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ORIGINAL ARTICLE

Pharmaceutical Promotions and Compliance with Community-Acquired Pneumonia Prescribing Guidelines by General Practitioners in Mbarara

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ABSTRACT

Background: Generic prescribing effectively reduces dispensing errors and promotes the availability, access and quality of pharmaceutical products in health facilities or pharmacies. However, in Uganda, non-compliance with treatment guidelines is prevalent, with evidence of some General Practitioners (GPs) prescribing non-essential and obsolete drugs. This study examines the role of pharmaceutical promotions in creating awareness of new medicines among GPs and the potential influence of these promotions on prescribing practices.

Methods: The study used a qualitative phenomenological research design. Key informant interviews were conducted with 33 experienced GPs from nine hospitals in Mbarara City, Uganda. The transcribed interviews were analysed using content analysis.

Results: Most GPs were male (78.79%), aged between 41-50 years (30.30%), with a work experience of 6-10 years (39.39%). All GPs had at least been exposed to pharmaceutical promotions such as free samples, visits from medical representatives, and Continuing Medical Education sessions. Most GPs had a positive outlook on these promotions, which they believed were informative, educational, and beneficial. However, the more GPs depend on pharmaceutical promotions, the less likely they are to follow the national or international guidelines for generic prescribing.

Conclusion: The study highlights the importance of ethical pharmaceutical promotion and the need for strict regulation by the National Drug Authority (NDA) to ensure that promotional activities do not compromise patient care and public health outcomes. The study recommends that GPs be more critical of the information and incentives provided during such promotions and should be trained in rational prescribing and evidence-based medicine.

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INTRODUCTION

Prescribing guidelines are crucial recommendations based on evidence-based data and clinical experience designed to guide General Health Practitioners (GPs) on the appropriate use of medicines for specific conditions.[1] Prescribing guidelines are often developed by national or international authorities or professional associations to improve the quality and safety of prescribing nations.[2] These guidelines aim to reduce the risk of adverse drug reactions, drug interactions, and antimicrobial resistance by promoting rational and cost-effective medicine use.[3,4,5] The World Health Organization (WHO) explicitly recommends using generic names and selection from the essential medicines list to be 100% for each country.[6] All GPs must use generic names while prescribing and refer to country-specific National Treatment Guidelines (NTGs) to make treatment decisions.[7] As per the World Health Organization (WHO) guidelines, limiting the number of drugs prescribed per patient encounter to a maximum of three is recommended.[6] Additionally, it is advisable to prescribe antibiotics in no more than 30% of patient encounters to minimize the risk of antibiotic resistance.[6]

Despite the importance of prescribing guidelines, over half of all medicines are prescribed and dispensed inappropriately globally,[8] as many GPs do not comply with generic prescriptions.[9] This non-compliance can be attributed to various factors, including temporary shortages, massive price spikes in the generic drug markets, lack of necessary facilities, and competency to assure therapeutic equivalence of different brand-name medicines, especially among GPs in low-resource settings.[10,11,12] Other studies cite the lack of necessary facilities and the competency to assure therapeutic equivalence of different brand-name medicines, especially among GPs in low-resource settings. [13,14] Consequently, multi-drug prescribing and overprescribing contribute to irrationality and misuse of drugs, especially among patients in developing nations.[15] Additionally, non-compliance with prescribing guidelines is a significant cause of preventable mortality and economic burden on low-resource countries.[16] Also, inappropriately prescribed drugs result in drug toxicities and are responsible for more than 50% of wastage in expenditures on essential medicines.[13]

Studies in Ghana, Nigeria, South Africa, Kenya, and Botswana, among others, reveal that 40% of GPs show non-compliance to treatment guidelines at primary healthcare centres, which has mostly stayed the same over two decades.[6,10] The Ugandan situation is particularly concerning, as most prescribers never comply with the Uganda national treatment guidelines, yet others recommend drugs already declared obsolete in other countries.[17,18,19] This usage of obsolete drugs and inconsistent prescribing practices can lead to serious health consequences and contribute to the development of drug-resistant strains of diseases.[18,20] Besides, it took approximately four years for Uganda Clinical Guidelines (UCG) (2016 to 2020) to make an updated

version of the prescribing guidelines available, which is longer than recommended by WHO.

