Special report

The private market for antimicrobials: an exploration of two selected mining and frontier areas of Guyana

Horace Cox[1], Friederike Roeder[2], Lucy Okell[3], Reza Niles-Robin[4], Kashana James[4], Olivia Valz[4], Katharina Hauck[3], and Elisa Sicuri[2]

ABSTRACT

Objective. To identify challenges that may raise pathogens' resistance to antimicrobial drugs by exploring the private market for antimicrobials in two selected mining and frontier areas of Guyana.

Methods. The private sector supply was mapped by approaching all authorized pharmacies and informal outlets, e.g., street vendors and grocery stores, around the two selected towns. Interviews were conducted with a) sellers on the availability of drugs, expiration dates, prices, and main producers; and b) customers on purchased drugs, diagnoses, and prescriptions received before purchasing drugs, and intention to complete the treatment. The information collected was described, and the determinants of the self-reported intention of customers to complete the whole treatment were identified.

Results. From the perspective of the supply of antimicrobials, essential medicines faced low and insecure availability, and prescriptions frequently deviated from diagnoses. From the perspective of the demand for antimicrobials, one-third of purchased antibiotics had a high potential for antimicrobial resistance as per the World Health Organization AWaRe classification. A high price reduced the self-reported intention to complete the treatment among those who had a prescription, while buying the medication in a licensed pharmacy increased such intention.

Conclusions. In Guyana, there persists a need to establish and revise policies addressing both supply and demand, such as restricting the sale of antimicrobials to licensed pharmacies and upon prescription, improving prescription practices while reducing the financial burden to patients, guaranteeing access to first-line treatment drugs, and instructing patients on appropriate use of antimicrobials. Revising such policies is an essential step to contain antimicrobial resistance in the analyzed areas and across Guyana.

Keywords Drug resistance, microbial; drugs, essential; prescription drug misuse; health policy; Guyana.

Antimicrobial resistance (AMR) is a major global health threat that requires the utmost attention of researchers and policymakers. A wide range of factors on both the supply and demand side for medications contributes to AMR. Supply-side factors encompass ineffective infection prevention and control, lack of regulation on the supply and administration of antimicrobials including the absence of good prescription practices, low-quality drugs, lack of accurate diagnostic tools to differentiate parasitic, bacterial, and viral infections, as well as insufficient research and development into new generations of drugs (1–4). Demand-side factors include barriers to accessing high-quality and affordable medicines, the inappropriate use of drugs, and poor adherence to prescriptions such as interrupting the treatment course (1, 4).

Challenges to tackling AMR vary globally. In high-income countries, hurdles mostly include antibiotic misuse, lack of antibiotic stewardship, and ineffective infection prevention and control practices (5). Meanwhile, low- and middle-income

[1] Caribbean Public Health Agency, Port of Spain, Trinidad and Tobago
[2] ISGlobal, Barcelona, Spain ✉ Elisa Sicuri, elisa.sicuri@isglobal.org
[3] Imperial College London, London, United Kingdom
[4] Ministry of Health Guyana, Georgetown, Guyana

countries (LMICs) additionally struggle to access affordable high-quality drugs in a context where the morbidity and mortality burden associated with infectious diseases is still substantial and includes infections caused by a wide range of pathogens (6). Consequently, LMICs are also at risk of resistance to antimalarial and antiretroviral medicines (7, 8). Related to this, the correct management of different infections in LMICs is often impeded by the lack of highly performing diagnostic tools, including point-of-care tests that are easy to use also in rural and remote areas. This hinders discerning between causes of infections and prescribing the appropriate treatment, with apparent consequences on AMR (3). Common to high-income countries and LMICs, although enormously more pronounced for infections specific to the latter, is the insufficient research and development into new generations of antimicrobial drugs (9).

This report is on an exploratory study conducted in two frontier and mining areas in Guyana. In the country, infectious diseases contributed to about 10% of all disability-adjusted life years (DALYs) in 2019 (10), exceeding the average of 8% across all Caribbean and South American countries. The main driver of this difference is HIV/AIDS, followed by lymphatic filariasis, malaria, and tuberculosis. Recent estimates suggest that Guyana is among the countries in the Americas with the highest age-standardized mortality rate associated with AMR (11).

