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# Knowledge and Practice of Acetaminophen Use in Conakry Before the Onset of COVID-19 Epidemic: A Cross-Sectional Study in the Private Pharmacies

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**Abstract:** Acetaminophen is a well-known as analgesic and antipyretic drug. It is considered to be safe when administered within its therapeutic range. However, in cases of intoxication, hepatotoxicity can occur. This was a cross-sectional study including persons who went to a pharmacy of Conakry to buy acetaminophen without a prescription. Data were collected by face-to-face interview. Good use, good knowledge, and overdose scores were evaluated based on the questionnaires. Data from 355 persons with a median age of 35.0 years who presented themselves for the purchase of acetaminophen for self-medication in 43 private pharmacies were analyzed. The main reasons for taking acetaminophen at home were headaches (60.3%) and various pains (48.5%). Over third (34.9%) said that they were not in any danger from excessive consumption of acetaminophen. Only 20.8% of patients had good knowledge of acetaminophen (score > 80%). Women scored higher than men (43.1% vs. 28.1%;  $p = 0.008$ ). Almost 43% had no information on the risk associated with excessive acetaminophen consumption. The results also reveal a significant association between acetaminophen use and information sources ( $p < 0.05$ ). Respondents who had good knowledge of acetaminophen were better users than those who did not have good knowledge of acetaminophen ( $p < 0.001$ ). Study showed low level of knowledge about acetaminophen and low proportion of people who have information about the consequences of using large doses of this drug. It therefore seems necessary to remind caregivers of the important role they must play in reinforcing the safe use of acetaminophen in self-medication.

**Keywords:** Analgesic, Knowledge, Acetaminophen, Self-medication

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## 1. Introduction

Health systems in developing countries, particularly in Africa, have undergone major transformations in recent decades. Despite some policies that have improved the accessibility and even efficiency of health services, access equity remains an unresolved issue, which makes self-medication the first line of defense at the onset of pathological symptoms instead of seeking care at a health center [1].

Self-medication refers to the use of non-prescription medications, usually over-the-counter drugs, to treat certain minor conditions without consulting a medical practitioner and without medical supervision [2]. It can take many forms, including acquiring medications without a prescription, sharing medications with others, or using a medication already available at home [3]. The most common medications used for self-medication include analgesic, antibiotics, cough suppressants, etc. [4]. These drugs are safe when used as recommended by health authorities, but the incidence of adverse events increases when consumers exceed recommended doses [5].

It has been reported that for example, acetaminophen, one of the world's most widely used analgesics, is a classic dose-dependent hepatotoxin [6], and the easiest way to inadvertently overdose is to combine it with cough, cold, or flare-up medications because people are unaware that acetaminophen is present in most of them [7]. Taking analgesic at the same time may increase the risk of adverse drug reactions, in patients with suspected drug allergies [8].

Many studies self-medication practices indicate that acetaminophen is the most common drug used for self-medication, with a proportion of up to 89% [9, 10]. In the United States, 5.5 million people reportedly use an analgesic, antipyretic or nonsteroidal anti-inflammatory every day [11]. The 2009 European Health Survey found 23.7% of people with pain treated themselves with over-the-counter (OTC) analgesics. A similar trend has been found in many other countries [2, 12, 13]. In Africa, the prevalence of self-medication can reach 75.5% [2].

According to the American Association of Poison Control Center's National Poison Data System annual report, in 2009, approximately 150,000 cases of poisoning were attributed to acetaminophen in the United States and 70,000 cases occurred annually in the United Kingdom and Canada [14]. The European SALT study of 600 cases of drug-induced acute liver failure requiring transplantation identified acetaminophen overdose in 1 in 6 cases, 10% of which were unintentional [6].

Guinea, like other countries, is not on the fringe of an increased consumption of analgesics. Unfortunately, the extent of this problem is not well known. The main objective of this study was to describe the reasons for self-medication with acetaminophen and to analyze the level of knowledge of how to use this drug in the private pharmacies of Conakry.