According to a few studies, pharmaceutical promotions are essential in informing general practitioners (GPs) about new drugs.[21,22,23] However, despite this, only a few studies have reported on the extent to which GPs adhere to prescribing guidelines.[23,24] Moreover, there has been limited research on GPs' attitudes towards these promotions, especially in the context of developing countries.[25] Pharmaceutical promotions take several forms, including advertising, drug samples, educational materials, sales representative visits, gifts, direct marketing and sponsored events. [26] It is aimed at ensuring that healthcare professionals' knowledge of recent advances in treatment options is updated. [27] When done within ethical boundaries, pharmaceutical promotion enhances access and use of medicine through its influence over prescribing choices.[28]

However, drug promotions have, in recent times, progressively transformed to embrace aggressive marketing strategies,[29] which are, at times, unethical. When unethically done, drug promotions negatively impact prescribing quality, rationality, and cost-effectiveness.[29] Drug companies often use promotions to influence doctors to prescribe their drugs, even if it is not the best option for the patient.[23] This can lead to overuse or inappropriate use of drugs, as well as compromising the health outcomes of patients and public health.[21,29] Critics argue that pharmaceutical promotions provide incomplete or misleading information and may selectively use clinical trial data to emphasise positive results while downplaying negative findings.[22,23] Additionally, the financial incentives associated with promotional activities can unduly influence prescribing decisions, leading to the use of more expensive or less effective drugs.[22] Overall, this is a serious issue that needs to be addressed to ensure better patient care and scientific exploration.[29]

In the Ugandan context, the regulatory body 'National Drug Authority' (NDA) guides the promotional strategies that pharmaceutical companies can use when publicising and promoting their drugs. NDA ensures that drug presentations, launches and exhibitions, continuing medical education sessions (CMEs), symposia, conferences, workshops, and other promotional activities, such as advertising, do not mislead the public.[30] More specifically, strict regulations govern the promotion of prescription-only medicines in diseases such as Community-acquired pneumonia (CAP), which has a prevalence rate of 25.6% among Ugandan children under five years old.[31] CAP is a lung disease (pneumonia) acquired outside the hospital. It presents with symptoms such as an inability to drink/feed, vomiting, convulsions, lower chest in-drawing, central cyanosis, lethargy, nasal flaring, grunting, and head nodding, among others.[31,32] Community-acquired pneumonia in adults causes breathing challenges, fever and cough, among others. Studies on antibiotic treatment regimens, among other treatments for CAP, have been done.[33,34] However, an in-depth understanding of how well pharmaceutical promotion

strategies affect compliance with CAP prescribing guidelines in Uganda is yet to be done.

While reasons for seemingly non-compliance among GPs are studied, more empirical evidence on the role of pharmaceutical promotional strategies in nudging Ugandan GPs to prescribe, especially for CAP, is needed. From 2013-2021, pneumonia accounted for 13,632 deaths among Ugandan children <5 years and a general mortality rate, inclusive of adults of 18%.[35] Patients with CAP continue to experience adverse reactions and drug interactions or fail to achieve the desired therapeutic outcomes.[36] The non-compliance of GPs with prescribing guidelines is a significant cause of preventable mortality, and the ever-increasing disease burden and changes in patient-healthcare dynamics are cause for worry among most patients in Uganda.[36] This study assesses the adherence to CAP prescribing guidelines by GPs in Uganda and their views on pharmaceutical promotions. It seeks to determine the reasons behind non-compliance and unethical promotions and their effects on prescribing quality, rationality, and cost-effectiveness for CAP. By identifying these factors, effective strategies can be developed to encourage compliance with ethical pharmaceutical promotions and CAP prescribing guidelines - ultimately leading to improved healthcare outcomes for patients and public health in low-resource countries such as Uganda.

METHODOLOGY

This descriptive study employed a qualitative phenomenological research design and an interview approach to collect data. The phenomenological method was selected to gain an in-depth understanding of the experiences and perspectives of GPs when prescribing Community-acquired pneumonia (CAP) drugs. This design allowed researchers to uncover why GPs prescribe a particular medication over others. Specifically, the study examined four promotional strategies: - public relations, personal selling, direct marketing, and sales promotion.

The study population was drawn from Mbarara City, Uganda, which includes two public and seven private hospitals, namely: Mbarara Regional Referral Hospital (public), Holy Innocents Children's Hospital, Ruharo Mission Hospital, Mayanja Memorial Hospital, Divine Mercy Hospital, Doctor's Plaza Hospital, Ankole Hospital, Mbarara Community Hospital and Mbarara City Health Centre IV (public). At the time of the study, there were 59 general practitioners (as informed by the human resource departments of each of those hospitals).