Few previous studies described threats to antimicrobial efficacy in the country. Between 2005 and 2010, antimalarial medicines were sampled as part of a study covering both Guyana and Suriname (12). Findings included the identification of numerous substandard drugs, particularly in the private (including informal) sector and in mining areas (12). Also, elevated use of antibiotics in pediatric patients in Guyana's capital compared to World Health Organization (WHO) standards was reported (13). As identified in 2010, the main barriers to accessing quality essential drugs in Guyana include a lack of regulation in the pricing policy of medicines, inadequate health surveillance, and inefficient supply systems (14). Further, various shortcomings emerged in the 2022 Tracking AMR Country Self-Assessment Survey (TrACSS) (15). Guyana's capacities in training, stewardship, and surveillance to contain AMR were reported to be well below the global average. However, there is little recent evidence on the AMR situation in terms of the availability of medicines and consumption behavior, particularly in the private sector.

This study was conducted in Port Kaituma (Region 1), bordering the Bolivarian Republic of Venezuela, and Mahdia (Region 8), bordering Brazil. The context of this study is relevant for several reasons. Multiple factors in mining and frontier areas of Guyana might differ compared to the capital city and have not been studied extensively. From the demand perspective, factors may include a lower willingness to pay for drugs due to lower average wages. From the supply perspective, the availability of high-quality drugs may be limited due to the high costs of reaching such remote areas. The private sector is the alternative for patients who cannot access the public health system. For example, the private sector may act as a substitute in rural areas with limited public health provision and for (undocumented) migrants. While several strategies to contain AMR are in place in the public sector, the private market for antimicrobials is barely regulated, and drugs are mainly sold over the counter. This particularly applies to frontier, remote, and mining areas.

Lastly, the study areas are located in Essequibo, a large territory historically contested by Venezuela. The claim has been reinforced by a recent referendum in Venezuela, possibly leading to a complicated geopolitical situation that might impact antimicrobial provision and worsen the management of AMR.

Indeed, evidence of AMR in country-border regions is growing. Reasons include migrants' limited access to healthcare resources and challenges faced by healthcare systems in reaching border regions (16–18). In general, the incidence of infectious diseases in mining areas tends to be high. For example, there is recent evidence of increased malaria transmission across the borders between Brazil, Guyana, and Venezuela (19, 20). Notably, C580Y mutations, markers of antimalarial resistance, specifically artemisinin resistance, were detected in mining areas of Guyana, including Port Kaituma (21).

The objective of this study is to describe the supply and demand for antimicrobial drugs in the two selected areas of Guyana and to analyze factors determining patients' intention to complete their antimicrobial treatment in the private sector. This will allow identification of challenges that may raise pathogens' resistance to antimicrobial drugs.

MATERIALS AND METHODS

The data were collected between October and November 2020 around the towns of Port Kaituma (Region 1), bordering Venezuela, and Mahdia (Region 8), bordering Brazil. According to the most recent census report from 2012, Region 1 and Region 8 have populations of about 27 000 and 10 900, respectively, out of Guyana's total population of 723 300. Specifically, Port Kaituma has 1 150 inhabitants and Mahdia has 2 560. Both towns are situated in the hinterland of Guyana and are accessed from the country's capital either after several hours of overland travel or by small planes landing on narrow airstrips. They have significant poverty rates, with mining activities being a primary source of income. Given these circumstances, the study can be classified as an "extreme case study" (22), indicating that the context may deviate to some extent from much of Guyana's territory.

We mapped the private sector supply by approaching all authorized pharmacies and informal outlets, for example, street vendors and grocery stores, around the two selected towns. Sellers were surveyed on medicine availability, expiration dates, prices, and main producers, upon written consent.

From the demand perspective, we produced a convenience sample of customers who had just purchased antimicrobial drugs from private sellers and interviewed them, upon written consent. The survey was conducted on different days of the week and at different times of the day to include consumers with varying schedules and occupations. Questions covered diagnosis, prescription, drugs purchased, pricing together with its perceived fairness, and intent to complete treatment.

