-square test. P-value <0.05 was considered significant at 95% confidence interval. Predictors of self-medication among the study participants were analysed using multivariate logistic regression.

Result: The mean age of the mothers was 33.34 ± 7.54 years, with most under 40 years old. The study found that 82.33% of mothers practiced self-medication, with paracetamol and cough syrups being the most commonly used OTC medications. Sources of information on OTC were mostly from pharmacists and doctors. Significant associations were observed between the practice of self-medication and maternal age ($\chi 2 = 15.556$, $p = 0.001$), number of children ($\chi 2 = 43.178$, $p = 0.001$), and the severity of symptoms ($\chi 2 = 214.915$, $p = 0.001$). Predictors of self-medication included the maternal age 30-39 years, long waiting times, and negative attitudes of healthcare workers ($p < 0.05$).

Conclusion: The high prevalence of self-medication with OTC drugs among mothers is influenced by various factors, including long waiting times at hospitals, cost considerations, and the attitudes of healthcare workers. To mitigate risks, public health interventions should focus on education, poverty alleviation programs, and stricter regulation of OTC medications. Further studies are recommended to involve a wider population and explore the long-term effects of self-medication in children.

Keywords: Self-medication, Over-the-counter drugs, Mothers' attitudes, Antibiotic resistance, Healthcare practices.

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Introduction

Over-the-counter (OTC) medications are drugs that can be purchased and used without a doctor's prescription.[1,2] This accessibility has contributed to a significant increase in their use across the globe, with many people turning to these medications for minor ailments and symptoms.[3,4] In developed countries, the use of OTC medications is often governed by stringent regulations, with clear labelling and guidelines to ensure consumer safety. However, in many developing regions, the rise in self-medication with OTC drugs has raised concerns about potential risks to public health, particularly among vulnerable populations like children.[5,6]

In many societies, self-medication is perceived as a practical solution for common health issues.[3] It offers convenience, reduced costs, easy accessibility, allowing individuals to avoid long wait times at medical facilities and the complexities of navigating healthcare systems.[3-6] However, this apparent convenience can mask significant dangers, especially when applied to children. Parents and caregivers may lack the medical knowledge to accurately diagnose and treat health conditions, leading to improper dosage, incorrect drug selection, or unrecognized drug interactions.[5,6,8-10] These risks are amplified when self-medication is practiced without adequate guidance from healthcare professionals.[2,8]

Mothers are typically the primary decision-makers when it comes to the health and well-being of their children. Their attitudes, beliefs, and practices toward the use of OTC medications can have a profound impact on children's health outcomes.[13] In regions where healthcare systems face challenges such as limited resources, inadequate infrastructure, and unwelcoming facilities, the reliance on OTC medications may be even more pronounced.[13] This can lead to a higher incidence of adverse drug reactions, delayed medical intervention for serious conditions, and the potential for antibiotic resistance due to indiscriminate use.[14,15]

Understanding the factors that drive mothers to opt for self-medication with OTC drugs is crucial for developing targeted interventions and public health policies. Factors such as educational background, cultural beliefs, economic constraints, and experiences with healthcare providers all play a role in shaping these decisions.[15-17] By exploring these elements, researchers can identify patterns of behaviour and potential points of intervention to improve child health outcomes. Though a cross-sectional study design, this research seeks to shed light on the prevalence of self-medication and the underlying reasons that contribute to its widespread practice. Ultimately, the goal is to offer insights that can guide healthcare professionals, policymakers, and caregivers toward safer and more informed practices regarding the use of OTC medications in children.

Method

Study Location

The study was done in Awka. Awka is a fast-growing city, the capital city of Anambra State with an estimated population of 301,657 as of 2006 Nigerian Census and over 2.5 million as of 2018 estimate.[18] It is located in South East, midway between Onitsha and Enugu which has played a significant role in its choice as an administrative centre for the colonial authorities and today a base for Anambra State. It is mostly populated by Igbos. The town was popularly known for metal works and blacksmithing.[19] They were known for making farm implements, dane guns and other ceremonial items. It is in the tropical rainforest zone. The economy revolves around government since many state and federal institutions are located in the city. Christianity is the main religion of the people. Today, Awka has become the centre of hospitality in Anambra state.[19]

Study Design

This is a community based cross-sectional descriptive study.

Study Period

Data collection took place over a two-month period, spanning from May 24 to June 18, 2023 with the assistance of three research assistants trained for three days on data collection and filling of the questionnaires and they assisted in that capacity. Participants were informed about the purpose of the study. Only those who gave informed consent were recruited for the study.