The study focused on General Practitioners (GPs), who are usually the first point of contact for patients seeking outpatient care in private and public healthcare facilities. The unit of analysis was the GPs themselves. We obtained data from hospitals that had GPs with three or more years of experience, resulting in a target population of 33 GPs.

Key-informant interviews were used to gather detailed information from each of the 33 study participants, which accounted for 33 interview sessions. Data was collected in two months in August and September 2022. The interviews were conducted privately, and the researchers ensured that participants' responses remained confidential. The interviews were audio-recoded and transcribed verbatim, and data were analysed using content analysis. The data were categorized and organized, and themes were identified. Codes were extracted, and exact quotations were written and interpreted to enrich the study.

The researchers obtained a letter of approval from the Research Ethics Committee of Mbarara University of Science and Technology (MUST-2022-546). Furthermore, written consent was obtained from respondents before data collection. To ensure anonymity, the researcher used codes for all informants to conceal the identity of the respondents. During interviews, participants were free to withdraw if they felt uncomfortable continuing the interviews.

RESULTS

Sociodemographic Characteristics of Respondents

Table 1 displays the socio-demographic characteristics of 33 GPs with over three years of work experience from nine hospitals in Mbarara City.

Regarding age, the largest group of respondents falls within the 31-50 age bracket, with 30.30% of them being between 41 and 50 years old. The table lists nine hospitals, with most respondents coming from Mbarara Regional Referral Hospital. In terms of years of experience, most respondents have 6-10 years of experience, with 39.39% falling into this category. Finally, most respondents were male (78.78%), with only 21.21% identifying as female.

Preferred first-line medicines for Children and Adults

General practitioners (GPs) were surveyed regarding their preferred first-line medications for children and adults in outpatient settings. The question aimed to determine whether GPs had specific preferences for certain drug brands when treating community-acquired pneumonia (CAP) patients. While some GPs prescribe generic medications, others prefer specific brands depending on availability, affordability, and efficacy.

> […] It depends on how serious the illness is. For children, I usually prefer a penicillin-like medication called amoxiclav, which is a combination of amoxicillin and clavulanic acid. However, if the child's CAP is severe, I opt for a third generation Cephalosporin called cefixime. In extreme cases, I may need to admit the child for intravenous (IV) treatments. *Male GP at Holy Innocents Children's Hospital.*

Table 1: Demographic characteristics of respondents

Age bracket	*Frequency*	*Percent*
25-30	6	18.18
31-40	9	27.27
41-50	10	30.30
Above 50 years	8	24.24
Total	33	100.0
Hospital		
Divine Mercy Hospital	3	9.09
Holy Innocents Children's Hospital	4	12.12
Ruharo Mission Hospital	3	9.09
Mayanja Memorial Hospital	4	12.12
Mbarara Doctor's Plaza Hospital	2	6.06
Mbarara City Health Center IV	3	9.09
Mbarara Regional Referral Hospital	10	30.30
Ankole Hospital	2	6.06
Mbarara Community Hospital	2	6.06
Years of experience		
3-5	9	27.27
6-10	13	39.39
Above 10	11	33.33
Total	33	100.0
Gender		
Female	7	21.21
Male	26	78.78
Total	33	100.0

[…] Before the COVID-19 outbreak, we used Azithromycin and Levofloxacin. During the pandemic, resistance to some of these drugs was reported. I have used Doxycycline for my patient care since. *Male GP at Mbarara Regional Referral Hospital*.

[…] I initially start with Levofloxacin or Azithromycin in adults to cover the typical and atypical organisms. Glevo, a Levofloxacin brand, is usually cheaper and packed in 5 tablets. For Azithromycin, I either use Zeemax or Zaha. I prefer these brands, especially for my price-sensitive patients. However, in cases of severe CAP, I often start them on third generation Cephalosporins like Ceftriaxone. *Male GP at Mbarara Regional Referral Hospital.*

Table 2: Preferred first-line medicines for Children

Preferred drug	Reason for choosing particular drugs
Amoxicillin	✓ Cheapest ✓ Recommended by guidelines ✓ Readily available. ✓ Patient drug history. ✓ The financial status of the patient.
Azithromycin	● The causative agent. ● If patients were initially started on the first-line medicines ● It covers typical and atypical organisms ● Cost-effectiveness ● Duration of treatment with the drug (3 days) ● Legacy of the brand
Amoxicillin-Clavulanate	➢ More effective ➢ The reputation of the drug ➢ Patient drug history
Ceftriaxone	✓ Severe CAP ✓ Efficacy of the drug
Amoxicillin and Flucloxacillin	-- Country of origin
Cefixime	Severe CAP
Ampicillin & Cloxacillin	Patient drug history

The study found that some GPs do not prescribe using brand names. They leave that decision to the pharmacists, who decide which brands to give.