## 2. Material and Methods

### 2.1. Study Setting and Population

This was a cross-sectional study of individuals who bought acetaminophen without a prescription at a pharmacy of Conakry for themselves or their families. Conakry has 346 private pharmacies according to the statistics from the Ministry of Health and Public Hygiene. A total of 43 private pharmacies were selected according to their accessibility and their agreement to host the survey. The persons who presented themselves for the purchase of acetaminophen for self-medication in private pharmacies were invited to participate in the study between January and June 2019.

### 2.2. Data Collection

Data collection followed a contact with the pharmacists in charge of the private pharmacies visited, to explain the objectives and benefits of the study. The data were collected by face-to-face interview through a standardized and pre-tested questionnaire from people who presented themselves at the pharmacy for the purchase of an acetaminophen and agreed to be interviewed. Interview questions included socio-demographic characteristics (age, gender, education level, marital status, parental status, source of information on medication use), data on knowledge (use and risk of unintentional overdose of acetaminophen, medications containing the active ingredients, reason for consumption of the molecules, maximum frequency of consumption, maximum dose of drug in one intake, daily dosage per intake, conditions of administration of the drug in children, consequences of overdose, measuring system used in children). KoboCollect software was used for data collection.

### 2.3. Statistical Analysis

Proportions were calculated for categorical variables. Quantitative variables were expressed as median with their interquartile ranges (IQR). Use, knowledge, and overdose scores were evaluated based on these 3 components of the questionnaire. A good response was scored on 1 point and a bad response on 0 point. A participant was considered a good user if his score was higher than 6 out of 8 points, as having a satisfactory knowledge if the score was higher than 7 out of 10 points. A person was at risk of unintentional overdose if the score was less than or equal to 3 out of 4 possible points [15]. The Student's test was used to compare means and the Fisher-exact or Chi-square tests were used to analyze differences across sociodemographic groups. A p-value <0.05 was considered significant. R.3.4.1 software was used for statistical analyses.

### 2.4. Ethical Considerations

Oral consent was obtained from each study participant. The study protocol was submitted and validated by approval (N°75/22012021) of the Committee of the Chair of Public Health of the Department of Pharmacy of the Faculty of Health Sciences and Techniques.

### 3. Results

#### 3.1. Sample Characteristics

355 persons with a median age of 35.0 (27-44) years agreed to complete the survey. The sample comprised 71.3% men. Around 59% of the respondents were married and 58.3% of the sample had at least one child (Table 1). About 20% of the participants said they favored buying medicines outside the pharmacy and the reasons given were availability and low cost in the market (62.5%).

Their reasons for taking acetaminophen were headaches (60.3%) and pain (48.5%). Doliprane® (61.4%), Eferalgan® (43.1%), Panadol® (38.3%) and Gripex® (23.4%) were the products containing acetaminophen most frequently cited by the respondents. Nearly 96% of the sample stated that they took 1 to 4 acetaminophen tablets per day. Regarding information on acetaminophen, the respondents almost half (46.5%) reported getting information from physicians and/or pharmacists.

**Table 1.** Characteristics of the population who bought acetaminophen by self-medication in the private pharmacies of Conakry, Guinea.

Characteristics	Number	Percentage (%)
Age (years)		
Median (IQR)	35.0 (27-44)	
Gender		
Male	253	71.3
Female	102	28.7
Marital status		
Married	209	58.9
Single	143	40.3
Widowed	3	0.8
To be parents		
Yes	207	58.3
No	148	41.7
Would you be willing to buy acetaminophen outside a pharmacy?		
Yes	72	20.3
No		
What are some reasons why you might buy Acetaminophen outside a pharmacy?		
Because these products are available and cheaper in the market.	45	62.5
I can buy them in quantity.	15	20.8
I can use it without a pharmacist's advice	6	8.3
Absence of a pharmacy, Proximity of a point of sale of medicines	13	18.1

#### 3.2. Knowledge About Dosing and Overdose Risks

About three-fourths of participants said that the recommended maximum acetaminophen dose of was 1g at a time (83%) and 2g per day (74%). Only a third knew that death could indicated occur from acetaminophen overdose (33.0%) or that there was danger in excessive consumption of acetaminophen (34.9%). On the other hand, some respondents did know that excessive consumption of acetaminophen could have consequences on the liver and kidneys, respectively 10% and 9%. But almost 43% had no information on the risk associated with excessive acetaminophen consumption.