Study Population

The participants were 300 randomly selected women residing in Awka, Anambra state, Nigeria who had children aged less than 14 years. The study population included a diverse range of mothers, encompassing varying educational and income levels.

Inclusion criteria

1. Mothers' resident in Awka with children <14 years who gave consent.

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Exclusion criteria

1. Mothers who refused consent were excluded from the study.
2. Mothers who were mentally unstable or severely ill were also excluded from participation.

Study Sample Size Determination

The sample size for the study was calculated using the formula below.[12]

Prevalence of self-medication among caregivers of children under-five was 90%.[13]

Using the Cochrane formula for sample size estimation

N = Z2 p(1-p)/d2

N = 1.96 2 x 0.90(1-0.90)/0.05

= 1.962 x 0.90 x 0.1/0.05

= 138

A sample size of 300 was used for the study.

Study Instrument

The data were collected using a self-designed questionnaire, developed after a comprehensive literature review. The questionnaire comprised of three sections, with a total of 19 questions relevant to the study objectives. The first section included 4 questions on sociodemographic factors, such as the mother's age, residence, educational qualification, and the number of children aged less than 14 years. The second section consisted of 7 questions exploring the mothers' practices regarding the use of over-the-counter (OTC) medications, including the type of treatment, source of medication, frequency of self-medication for their children in the previous year, history of allergies in children, extent of symptoms for which self-medication was practiced, maternal actions when symptoms did not improve with medication, and common complaints for which OTC self-medication was practiced. The third section comprised 8 questions assessing the mothers' attitudes toward self-medication for their children, using a 3-point Likert scale (Disagree=1, Neutral=2, Agree=3). The questionnaire was validated by a statistician proficient in research and data analysis, and subsequently utilized for data collection.

Data analysis

The data obtained were analysed using the Statistical Package for Social Sciences (SPSS) version 21.0 (IBM Corp., Armonk, New York, USA). Sociodemographic variables and self-medication-related variables were summarized using descriptive statistics, including frequency counts, percentages, ranges, means, and standard deviations. Bar charts were utilized to depict the most used medications and the participants' attitudes toward self-medication. The chi-square test was employed to assess the association between the practice of self-medication and each of the following factors: age, educational status, experience of allergy, and extent of symptoms among the mothers in the study. The alpha level was set at 0.05. Predictors of self-medication among the study participants were analysed using multivariate logistic regression. One questionnaire had incomplete data. So, only 299 questionnaires were entered for analysis.

Ethical approval

Ethical approval for this study was obtained from the Anambra State Ministry of Health Research Ethics Committee in Awka with approval no. ASMOHREC/2023/26072023/05 (26 July, 2023)

Voluntariness

Participation was voluntary and participants could withdraw at any point with no penalty.

Beneficence

This study will provide facts on the prevalence of the use of OTC in Awka and the common medications used. This will help in health planning and enlightenment on the dangers of OTC.

Non maleficence

No harm was done to any mother in this study

Confidentiality

All information obtained during the course of this study was kept confidential.

Cost and inducement

No cost was incurred by the participant and no monetary inducement.

Results

Participant Characteristics

Three hundred participant was recruited but 1 participant had incomplete data and was exempted from analysis.

A total of 299 mothers with a mean age of 33.34 ± 7.54 years participated in this study. The majority were younger than 40 years of age (80.33%), had attained at least a tertiary level of education (56.4%), and had two or fewer children (68.56%) (Table 1).

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Table 1: Socio-demographic profile of the mothers involved in the study

Variable	Freq	Percent (%)
Age of mother (years)		
-Less than 30 years	101	33.67
-30-39 years	140	46.67
-40-49 years	47	15.67
-50 years and above	12	4.00
Mean Age (±SD)	33.34 ±7 .54	
Educational Status		
-Primary	14	4.7
-Secondary	116	38.7
-Tertiary	143	47.4
-Postgraduate	27	9
Number of children less than 14years *(n=299)*		
-One child	114	38.13
-Two children	91	30.43
-Three children	54	18.06
-Four children	24	8.03
-Five children	14	4.68
Six children	2	0.67

Commonly Used Medications

Paracetamol (43.3%) was the most used medication, followed by cough syrup (24.1%), while flu syrup (2.0%) and antidiarrheal agents (3.5%) were the least used medications (Table 2).