> […] With Amoxicillin, I do not have a specific brand preference. In the general outpatient pharmacy of this hospital, we do not even know the brands available. The Hospital pharmacy stocks the Children's formulation for Azithromycin but hardly has Azithromycin for adults. I usually prescribe Xithrone, Zaha and Zithroriv (Azithromycin brands), which must be bought in retail pharmacies. *Female GP at Mbarara Regional Referral Hospital.*

> […] I am often sceptical about prescribing some brands because I do not know what the patients can afford. So, I mostly prescribe generic names. It is the pharmacist's discretion to decide whether or not to give a particular brand. *Male GP at Divine Mercy Hospital.*

The study investigated why GPs choose to prescribe certain brands over others. Their responses included quality, efficaciousness, cost, patient age, country of origin, and drug availability.

> […] It depends on the country of origin. Good brands come from Europe, Greece, and Egypt. I am not a pharmacist, but I believe some drugs have a reasonable amount of active ingredients compared to others. I also pay attention to the drug's

frequency of administration. *Male GP at Mbarara Regional Referral Hospital.*

> […] When I first joined this hospital, there were trusted brands that my seniors were prescribing. I went with the status quo. Now that I am experienced, I choose brands that have proven effective. I pay attention to my patient's feedback. If a patient reports that the drug never worked as expected, this informs my choice for other alternatives. I also consider the drug cost and status of the patients. *Male GP at Mbarara Doctors' Plaza Hospital.*

> […] While some brands are more effective, I often consider the patient's financial status before prescribing high-quality drugs from Egypt, Germany, and the UK. I, for instance, recommend Amoxiclav to my high-status patients. For patients with little ability to pay, I prescribe Amoxiclav from India, such as Bactoclav (Amoxicillin and Clavulanic acid). However, for patients who can hardly afford these treatments, I prescribe Amoxicillin. *Female GP at Ruharo Mission Hospital*.

The study further investigated how participants learned about the drug brands. Results show that some GPs rely on medical representatives and pharmaceutical marketers to learn about drug brands. Others learn from colleagues or patients. Some GPs also mentioned that they are taught generic names in school and only know about specific brands when they are available on the market. Also, some GPs indicated that they must be aware of all the drug brands available in their area, which can impact their prescribing decisions.

> […] We often get pharmaceutical sales representatives who tell us about their brands. They give us some samples, which we use to get patient feedback. CMEs have also informed us about the available brands. *Male, GP, Holy Innocent Children Hospital.*

> […] We should be getting drugs supplied by the Ministry of Health. However, in our setting, there are some drugs our health ministry cannot provide. Thus, we get most drugs from independent pharmacists. They (pharmacists) often tell us what is available in their stores, which becomes our basis for prescribing. *Male GP Mbarara Regional Referral Hospital.*

> […] I learned about most drugs from colleagues. In school, we are taught the generic names and not the brands. Unless there is a specific brand and it is the only one on the market, the tutors may mention it. *Male GP at Mbarara Regional Referral Hospital.*

The study established that GPs are exposed to promotional activities such as medical representative visits, Continuing Medical Education sessions, Sponsorships, free samples, donations, gifts, phone calls, emails, trips/tours, and SMS messages.

The GPs' perceptions of drug promotions are varied. Some GPs use promotional activities to guide their prescribing, while others rely on

generic names and leave the pharmacist to decide. Some GPs are influenced by more potent drugs that help their patients. In contrast, others feel that specific companies heavily fund someone to market their products, leading to the prescribing of particular company brands. However, most GPs agree that the drugs must be authentic and that good information significantly influences their prescribing decisions.