About 70% of participants with children, used the syrup form and 18% used a weight-based dose, but only slightly more than a third reported using a measuring system to

administer acetaminophen to children. Less than 10% reported administering the dosage of 10 mg/kg every 4 hours and 15 mg/kg every 6 hours.

Table 2 shows the distribution of scores for acetaminophen knowledge and use. Only 20.8% of respondents had an acetaminophen knowledge (score >80%). Women had a better score than men (43.1% versus 28.1%;  $p = 0.008$ ). Regarding the use of acetaminophen, 17.9% of the participants were considered good users (score >80%). More women scored in the good use range than men (45.5% versus 29.2%;  $p = 0.006$ ). Acetaminophen use was also significantly associated with information sources ( $p < 0.05$ ). Respondents who had good knowledge of acetaminophen were better users than those who did not have good knowledge of acetaminophen ( $p < 0.001$ ).

**Table 2.** Bivariate analysis of the proper use, knowledge and risk of overdose of acetaminophen in the private pharmacies of Conakry, Guinea.

Variables	Good use	Poor use	p-value	Good Knowledge	Poor Knowledge	p-value	Risk of overdose		p-value
	(score > 80%) N (%)	(score < 80%) N (%)		(score > 80%) N (%)	(score < 80%) N (%)		Yes (%)	No (%)	
Age, years (SD)	36.38 (±12.90)	34.93 (±12.58)	0.31	37.22 (±11.57)	34.55 (±13.13)	0.05	31.87 (±13.59)	35.76 (±12.57)	0.13
Gender			< 0.006			< 0.008			0.26
Female	46 (45.1)	56 (54.9)		44 (43.1)	58 (56.9)		6 (5.9)	96 (94.1)	
Male	74 (29.2)	179 (70.8)		71 (28.1)	182 (71.9)		26 (10.3)	227 (89.7)	
Marital status			0.43			0.29			0.14
Single	50 (35.0)	93 (65.0)		42 (29.4)	101 (70.6)		18 (12.6)	125 (87.4)	

Variables	Good use (score > 80%) N (%)	Poor use (score < 80%) N (%)	p-value	Good Knowledge (score > 80%) N (%)	Poor Knowledge (score < 80%) N (%)	p-value	Risk of overdose		p-value
							Yes (%)	No (%)	
Married	68 (32.5)	141 (67.5)		71 (34.0)	138 (66.0)		14 (6.7)	195 (93.3)	
Widowed	2 (66.7)	1 (33.3)		2 (66.7)	1 (33.3)		0 (0.0)	3 (100.0)	
To be parents			0.56			0.08			0.11
No	47 (31.8)	101 (68.2)		40 (27.0)	108 (73.0)		18 (12.2)	130 (87.8)	
Yes	73 (35.3)	134 (64.7)		75 (36.2)	132 (63.8)		14 (6.8)	193 (93.2)	
Purchase of medication outside the pharmacy			0.08			< 0.001			0.35
No	89 (31.4)	194 (68.6)		76 (26.9)	207 (73.1)		28 (9.9)	255 (90.1)	
Yes	31 (43.1)	41 (56.9)		39 (54.2)	33 (45.8)		4 (5.6)	68 (94.4)	
Source of information on Acetaminophen			< 0.01			< 0.001			0.54
Physician/Pharmacist	66 (40.0)	99 (60.0)		71 (43.0)	94 (57.0)		15 (9.1)	150 (90.9)	
I never get informed from friends and family	23 (35.9)	41 (64.1)		20 (31.2)	44 (68.8)		3 (4.7)	61 (95.3)	
Internet/Notice	27 (22.9)	91 (77.1)		21 (17.8)	97 (82.2)		13 (11.0)	105 (89.0)	
Knowledge	4 (50.0)	4 (50.0)		3 (37.5)	5 (62.5)		1 (12.5)	7 (87.5)	< 0.002
Good	89 (77.4)	26 (22.6)		-	-		3 (2.6)	112 (97.4)	
Poor	31 (12.9)	209 (87.1)		-	-		29 (12.1)	211 (87.9)	
User						< 0.001			< 0.006
Good	-	-		89 (74.2)	31 (25.8)		4 (3.3)	116 (96.7)	
Poor	-	-		26 (11.1)	209 (88.9)		28 (11.9)	207 (88.1)	

## 4. Discussion

This cross-sectional study found that only one-third of people buying of unprescribed acetaminophen in Conakry pharmacies were “good users” and less than half had good knowledge about acetaminophen dosing and potential adverse effects. One respondent in ten had a potential risk of overdosing.