Most used medications *(n=299)* *	Freq	Percent (%)
Antibiotics	26	6.5
Anti-diarrhoea	14	3.5
Antihistamine	21	5.3
Antimalaria	57	14.3
Cough syrup	96	24.1
Flu syrup	8	2.0
Paracetamol	173	43.3
Others	4	1.0

**=multiple response variable*

Sources of Medication

The most common sources of medication or information about medication among the participants were pharmacists (48.7%), followed by physicians (30.6%), and television/radio/internet (7.3%). Other sources, such as friends/relatives, leaflets/magazines/books, and previous prescriptions, had lower frequencies ranging from 0.9% to 3.8%.

Self-Medication Practices

Most participants (82.33%) practiced self-medication, with the majority (83.30%) being repeat offenders (within the last 1 year). A substantial proportion (15.4%) acknowledged experiencing allergic reactions after self-medicating, while only 75.4% visited the hospital when there was no improvement in symptoms. Table 3

Table 3: Sources and frequency of used medications, presence of drug allergy and mothers' action when medications fail

Sources of medications *(n=345)* *	Freq	Percent (%)
Chemist	3	0.9
Friends/relatives	13	3.8
Leaflets/magazine/books	6	1.7
Nurse	9	2.6
Pharmacist	167	48.7
Physician	105	30.6
Previous prescription	13	3.8
Television/radio	27	7.3
Frequency of self-medication, experience of allergy and mothers' action after self-medication within the last 1 year		
Variable	**Freq**	**Percent (%)**
Do you practice self-medication?		
Yes	247	82.33
No	53	17.67
Frequency of self-medication in the last 1 yr *(n=247)*		
Once	42	17.0
Twice	50	20.2
Thrice	38	15.4
Four times	23	9.3
≥4	94	38.0
Had any allergy? *(n=298)*		
Yes	46	15.4
No	199	66.8
Do not know	53	
Mothers action if no-improvement after self-medication (n=281)		
Go to hospital	212	75.4
Go to health centre to see a nurse	30	10.7
Consult a pharmacist	17	6.0
Search the internet	13	4.6
Relatives/friends advice	3	1.1

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Go to hospital, consult a pharmacist	2	0.7
Go to hospital, consult a pharmacist, continue on self-medication	1	0.4
Go to hospital, continue on self-medication	2	0.7
Go to hospital, search the internet	1	0.4

**=multiple response variable*

The most common complaints for which self-medication was practiced were fever (45.3%), cough (36.2%), and headache (10.8%), with symptoms mostly rated as mild (47.7%) and mild-to-moderate (30.8%). Other complaints, such as skin rash, diarrhoea, vomiting, and others, had lower frequencies ranging from 0.3% to 2.2%. Table 4

Table 4: Showing the extent of symptoms and most common complaint

Variable	Freq	Percent (%)
Extent of symptoms *(n=299)*		
Mild	141	47.2
Mild to moderate	92	30.8
Moderate	23	7.4
Severe	4	1.3
I do not self-medicate	40	13.4
Most common compliant for which self-medication was practiced *(n=362)**		
Fever	164	45.3
Cough	131	36.2
Headache	39	10.8
Skin Rash	17	4.7
Stooling	8	2.2
Vomiting	2	0.6
Others	1	0.3

**=multiple response variable*

Reasons for Self-Medication

The reported reasons for indulging in self-medication among the participants were: long waiting times at the clinic (37.3%), expensive consultation fees (35.3%), claimed awareness of the children's disease from symptoms (31.3%), awareness of side effects of medications (30.3%), lack of sufficient health information (30.3%), poor attitudes of healthcare workers (27.3%), frustrating nature of the nearest clinic (18.3%), and claims of being expert enough (8.3%) (Table 5). All these reasons showed positive mean Likert scores toward the use of self-medication, except for 'I am expert enough.'