> […] Some pharmaceutical promotional strategies are intense. At times, these representatives showcase good drugs that are cheap and effective. Besides, we learn about superior brands through pharmaceutical promotions. However, I would have appreciated them better if I had been provided with adequate information. *Male GP at Mbarara Regional Referral Hospital.*

> […] If I were to make an honest comparison, I would find the CMEs better than a medical representative visit. I find CMEs more influential and provide unbiased information. With CMEs, we can discuss and agree or disagree, depending on the facts. The CMEs I have attended attract knowledgeable personnel in the subject matter. *Male GP at Mayanja Memorial Hospital.*

> […] Every day, we learn. The interactions with the medical representatives are quite enlightening. The awareness creation of this activity is important. However, I always take time to assimilate the information to make better decisions. *Male GP at Holy Innocents Children's Hospital*

> […] I like drug promotions. When someone reminds you of a certain drug, automatically, it comes first when you interface with a condition for which such a drug can cure. The promotions also improve our knowledge of certain conditions whose treatment we may not know. They improve our confidence in treating such diseases, and we prioritise the drugs being promoted. We usually prescribe drugs that are at our fingertips than drugs we have to read in books. *Male GP at Ankole Hospital*

GPs had mixed reactions towards promotional gifts and samples from medical marketers. Most expressed that patient outcomes were their priority, regardless of promotional packages.

> […] I have known many of my colleagues who were influenced by promotional activities. Some pharmaceutical companies heavily fund doctors who prescribe their brands. I have not had much luck…which I would not mind, by the way. However, the funding must be justifiable with drugs that solve our patients' problems. *Female GP at Mbarara Community Hospital.*

> […] As for the gifts, I do not want to be bribed. I would receive their gifts if the pharmaceutical company appreciates my community efforts. However, I do not entertain gifts from such companies whose

aim is to have me prescribe their drugs. *Male GP at Mayanja Memorial Hospital.*

[…] I have received free samples and given them to my patients. However, the challenge with free samples is that they are often dumped on us. The drugs are often close to expiration, which I find very annoying. *Male GP at Mbarara Regional Referral Hospital*

[…] Free samples have helped our patients who cannot afford medicines. We have several patients who cannot afford anything. Sometimes, when you are offered these drugs, they save lives. If you have been to the emergency unit of our hospital, you see destitute. Providing free samples from pharmaceutical companies has helped us a lot. *Female GP at Mbarara City Health Center IV.*

The study investigated the GP's usage of the available local and international prescribing guidelines. All GPs were aware of the role of the World Health Organization guidelines and National Treatment Guidelines/Uganda Clinical Guidelines. A few GPs used them alongside other factors such as patient observations or reaction to the drug, economic status of the patient, availability of the medicines, and experience of the GP, among others.

[…] I use UCG 2016 based on my experience with medicine. They recently released the UCG 2020, but it has not reached our desk. Hopefully, we shall begin implementing that one soon. *Male GP at Ankole Hospital*.

[…] I base it on the WHO guidelines, but the patient's history is relatively important. Some patients come when they have already been started on some antibiotics. For CAP, if a patient comes when he has already started on Amoxicillin, say for about five days, I choose a second line or something superior. *Male GP Holy Innocents Children Hospital.*

[…] We have standard protocols for children, the WHO paediatric handbook, and both UCG and the British National Formulary (BNF) for adults. We follow them, but eventually, you come up with your drug list/Essential drug list. However, we ensure it is in line with what is available, what our patients respond to, and the correct protocol. *Male GP Mbarara City Health Centre IV.*

[…] I often base my decision on the Infectious Diseases Society of America (IDSA) guidelines. I rarely use the Uganda Clinical Guidelines (UCG) unless for a few drugs like Amoxiclav (Amoxicillin and Clavulanic acid combination), which we use for upper respiratory tract infections. I also consider the age of the patients. For elderly patients, we may want to use drugs specific to certain organisms. Also, when the patient does not have money, we prescribe the cheapest drug available. *Female GP Mbarara Regional Referral Hospital*.

[…] We use the WHO and UCG guidelines for our prescribing. However, because this hospital is specialised, we depend on superior guidelines, such as the American Paediatric Handbook. The American Paediatric Handbook sets standards higher than the WHO guidelines, favouring the general population. *Male GP Holy Innocents Children Hospital.*

The study findings indicate that the WHO and Uganda Clinical Guidelines (UCG) are vital in guiding the GPs' prescribing decisions. However, the guidelines often have certain limitations which impact compliance among GPs, especially for CAP.