Participants’ main reason for self-medicating with acetaminophen was headache. This finding is consistent with results of a study elsewhere in West Africa [1]. Given that headache is one of the first signs of many tropical diseases [16, 17], routine self-medication could lead to delayed diagnosis of these diseases. Doliprane® and Efferalgan® were the acetaminophen-containing specialties most known by the respondents. This could be explained by the fact that these two drugs are abundantly advertised on Guinean television channels and are the most widely sold drugs Conakry in the pharmacies.

Most respondents knew the maximum unit dosage, but only about 2 out of 10 knew the maximum daily dosage and only one person in ten had any idea of the risk of liver toxicity. A substantial proportion were unaware of the risk of death associated with overdosing. These knowledge deficits increase the risks of self-medication. Because acetaminophen a well-known analgesic and antipyretic, it is considered to be safe when administered within its therapeutic range, but hepatotoxicity can occur in cases of acute intoxication [18]. After a therapeutic dose, Acetaminophen is mostly converted to pharmacologically inactive glucuronide and sulfate conjugates, with a minor fraction being oxidized to a reactive metabolite N-acetyl-para-benzoquinoneimine, which is highly reactive and is primarily responsible for

Acetaminophen-induced hepatotoxicity [19]. Hepatotoxicity can be exacerbated hepatitis B virus infection, which is highly prevalent in Guinea, even greater than 10% in some populations [20].

Unfortunately, although the majority (70%) of participants with children used the syrup form with a measuring system, few were aware that the dosage in children was based on the child's weight. This could lead to cases of overdosing or unintentional underdosing.

Women had a better score for use and knowledge of acetaminophen. A study in France also found that women, people with children and those with validated sources of information (doctors, pharmacists or drug leaflets) were more knowledgeable about acetaminophen [15]. Good knowledge of acetaminophen would promote good use of it and would be linked to the source of information on acetaminophen.

We also found that the sources of information on non-pharmacy purchases are related to knowledge about acetaminophen. Not surprisingly, people with poor knowledge and poor users were more likely to be at risk of unintentional overdose.

To our knowledge, this study is the first to assess acetaminophen use patterns in Guinea. It is one of the first studies to assess the extent of self-medication with Acetaminophen in a country where the pharmaceutical sector is weakly regulated. However, may have some limitations. The study did not include all pharmacies in Conakry. In addition, the study only included the population that purchased their medicines from a licensed pharmacy. Many other people who buy Acetaminophen in the illicit market were not included. A study on this population could also be very useful for a better understanding of this problem. Finally, data were collected by self-administration of the questionnaire. This could lead to some reporting bias.

Despite these limitations, the study provides data that are useful for Guinean public health.

## 5. Conclusion

In conclusion, the results of this study revealed a high proportion of acetaminophen misusers, including people at risk of potentially overdosing. Despite its long-standing common use and widely available information on dose-related hepatic, and renal toxicities, respondents were largely unfamiliar with correct dosing and the risks of misuse. Physicians and pharmacists thus need to be reminded of the importance of reinforcing safe acetaminophen use of and of encouraging patients to seek their advice before taking medicine for any reason. More in-depth further studies with a larger number of participants, not only in private pharmacies but also in households in the city of Conakry, will be relevant to measure the prevalence of self-medication use of acetaminophen and other OTC medicines in order to prevent overdoses and other adverse effects.

## Declaration of Interest

The authors declare that they have no competing interests.

## Authors' Contributions

AT, KJJOK, LF, AD and AC designed the research; LF, STB, SCB and AFT collected data; AT, KJJOK, LF and AC performed the statistical analysis; AT, KJJOK, LF, NNL, AKK, AD and AC wrote the paper; and all authors read and approved the final manuscript.

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