Table 5: Assessment of attitude of mothers towards self-medications with mean Likert Scale

Variable	Likert Scale (%)			Mean Likert Score	Scoring
	Agree (3)	Neutral (2)	Disagree (1)		
Waiting time in clinic too long	112 (37.3)	89 (29.7)	99 (33.0)	2.04	Positive
Consultation fees are too expensive	106 (35.3)	102 (34.0)	92 (30.7)	2.05	Positive
Nearest clinic is too frustrating	55 (18.3)	93 (31.0)	152 (50.7)	1.68	Positive
Bad attitude of healthcare workers	82 (27.3)	94 (31.3)	124 (41.3)	1.86	Positive
Lack of sufficient health information	91 (30.3)	84 (28.0)	125 (41.7)	1.89	Positive
Awareness of side effects of medications	91 (30.3)	102 (34.0)	107 (35.7)	1.95	Positive

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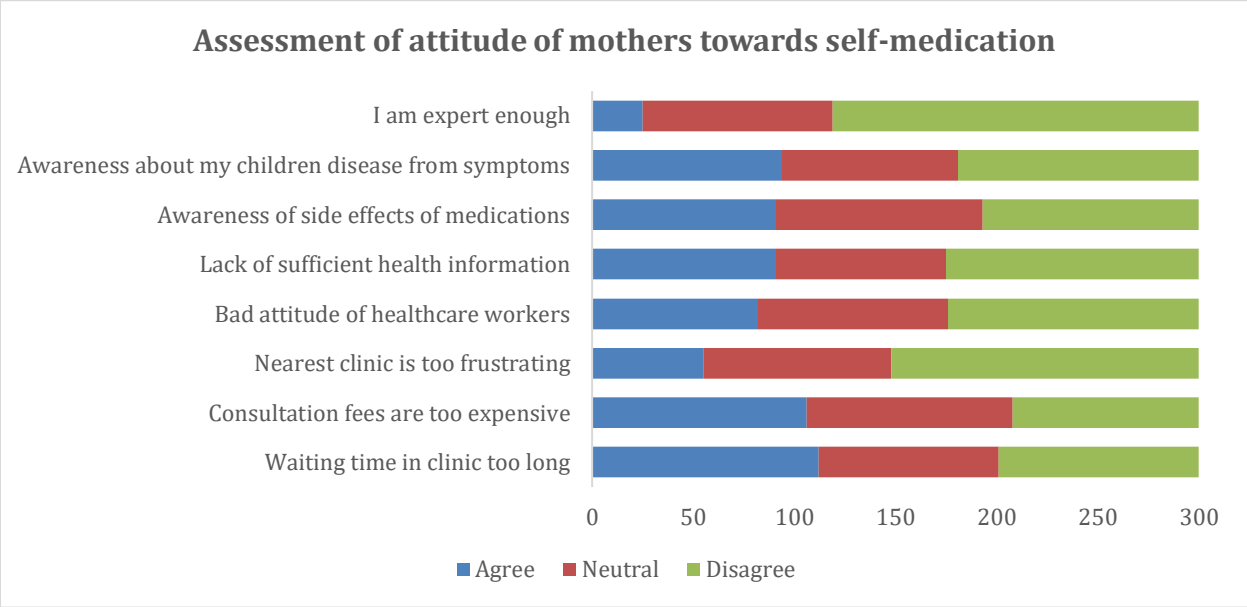

Figure 1: Assessment of attitude of mothers towards self-medication

Associations and Predictors

Significant associations were found between the practice of self-medication and each of the following: age of the mothers ($\chi 2 = 15.556$, $p = 0.001$), having up to three children ($\chi 2 = 43.178$, $p = 0.001$), and extent of symptoms ($\chi 2 = 214.915$, $p = 0.001$) (Table 3).

Table 6: Chi-square analysis showing association between practice of self-medication with age, educational status, experience of allergy and extent of symptoms among the mothers in the study

Variables	Total freq (%)	Practice of self-medication		χ^2-value	p-value
		No (%)	Yes (%)		
Age of mother					
<30 years	101 (33.67)	28 (52.8)	73 (29.5)		
30-39 years	140 (46.67)	23 (43.4)	117 (47.4)	15.556	0.001*
40-49 years	47 (15.67)	2 (3.8)	45 (18.2)		
≥50 years	12 (4.00)	0	12 (4.8)		
Number of children less than 14years *(n=299)*					
One child	124 (41.47)	41 (77.36)	83 (33.74)		
Two children	117 (39.13)	5 (9.43)	112 (45.53)		
Three children	54 (18.06)	4 (7.55)	50 (20.33)	43.178	0.001*
>3 children	4 (1.34)	3 (5.66)	1 (0.41)		
Education Status					
Primary	14 (4.7)	1 (1.9)	13 (5.3)		
Secondary	116 (38.7)	15 (28.3)	101 (40.9)	5.883	0.117
Tertiary	143 (47.7)	33 (62.3)	110 (44.5)		
Postgraduate	27 (9.0)	4 (7.6)	23 (9.1)		
Experience of allergy					
Yes	46 (14.4)	4 (7.8)	42 (17.0)		
No	199 (66.8)	39 (76.5)	160 (64.8)	3.316	0.191