[…] Certain medical conditions are subject to change, which may warrant a shift in their management. As far as I know, the most recent version of the guidelines is not available yet. The version I possess is from 2016, although I hardly ever refer to it. It takes a considerable amount of time for the UCG to update its guidelines, despite the fact that new research and improved treatments are being introduced every year. Furthermore, the drugs listed in the guidelines are not up-to-date and relevant. *Male GP at Mbarara Doctor's Plaza Hospital.*

[…] The UGC is useful. However, I marry it with new research to stay updated. For example, we no longer give Amoxicillin three times daily as guided in the UCG. *Male GP at Ruharo Mission Hospital.*

[…] The people who work on these clinical guidelines are not serious! They never researched widely from several sources to know what happens in Ugandan hospitals nationwide. They make these guidelines minus consulting the prescribers. Besides, I have never seen any regulators trying to follow up to note whatever is happening in our hospitals. I do not bother looking at the local guidelines. I either base my prescribing on the British National Formulary or use the NICE guidelines from Europe or the American Academy of Paediatrics. *Male GP Holy Innocent Children Hospital.*

DISCUSSION

The study found that General Practitioners (GPs) consider multiple factors when choosing between different brands of antibiotics. These factors include cost, efficacy, availability, frequency of administration, stock-outs or shortages, country of origin, and feedback from patients or seniors. Sometimes, some GPs compromise on one factor, depending on the patient's financial status, while others prescribe affordable and effective drugs. The study found different brand names for the drugs GPs used when treating Community-Acquired Pneumonia (CAP). However, some of these drugs, such as flucamox and ampicillin, are not recommended by the World Health Organization (WHO), the Infectious Diseases Society of America (IDSA), or the American Thoracic Society (ATS) guidelines for CAP. This is because they may have lower efficacy or

toxicity than the preferred drugs.[37] Overall, it can be deduced that the price/affordability, availability, efficacy and familiarity with the products are significant determinants in influencing general practitioners into prescribing a given drug or brand of the promoted drug. When choosing a medication brand, GPs must consider various factors such as availability, affordability, and efficacy.[38]

Table 3: Preferred first-line medicines for Adults

Preferred drug	Reasons for preference
Amoxicillin	● Readily available ● Cheaper compared to another drug
Amoxi-Clav	More effective
Levofloxacin	● To cover the typical and atypical organisms. ● More effective ● Affordability.
Ceftriaxone	Used for severe CAP
Azithromycin	✓ Coverage of a wide range of micro-organisms. ✓ Patient drug history ✓ The pill burden ✓ Frequency of drug administration ✓ Efficacy.
Cefixime	Severe CAP
Amoxicillin and Flucloxacillin	Efficacious
Ampicillin & Cloxacillin	Patient drug history.

Concerning the first-line medicines, the research findings suggest that the Amoxicillin-Clavulanate combination is the preferred first-line treatment for outpatient children diagnosed with community-acquired pneumonia (CAP). This aligns with the current Uganda clinical guidelines for treating CAP. The Uganda Clinical Guideline recommends a dosage of 40mg/kg of Amoxicillin to be given every 12 hours for five days to children below five years. For children aged 2-12 months, the recommended dosage is 250 mg every 12 hours for five days; for those aged 1-3 years, it is 500 mg every 12 hours for five days; and for those aged 3-5 years, it is 750 mg every 12 hours for five days.[39]

On the other hand, the preferred first-line treatment for outpatient adults diagnosed with CAP is Azithromycin. This contradicts both the old and recently updated clinical guidelines. The recently updated Clinical Practice Guidelines recommend monotherapy with Amoxicillin, Doxycycline, or a Macrolide (Azithromycin or Clarithromycin) for patients without risk factors for drug-resistant pathogens. Azithromycin is only recommended as the first-line treatment for patients with a known allergy to penicillins, such as Amoxicillin.[39] For patients with comorbidities,

the international guidelines recommend using broader-spectrum coverage consisting of either monotherapy with a respiratory fluoroquinolone (Levofloxacin, Moxifloxacin, or Gemifloxacin) or combination therapy with Amoxicillin/clavulanate or a cephalosporin.[39]

The study also found that some GPs do not prescribe using brand names; a decision they leave to the pharmacists. This approach ensures that patients receive the most affordable medication available. It is also important to note that the brand choice may vary depending on the patient's needs and medical history, as stated by the study participants.