The determinants of the reported intention to complete the treatment were identified using a logistic regression model (additional information on methodology and descriptive statistics are available from the corresponding author). The main covariates included possessing a prescription and having paid a price above the median. Further, an interaction between the two factors was included, under the hypothesis that a prescription may imply a higher price. Buying only antibiotics and buying the medication at a pharmacy, as opposed to informal outlets,

were also added as covariates, hypothesizing that this might influence the intention to complete treatment.

The study protocol obtained approval from the Institutional Review Board of the Ministry of Public Health of Guyana (IRB Approval of New Protocol #648/2019) and the Imperial College Research Ethics Committee (ICREC reference 19IC5592).

RESULTS

Supply perspective

We interviewed 11 personnel (4 in Port Kaituma and 7 in Mahdia) from 10 drug selling points. Of the 11 personnel, 5 were employees of four pharmacies (including 3 pharmacists, 1 doctor, and 1 employee with incomplete training in health), and 6 were employees of different shops such as supermarkets. Two of the six had incomplete training in health. The employees of at least nine other identified selling points were unable to participate in the study.

Availability. All five personnel of the pharmacies and three sellers of the shops reported usually stocking antibiotics. However, only six selling points had antibiotics in stock on the day of the survey, on average 29.8 packs. All providers of antibiotics except one pharmacist reported that at least one type of antibiotic had gone out of stock over the past seven days. Ampicillin was in stock in four pharmacies and one store; azithromycin was available in one pharmacy; and ciprofloxacin in one store and one pharmacy. Among the three antibiotics available, ampicillin was the only one with low resistance potential according to the WHO AwaRe classification (23).

Similarly, all five employees of pharmacies and most of the other sellers (5/6) said they usually stocked antimalarial drugs. All five pharmacies and two shops had at least one antimalarial in stock (artemether/lumefantrine, hydroxychloroquine, dihydroartemisinin, mefloquine), 19.1 packs on average, on the day of the survey. Most providers (n = 9) reported that at least one antimalarial had gone out of stock at some point within the past seven days. Many of the sellers at pharmacies (n = 4) reported usually having other medications in stock that were not available on the day of the interview, such as artemisinin-based combination therapies (ACTs), primaquine, and chloroquine.

Nobody reported selling antiretroviral drugs.

Shelf life. None of the drugs viewed were expired at the time of the interview, with 18% expiring in the following 4–5 months and the rest within the following two years.

Country of origin. Across all selling points, 15 different brands of antimalarial and 10 different brands of antibiotic drugs were examined. Among the antimalarials, five were produced in Guyana, five in India, four in China, and one in Cyprus. Most antibiotics were imported from India (8/10), and from the remaining two, one originated from China and the other from the United Kingdom.

Compliance with guidelines. Respondents answered that when selling drugs, they follow the customer's request (73%; 8/11), consider recommendations of the local health personnel (36%; 4/11), and/or comply with the recommendations of the Ministry of Health (18%; 2/11). Compared to shop sellers, pharmacy employees were more likely to follow official recommendations and less likely to follow the customers' requests.

Demand perspective

Of the 119 customers who participated in the study, 59 were in Port Kaituma and 60 in Mahdia. Across both areas, the sample was balanced in sex, ethnicity, and age. Thirty-six participants purchased drugs at a supermarket or other informal store, and 83 at a pharmacy. There was an overlap of five selling points between the supply and demand surveys, with 71% (85/119) of the sample being customers of any of these five selling points, and 29% (34/119) being customers at nine other selling points not included in the supply mapping. Drugs were bought for the participants themselves or for a relative or friend. Among the participants, 64% (76/119) bought antibiotics, 28% (33/119) antimalarials, 6% (7/119) both antibiotics and antimalarials, and 3% (4/119) purchased antiretroviral medications.

Availability and drugs sought. Two customers (2%; 2/119) encountered drug shortages at their intended point of purchase, while 16 customers (13%; 16/119) reported having unsuccessfully searched for drugs elsewhere before going to the outlet where they were interviewed. Also, 48 respondents (40%; 48/119) preferred the private sector over queuing at the pharmacies of public health facilities.