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Variables	Total freq (%)	Practice of self-medication		χ^2-value	p-value
		No (%)	Yes (%)		
Do not know	53 (17.8)	8 (15.7)	45 (18.2)		
Extent of symptoms					
Mild	141 (47.2)	8 (15.4)	133(53.9)		
Mild to moderate	92 (30.8)	4 (7.7)	88 (35.6)		
Moderate	22 (7.4)	1 (1.9)	21 (8.5)	214.915	0.001*
Severe	4 (1.3)	0	4 (1.6)		
I do not self-medicate	40 (13.4)	39 (75)	1 (0.40)		

Significant predictors of self-medication among the participants were the age of mothers 30-39 years, long waiting time, and poor attitudes of health workers ($p < 0.05$) (Table 6)

Table 7: Multivariate logistic regression showing the relationships between maternal variables and self-medication

Predictor variables	Odds ratio	*p-value*	(95% Confidence Interval)	
			Lower	Upper
Age of mother				
<30yrs				
30-39years	1.113	0.004	1.035	1.199
40-49 years				
≥50yrs				
Education Status				
Primary	-	-	-	-
Secondary	1.254	0.855	0.110	14.261
Tertiary	0.797	0.851	0.075	8.487
Postgraduate	0.774	0.846	0.059	10.219
Number of children less than 5 years				
Less than 3 children	-	-	-	-
3 children and above	2.347	0.100	0.848	6.492
Waiting time in clinic too long				
Agree	-	-	-	-
Disagree	.3064812	0.025	.1091137	0.861
Neutral	.3271096	0.022	.1256534	.8515542
Consultation fees are too expensive				
Agree	-	-	-	-
Disagree	2.727186	0.052	.9910809	7.504476
Neutral	.9123642	0.849	.3543646	2.349017
Nearest clinic is too frustrating				
Agree	-	-	-	-
Disagree	.3370929	0.131	.0820643	1.384665
Neutral	.5182052	0.387	.1168781	2.297579

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Predictor variables	Odds ratio	*p-value*	(95% Confidence Interval)	
			Lower	Upper
Bad attitude of healthcare workers				
Agree	-	-	-	-
Disagree	.2055646	0.026	.051291	.8238636
Neutral	.3290253	0.115	.0826151	1.310386
Lack of sufficient health information				
Agree	-	-	-	-
Disagree	0.498	0.196	0.173	1.433514
Neutral	0.568	0.319	0.187	1.727114
Awareness of side effects of medications				
Agree	-	-	-	-
Disagree	1.819	0.207	0.718	4.608555
Neutral	2.437	0.083	0.889	6.677889
Awareness about my children disease from symptoms				
Agree	-	-	-	-
Disagree	0.450	0.118	0.165	1.225888
Neutral	0.844	0.733	.3184907	2.237646
I am expert enough				
Agree	-	-	-	-
Disagree	1.077	0.914	.2814217	4.119077
Neutral	1.165	0.828	.2935842	4.623214

Discussion

Paracetamol, an antipyretic, was found to be the most commonly reported OTC medication in this study. This finding is unsurprising because fever is the most common reason for parents or caregivers to seek medical attention for children and the most frequent complaint in approximately 75% of paediatric consultations in healthcare practice.[3] Paracetamol has been reported as the drug of choice by most parents for febrile conditions.[15,16] The reasons for choosing paracetamol are evident: it is inexpensive, effective, relatively safe, and readily available. It is globally accepted as the most widely used antipyretic, and its consumption is escalating.[4]

However, it is worth noting that at high doses, it is both hepatotoxic and nephrotoxic.[5] Paracetamol is the most common drug involved in drug abuse and overdose in children, as many of these OTC medications contain it.[6]

Cough syrups were also found to be commonly used, as cough was a prevalent symptom in this study. The reasons are their availability, low cost, and palatable formulations for children. Additionally, some mothers lack knowledge about respiratory infections and tend to treat every cough episode with different brands of cough syrup, only seeking medical advice when they fail. Antimalarial drugs were also commonly used in this study, likely due to the belief in our setting that most childhood fevers are caused by malaria. From clinical experience, every febrile child must have received antimalarials before presenting to the hospital when they have failed. Some antimalarial formulations are inexpensive and readily available. It is imperative to address parental concerns and beliefs about their children's health during counselling. Another significant finding was the use of antibiotics as OTC medications, which can lead to antibiotic resistance when taken at incorrect doses or durations. Similar findings on antibiotic use as OTC medications were reported in other studies.[14,20,23]

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Pharmacists, followed by doctors, were the common sources of information on OTC medications. Some healthcare professionals provide prescriptions over the phone based on their knowledge and experiences, without proper guidance on their use, patient assessment, or laboratory investigations to ascertain the actual causes of illnesses. This practice has been exacerbated in the era of telemedicine.