Most GPs learned about the different CAP brands and their efficacy from different sources, including pharmaceutical sales representatives, colleagues or seniors and pharmacies. This implies that most GPs do not depend on national guidelines to prescribe and rely on various sources to stay informed about the latest drug brands and their efficacy. By keeping up to date with the latest developments in the pharmaceutical industry, GPs can make informed decisions when prescribing medication to their patients.[40]

Nonetheless, attitudes of GPs towards various pharmaceutical promotions were mixed. Some GPs found the promotions helpful, especially in keeping them up to date with new information and drug products. Promotions that provided evidence about the efficacy of the drugs were appreciated since they enhanced the GPs' knowledge and confidence in prescribing medication. Continuing Medical Education (CME) sessions were particularly found to be an influential platform where GPs receive updates or guidelines on the rational use of antibiotics. The CME sessions provide impartial information and involve consultants in specific fields.

Some GPs were influenced by promotional activities when offered incentives like free samples, gifts or sponsorships. Free samples were viewed as a means of testing the product's authenticity, which could help treat emergencies and care for those who could not afford expensive drugs. Also, gifts are a great way to build a strong relationship with pharmaceutical companies and can be motivating. Most GPs think gifts are acceptable only if the promoted drugs are effective and affordable for their patients.

However, a few GPs did not find promotional activities effective in influencing their prescribing habits. They were sceptical of the information provided by the marketers and questioned its validity and reliability. Some pharmaceutical representatives lacked product knowledge, making it difficult for GPs to trust the information. Besides, some free samples were offered close to their expiration date. Additionally, some GPs felt wary of accepting promotional gifts because they did not want to be influenced by them. Accepting gifts can create a conflict of interest that may affect prescribing decisions.[41] Therefore, GPS must remain objective.

The study found that GPs had varying and sometimes conflicting opinions about the

guidelines. While some GPs followed the WHO, UCG, and BNF guidelines depending on their availability, accessibility, and relevance to their practice, others relied on their experience and what they thought was best for their patients. Some GPs did not adhere to the guidelines because they were not up-to-date or specific to their practice settings. Other GPs had not received the guidelines and had to rely on other sources of information or guidance. The Uganda clinical guidelines were not updated frequently, which justified the GPs' decision to ignore them.

It may be necessary for the Ministry of Health to revise the guidelines regularly while collaborating with drug researchers and engaging pharmaceutical prescribers. Additionally, pharmaceutical sales/medical representatives must be better regulated to ensure that those employed have the minimum qualifications to perform their jobs professionally without misleading the GPs. Pharmaceutical companies should refer to locally approved guidelines to enhance compliance with CAP prescribing guidelines. This is because the resistance patterns of bacteria vary in different parts of the world. More interventions are needed to improve compliance with prescribing guidelines among GPs and to minimise the negative impacts of pharmaceutical promotions on prescribing quality, rationality, and cost-effectiveness.

CONCLUSION

The study sheds light on General Practitioners' (GPs) prescribing practices for Uganda's Community-Acquired Pneumonia (CAP). The findings indicate a need for GPs to receive a thorough education on the optimal and rational use of antibiotics for this common and potentially fatal infection. Furthermore, there is a need for further research on the quality and reliability of information sources regarding CAP medications. The study suggests that the National Drug Authority (NDA) should develop and update evidence-based, user-friendly prescribing guidelines relevant to the local context and needs of GPs and patients. In addition, pharmaceutical promotional activities such as sales representative visits, drug samples, gifts, and sponsored events should be regulated to ensure they are ethical, transparent, and balanced. Lastly, there is a need to educate and empower GPs about the appropriate use of medicines and their potential benefits and risks. This will help GPs make informed and shared decisions, improving patient health outcomes.

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REFERENCES

1. Tichelaar J, Richir MC, Garner S, Hogerzeil H, de Vries TP. WHO Guide to Good Prescribing is 25 Years Old: Quo Vadis? European Journal of Clinical Pharmacology. 2020; 76: 507-13. https://link.springer.com/article/10.1007/s00228-019-02823-w

2. Campbell SM, Meyer JC, Godman B. Why Compliance to National Prescribing Guidelines is Important, Especially Across Sub-Saharan Africa, and Suggestions for the Future. Journal of Biomedical Pharmaceutical Sciences. 2021 Jun 23;4(6).

3. Nemr N, Kishk RM, Elsaid NMAB, Louis N, Fahmy E, Khattab S. Knowledge, Attitude, and Practice (KAP) of Antimicrobial Prescription and its Resistance among Health Care Providers in the COVID-19 Era: A Cross-Sectional Study. PLoS One. 2023 Aug 10; 18 (8): e0289711. http://doi.org/10.1371/journal.pone.0289711.