Most customers (70%; 83/119) bought at least one antibiotic. Of these, 92% (76/83) bought antibiotics only, with 66% (55/83) purchasing just one type of antibiotic, leaving 25% (21/83) buying combinations of antibiotics and 8% (7/83) buying both antibiotics and antimalarials. Three types of antibiotics were bought more frequently: 38 interviewees purchased ampicillin (37%; 38/103), 23 ciprofloxacin (22%; 23/103), and 8 amoxicillin (8%; 8/103). Ciprofloxacin and ampicillin were often bought with other antibiotics such as azithromycin and doxycycline. Considering that some customers bought more than one type of antibiotic, the total number of antibiotics purchases was 103. As defined by WHO, 63% (65/103) of all antibiotics purchased are included in the AWaRe "access group," and 37% (38/103) in the "watch group" (Table 1). Access group drugs were prescribed in 23% (15/65) and watch group drugs in 34% (13/38) of cases. Ethionamide, bought by one client upon prescription, is not AWaRe-classified but is included in the WHO list of essential medicines (24).

Thirty-nine (33%; 39/119) customers bought antimalarial medicines. Among those, ACTs were purchased 25 times (64%; 25/39), but only in seven cases (18%; 7/39) in combination with primaquine (Table 1). Primaquine and chloroquine were bought individually by five customers (13%; 5/39). Quinine was purchased by three customers (8%; 3/39), and one of them also bought chloroquine and an antibiotic.

Antiretrovirals were bought by four customers (3%; 4/119). Two customers purchased zidovudine, whose use is recommended in combination with other antiretrovirals and which is listed as an essential drug. Two customers did not specify the kind of antiretroviral bought. One customer bought the medication in combination with an antibiotic.

Diagnosis and prescription patterns. Of the respondents, 37% (44/119) had received a diagnosis and 33% (39/119) had a prescription from health personnel before buying medications (Table 2). The prescription rate was lowest for antibiotic and antimalarial drugs (29%; 22/76, and 31%; 10/32) and highest for antiretroviral medication (75%; 3/4). Further, among all patients with a prescription, 30% (12/39) were prescribed a medication potentially not in line with the diagnosis received

TABLE 1. Antibiotics (by AWaRe classification) and antimalarials bought

Class of medication bought	%	n/N
"Access" group antibiotics bought		
Ampicillin	37%	38/103
Amoxicillin	8%	8/103
Amoxicillin/clavulanic acid	4%	4/103
Metronidazole	7%	7/103
Sulfamethoxazole/trimethoprim	4%	4/103
Doxycycline	4%	4/103
Total	63%	65/103
"Watch" group antibiotics bought		
Ciprofloxacin	22%	23/103
Azithromycin	7%	7/103
Erythromycin	6%	6/103
Levofloxacin	2%	2/103
Total	37%	38/103
Antimalarials bought		
Artemether/lumefantrine	50%	16/32
Artemether/lumefantrine, primaquine	22%	7/32
Chloroquine	9%	3/32
Dihydroartemisinin/piperaquine	6%	2/32
Primaquine	6%	2/32
Quinine	3%	1/32
Quinine, chloroquine	3%	1/32
Total	100%	32
Combinations of antibiotics and antimalarials bought		
Artemether/lumefantrine, ampicillin	29%	2/7
Artemether/lumefantrine, primaquine, amoxicillin	14%	1/7
Artemether/lumefantrine, ampicillin, primaquine	14%	1/7
Primaquine, chloroquine, ciprofloxacin	14%	1/7
Sulfamethoxazole/trimethoprim, chloroquine, metronidazole	14%	1/7
Sulfamethoxazole/trimethoprim, quinine	14%	1/7
Total	100%	7

Note: "*N*" stands for the subgroups of antibiotics and antimalarials, while "*n*" represents the number of purchases of each specific drug (combination). *N* = 103 is the total number of antibiotics purchases, while *N* = 32 is the total number of antimalarials purchases. *N* = 7 is the number of customers who bought both antibiotics and antimalarials.
Source: Prepared by the authors based on the study data.