Television/radio advertisements and the internet also contributed reasonably as sources of OTC medication information for mothers in this study.

However, the internet remains an unreliable source for drug use information, as much of the content is unfiltered and unregulated, leaving mothers in a selection dilemma. Drug labels and leaflets were also noted as sources of OTC medication information in this study. The information in these leaflets may be misinterpreted due to poor knowledge of drug dosage calculations, medical terminologies, and language barriers.[8] The use of previous prescriptions and advice from friends and relatives each contributed about 3.8% to the source of information on OTC medication use. These practices are common in our setting, with mothers repeating previous prescriptions when children present with similar symptoms, likely unaware that different illnesses may manifest with similar symptoms. This issue is compounded by the influence of friends and relatives, especially advice from older relatives who believe they are knowledgeable in child care management.

However, some of the information they have is outdated and may be detrimental to children's health. These practices are driven by poverty and ignorance; therefore, programs aimed at alleviating poverty and public awareness campaigns will contribute immensely toward controlling the indiscriminate use and abuse of OTC medications.

The prevalence of OTC medication use in this study was 82.3%. A study conducted in Indonesia by Ahmed et al. reported a prevalence rate of 58.82%.[9] Different studies have also documented varying rates of self-medication in children by parents, ranging from 43% to 95.7%.[10] The reasons for the varied prevalence rates might be due to differences in data collection methods, the cost of medical care, availability of free paediatric services, and parents' concerns about the safety of medicine use in children. The use of OTC medications cuts across all socioeconomic classes in this study. The majority of mothers used these OTC drugs for mild to moderate symptoms, consulting hospitals and private clinics only when self-medication failed.

Similar findings have been reported in other studies.[15,22] About 18.2% of mothers in this study did not know about their children's history of allergies. Another similar study reported that 20% of mothers were unaware of their children's allergy history.[5] The adverse effects of OTC medications vary depending on the composition of the medication, the formulation, and its pharmacokinetics in the child. Most mothers lack this knowledge and use these drugs indiscriminately, resulting in adverse drug reactions.

Mild to moderate symptoms prompted self-medication with OTC medications. The mothers' Likert scores showed positive attitudes toward the use of OTC medications for all the assessed factors, except for "I am expert enough." Significant predictors of self-medication among the participants were the higher age of mothers, long waiting times, and poor attitudes of health workers ($p < 0.05$).

Strength of the study

The findings in this study can be used to create an in-depth research study.

Limitations of the study

Certain questions relied on participants recalling past activities, thereby introducing the potential for recall bias.

Implications of the findings

A more comprehensive study involving a wider population should be embarked on. Also, continuous education on dangers of unguided use of OTC medication should be done routine in our communities and media.

Conclusion

The use of over-the-counter (OTC) medications among mothers for their children is highly prevalent, driven primarily by factors such as poverty, lack of medical knowledge, attitudes of

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healthcare workers, and long waiting times at hospitals. Paracetamol and cough syrups were the most commonly used OTC medications, often for mild to moderate symptoms. Significant predictors of self-medication included the age of mothers, long waiting times, and poor attitudes of health workers.

While OTC medications are generally safe, their indiscriminate use can lead to adverse effects and antibiotic resistance. Addressing these underlying factors through education, poverty alleviation programs, and stricter regulation of OTC medication use is crucial to promote responsible self-medication practices and improve child health outcomes.

Declarations

Ethical Consideration: Ethical approval for this study was obtained from the Anambra State Ministry of Health Research Ethics Committee in Awka with approval no. ASMOHREC/2023/26072023/05 (26 July, 2023).

Authors' Contribution: All authors participated in the study's conceptual design, project execution, manuscript writing, and revisions. Each author has read and approved the final version of the manuscript.

Conflict of interest: The authors declare that they have no conflicts of interest related to this study.

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