TABLE 2. Demand side characteristics

Characteristic	%	n/N
Diagnosis received	37%	44/119
Prescription rate		
All medications	33%	39/119
Prescription rate, by class of drug		
Only antibiotics	29%	22/76
Only antimalarials	31%	10/32
Antibiotics and antimalarials	57%	4/7
Antiretrovirals	75%	3/4
Intention to complete treatment	75%	89/119
Intention to complete treatment, by prescription		
No prescription	81%	65/80
Prescription	62%	24/39
Intention to complete treatment, by price paid		
Price above median	69%	40/58
Price below median	80%	49/61
Intention to complete treatment, by class of drug		
Antibiotics only	71%	54/76
Other drugs and combinations thereof	81%	35/43

Note: Percentages were calculated either for the whole sample or for different subsamples, with "*N*" guiding the identification of these samples and "*n*" quantifying the observations of interest.
Source: Prepared by the authors based on the study data.

Intention to complete the treatment. Overall, 75% (89/119) of the customers said that they or the person they bought the drugs for would complete the whole course of treatment (Table 2). This proportion was lower among those with a prescription (62%; 24/39) than among those without (81%; 65/80), and lower for customers who incurred a cost above the median (69%; 40/58) compared to those who incurred a cost below the median (80%; 49/61). The reported uptake was lower among customers who only bought antibiotics (71%; 54/76) than among those who also bought other drugs or combinations of both (81%; 35/43).

Table 4 presents the results of the logistic regression model. Significant odds ratios (OR) suggest that among customers who had a prescription and paid a high price, the odds of completing the treatment were reduced by 0.031 ($p = 0.003$). Also, consumers of antibiotics only were less likely to report the intent to complete the treatment (OR = 0.317; $p = 0.091$), while the opposite was true for those who bought their medication at a pharmacy (OR = 4.885; $p = 0.002$).

DISCUSSION

This exploratory study highlights key challenges to AMR containment in the private market for antimicrobial drugs in two mining and frontier areas of Guyana.

From the supply perspective, the availability of essential antimicrobials seemed not secure, with frequent stockouts and patients resorting to multiple outlets. While partly attributable to the COVID-19 pandemic, we cannot disregard the existence of more structural drug supply challenges. There is an opportunity for the public and private sectors to collaborate to ensure the provision of essential drugs: the experience accumulated in the more regulated public sector should be transferred to the private sector. This includes tools for monitoring stock levels and organizing procurement, as well as the required training for human resources.

(Table 3); for example, one patient diagnosed with dengue, three with influenza, and three with malaria each received a prescription for antibiotics.

Affordability. The median price spent on any type of medication was USD 11.95. The median price of antibiotics was USD 5.74, while the median prices of antimalarial and antiretroviral drugs were about four times higher (USD 19.12 and USD 21.51, respectively; see also Figure 1). The median consumer who bought both antibiotic and antimalarial drugs spent USD 23.90. The median price paid for prescribed medications was USD 16.73, compared to USD 11.47 for medications without prescription.

Further, four customers stated they were not carrying enough money to pay for the whole dosage. One planned to search for cheaper drugs elsewhere, while six had previously visited more expensive outlets. Overall, the price paid was perceived as unfair by 59% (70/119) of the interviewees.

TABLE 3. Symptoms reported and medications prescribed, by diagnosis

	No diagnosis	Dengue	Influenza	Malaria	Respiratory infection[a]	Other bacterial[b]	Other[c]
Reported symptoms							
Fever	4	0	1	1	2	2	5
Cough	0	0	2	3	1	0	2
Diarrhea	1	1	1	3	0	1	3
Stomachache	1	0	0	1	3	0	1
Vomiting	1	0	1	7	0	0	1
Dizziness	0	0	1	7	2	1	4
Other	1	0	0	3	1	1	4
No answer	0	0	1	1	0	0	1
Medications prescribed							
Only antibiotics	0	**1**	**3**	**1**	5	4	8
Only antimalarials	0	0	0	10	0	0	0
Antibiotics and antimalarials	**2**	0	0	**2**	0	0	0
Antiretrovirals	**2**	0	0	**1**	0	0	0
Number of patients	4	1	3	14	5	4	8

Notes: The table only includes patients who received a prescription. Bold font indicates prescriptions that potentially do not match the diagnosis. Multiple symptoms per individual are possible.
[a] Respiratory infections, including bronchitis, pneumonia; [b] Other bacterial infections, including urinary tract infections, gum infections, tuberculosis; [c] Other, including diarrhea, sinusitis, sexually transmitted infections, gallstones.
Source: Prepared by the authors based on the study data.

FIGURE 1. Distribution of price paid, by class of medication
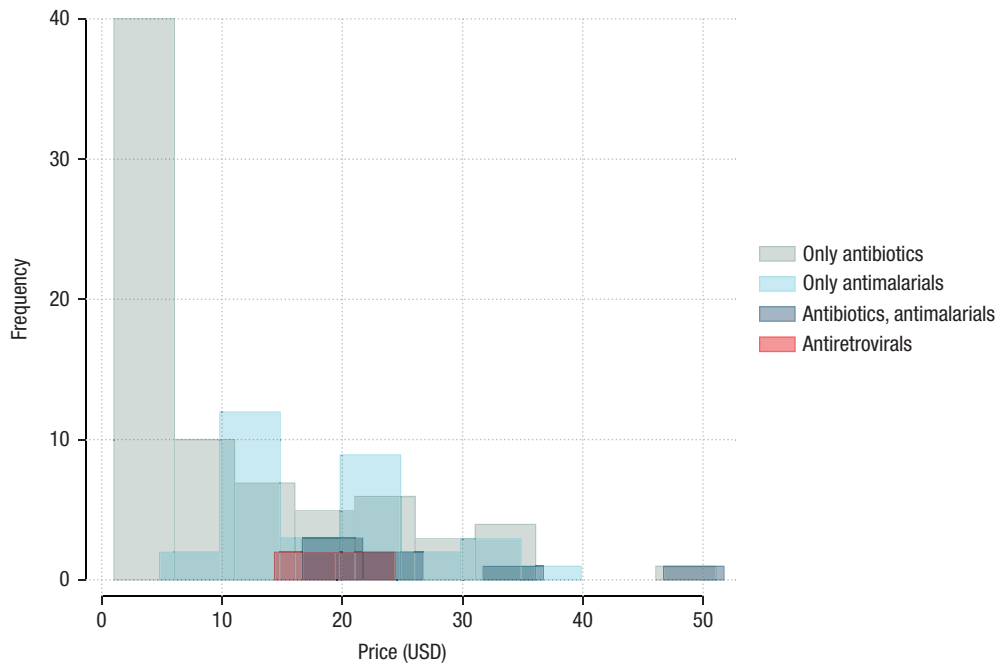
Source: Prepared by the authors based on the study data.

There persists a lack of surveillance of the quality of antimicrobial drugs in Guyana, as suggested in the 2022 WHO TrACSS report (15). Existing surveillance should be extended following a framework laid out by the Caribbean Public Health Agency (CARPHA) (25).

From the demand perspective, there is a concerning significant association between paying more than the median price and not intending to complete the treatment among those who received a prescription. One explanation could be that those with a prescription incurred higher costs and were discouraged from completing the treatment. It is possible that these patients saved part of the medication for future needs. In general, and not linked to having a prescription, the negative effect of prices on adherence to antimicrobial treatment has been documented before (26, 27). However, to our knowledge, no previous studies have found that a high price acts as a barrier to treatment adherence among patients who have a prescription.

TABLE 4. Predictors of reporting the intention to complete treatment

Variable	OR	95% CI
Prescription	2.833	0.496, 16.190
Price above median	1.182	0.313, 4.471
Prescription x Price above median	0.031**	0.003, 0.316
Only antibiotics	0.317*	0.084, 1.202
Pharmacy	4.885**	1.765, 13.520
N	119	

OR: odds ratio, calculated using a logistic regression model; CI: confidence interval; *$p < 0.1$ **$p < 0.01$.
Note: Explanation of dummy variables: Prescription: client with prescription (=1) or without (=0). Price above the median (in USD): client paid a price above (=1) vs. below (=0) the median of the sample. Prescription x Price above median: interaction of these two variables. Only antibiotics: clients who bought only antibiotics (=1) vs. other drugs or combinations of both (=0). Pharmacy: clients who purchased drugs at a pharmacy (=1) vs. at a store (=0).
Source: Prepared by the authors based on the study data.

Also, the drugs are not affordable, considering that the median monthly salary of a worker in this setting is USD 800, which potentially represents a large share of a family's income. If obtaining drugs upon prescription and paying a high price is a barrier to completing the treatment, a strategy to reduce costs could be the introduction of generic drugs to the market and consideration in prescriptions (28). However, despite the announcement by Guyana's pharmaceutical regulators to import generic drugs in 2017, the average price at the time of the survey was still high relative to the median salary of a worker. Another strategy to reduce prices is removing (importation) taxes (29).

If a reduction in price is possible, the monitoring of drug consumption should be improved. As patients might access antimicrobial drugs more easily, stricter regulations should be put in place, while assuring availability and high quality. Possible regulations include 1) selling antimicrobial drugs only upon prescription, and 2) selling antimicrobial drugs only at licensed pharmacies. Additionally, a nonfinancial measure to reduce costs to patients would be to update guidelines regarding the length of treatment. Recent studies suggest that the treatment course of specific antibiotics and antimalarials can be shorter than previously thought (30–32). Importantly, this could also improve treatment adherence, as a reduced medication course is likely less expensive and may imply a shorter duration of side effects (33).

We found a positive effect of buying the medication in pharmacies on the reported intent to complete the treatment. Clients of pharmacies might initially be more inclined to adhere to the treatment due to potentially higher education level and higher ability to pay. However, consumers of antibiotics only were less likely to report completing the whole treatment. This is not necessarily reflected in the literature (34), possibly because most studies focus on antibiotics only. Further, the responses suggest that patients have to rely on the private market, as the public healthcare system cannot sufficiently or efficiently supply them with medications. Strengthening the supply of medicines in the public health system could have several advantages: the quality of the drugs could be centrally monitored, patients' out-of-pocket expenditure might decrease, and patients could be educated on the correct use of the medicines.

In accordance with numerous reports, we found that many patients received prescriptions potentially misaligned with their diagnosis (4, 35). This highlights the need for improved implementation of antimicrobial stewardship at all levels of the healthcare system. Also, the data show inconsistencies in the treatment bought. Potential wrong combinations occurred mostly with antimalarial drugs: ACTs were frequently purchased without primaquine. In the case of HIV, two patients bought the drug zidovudine on its own, although it should be consumed in combination with other antiretrovirals. However, it cannot be ruled out that the purchasers already possessed the additional antiretrovirals. Antibiotics were often purchased inappropriately given the diagnosis. This is likely a reflection of a lack of knowledge on the patient's side and insufficient educational programs on the seller's side.

Most of the antibiotics bought were broad-spectrum antibiotics that show lower resistance potential and belong to the AWaRe access group. However, 37% of antibiotics purchased are listed in the watch group reserved for specific infections (23).

This study has several limitations, partly given its exploratory nature. Beyond those mentioned above, limitations include the representativity of the sample. On the supply side, sellers might hesitate to reveal all medicines available. This is reflected by the fact that consumers reported having bought a larger variety of drugs than what the stores reported selling. On the demand side, respondents might have provided socially desirable responses rather than accurate ones.

The two locations explored in this study are not representative of the whole country; they are rather an extreme case due to their location in the country's hinterland and proximity to complex international borders and a vast mining territory. However, the features of the private market for antimicrobials that we encountered seem not to be specific to these areas and may be present elsewhere, particularly outside the capital city.

In conclusion, policies should address both demand and supply perspectives by restricting the sale of antimicrobial drugs to licensed pharmacies and to selling upon prescription only, while improving the access and affordability of medicines, improving prescription practices, and educating patients on the correct use of the drugs. Further studies are needed to understand the private market's role in AMR and the effectiveness of various policies in mitigating this issue.

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El mercado privado de los antimicrobianos: examen exploratorio en dos zonas mineras y fronterizas seleccionadas de Guyana

RESUMEN

Objetivo. Determinar los elementos que pueden aumentar la resistencia de los agentes patógenos a los medicamentos antimicrobianos mediante el examen del mercado privado de estos medicamentos en dos zonas mineras y fronterizas seleccionadas de Guyana.

Métodos. Se elaboró un mapa de los suministros para el sector privado mediante una consulta a la totalidad de las farmacias autorizadas y a puntos de venta informales como vendedores ambulantes y tiendas de comestibles, en las dos ciudades seleccionadas. Se realizaron entrevistas con a) los vendedores (sobre la disponibilidad de medicamentos, fechas de caducidad, precios y fabricantes principales); y b) los clientes (sobre los medicamentos que habían comprado, los diagnósticos y las recetas que se les habían proporcionado antes de comprar los medicamentos, y sobre su intención de completar el tratamiento). Se describió la información recopilada y se determinaron los factores determinantes de la intención de completar el tratamiento manifestada por los clientes.

Resultados. Desde el punto de vista de la oferta de antimicrobianos, la disponibilidad de medicamentos esenciales era escasa y no estaba garantizada y las prescripciones se apartaban con frecuencia de lo requerido por los diagnósticos. Desde el punto de vista de la demanda de antimicrobianos, un tercio de los antibióticos comercializados tenía un potencial alto de resistencia a los antimicrobianos según la clasificación AWaRe de la Organización Mundial de la Salud. Un precio elevado comportaba una reducción en la intención de completar el tratamiento, según lo manifestado por los pacientes que disponían de una receta, mientras que la compra del medicamento en una farmacia autorizada aumentaba esta intención.

Conclusiones. En Guyana persiste la necesidad de implantar y actualizar una serie de políticas que aborden tanto la oferta como la demanda. Entre ellas se encuentran las de limitar la venta de antimicrobianos únicamente a las farmacias autorizadas y con receta médica, mejorar las prácticas de prescripción, y a la vez reducir la carga económica que suponen para los pacientes, garantizar el acceso a los medicamentos de primera línea, e instruir a los pacientes sobre el uso adecuado de los antimicrobianos. La actualización de estas políticas es un paso esencial para contener la resistencia a los antimicrobianos en las zonas analizadas y en toda Guyana.

Palabras clave Farmacorresistencia microbiana; medicamentos esenciales; mal uso de medicamentos de venta con receta; política de salud; Guyana.

Mercado privado de antimicrobianos: exploração de duas áreas de mineração e de fronteira na Guiana

RESUMO

Objetivo. Explorar o mercado privado de medicamentos antimicrobianos em duas áreas de mineração e de fronteira na Guiana para identificar os desafios que podem aumentar a resistência dos patógenos aos antimicrobianos.

Métodos. Foram abordadas todas as farmácias autorizadas e pontos de venda informais, como vendedores ambulantes e mercearias, nas duas cidades selecionadas a fim de mapear a oferta do setor privado. Foram realizadas entrevistas com: a) vendedores (sobre disponibilidade, datas de validade, preços e principais produtores dos medicamentos); e b) clientes (sobre medicamentos comprados, diagnósticos, prescrições recebidas antes da compra dos medicamentos e a intenção de concluir o tratamento). As informações coletadas foram descritas e identificaram-se os determinantes da intenção declarada pelos clientes de concluir todo o tratamento.

Resultados. Do ponto de vista da oferta de antimicrobianos, medicamentos essenciais tinham disponibilidade baixa e incerta, e as prescrições frequentemente divergiam dos diagnósticos. Com relação à demanda por antimicrobianos, um terço dos antibióticos comprados tinha alto potencial de resistência a antimicrobianos de acordo com a classificação AWaRe da Organização Mundial da Saúde. Preços elevados reduziam a intenção declarada de concluir o tratamento entre as pessoas que tinham prescrição, e a compra do medicamento em farmácias licenciadas aumentava essa intenção.

Conclusões. Na Guiana, persiste a necessidade de estabelecer e revisar políticas que abordem tanto a oferta quanto a demanda, como: restringir a venda de antimicrobianos a farmácias licenciadas e mediante prescrição; melhorar as práticas de prescrição e, ao mesmo tempo, reduzir a carga financeira dos pacientes; garantir o acesso a medicamentos de primeira linha; e orientar os pacientes sobre o uso adequado de antimicrobianos. Revisar essas políticas é uma etapa essencial para conter a resistência a antimicrobianos nas áreas analisadas e no país inteiro.

Palavras-chave Resistência microbiana a medicamentos; medicamentos essenciais; uso indevido de medicamentos sob prescrição; política de saúde; Guiana.