4. Olaoye O, Tuck C, Khor WP, McMenamin R, Hudson L, Northall M, et al. Improving Access to Antimicrobial Prescribing Guidelines in 4 African Countries: Development and Pilot Implementation of an App and Cross-Sectional Assessment of Attitudes and Behaviour Survey of Healthcare Workers and Patients. Antibiotics. 2020 Aug 29;9(9):555. http://doi.org/10.3390/antibiotics9090555

5. Alexander GC, Qato DM. Ensuring Access to Medications in the US during the COVID-19 Pandemic. Jama. 2020 Jul 7;324(1):31-2. https://doi.org/10.1001/jama.2020.6016

6. Ofori-Asenso R. A Closer Look at the World Health Organization's Prescribing Indicators. Journal of Pharmacology and Pharmacotherapeutics. 2016; 7(1): 51-4. https://doi.org/10.4103/0976-500X.179352.

7. Merchant HA, Babar ZU, Hussain IM. A Leap Towards Enforcing Medicines Prescribing by Generic Names in Low-and Middle-Income Countries (LMICs): Pitfalls, Limitations, and Recommendations for Local Drug Regulatory Agencies. Journal of Pharmaceutical Policy and Practice. 2022 Dec;15(1):1-7. https://doi.org/10.1186/s40545-022-00501-4

8. Niaz Q, Godman B, Campbell S, Kibuule D. Compliance to Prescribing Guidelines among Public Health Care Facilities in Namibia; Findings and implications. International journal of clinical pharmacy. 2020; 42(4): 1227-36. https://doi.org/10.1007/s11096-020-01056-7

9. Hassali MA, Wong ZY, Alrasheedy AA, Saleem F, Yahaya AH, Aljadhey H. Perspectives of Physicians Practicing in Low- and Middle-Income Countries Towards Generic Medicines: a narrative review. Health policy. 2014 Sep 1;117(3):297-310. https://doi.org/10.1016/j.healthpol.2014.07.014

10. Owusu H, Thekkur P, Ashubwe-Jalemba J, Hedidor GK, Corquaye O, Aggor A, et al., Compliance to Guidelines in Prescribing

Empirical Antibiotics for Individuals with Uncomplicated Urinary Tract Infection in a Primary Health Facility of Ghana, 2019–2021. International Journal of Environmental Research and Public Health. 2022 Sep 29;19(19):12413. https://doi.org/10.3390/ijerph191912413

11. Parker C, Nielsen VL. Compliance: 14 questions. Regulatory Theory: Foundations and Applications. 2017 Feb 23:217-32.

12. Hugtenburg JG, Timmers L, Elders PJ, Vervloet M, van Dijk L. Definitions, Variants, and Causes of Non-Adherence with Medication: A Challenge for Tailored Interventions. Patient Preference and Adherence. 2013 Jul 10:675-82. https://www.tandfonline.com/doi/full/10.2147/PPA.S29549

13. Obakiro SB, Napyo A, Wilberforce MJ, Adongo P, Kiyimba K, Anthierens S, et al. Are Antibiotic Prescription Practices in Eastern Uganda Concordant with the National Standard Treatment Guidelines? A Cross-Sectional Retrospective Study. Journal of Global Antimicrobial Resistance. 2022 Jun 1;29:513-9. https://doi.org/10.1016/j.jgar.2021.11.006

14. Murshid MA, Mohaidin Z. Physicians' Perceptions Towards Brand Medicine and its Effect on Prescribing: A Narrative Review. Journal of Generic Medicines. 2017 Dec;13(4):157-83. https://doi.org/10.1177/1741134317709509

15. Lukali V, Michelo C. Factors Associated with Irrational Drug Use at a District Hospital in Zambia: Patient Record-Based Observations. Medical Journal of Zambia. 2015 Nov 16;42(1):25-30.

16. Naghavi S, Mehrolhassani MH, Nakhaee N, Yazdi-Feyzabadi V. Effective factors in Non-Compliance with Therapeutic Orders of Specialists in Outpatient Clinics in Iran: A Qualitative Study. BMC Health Services Research. 2019 Dec;19(1):1-6.

17. Boniface M, Nambatya W, Rajab K. An Evaluation of Antibiotic Prescribing Practices in a Rural Refugee Settlement District in Uganda. Antibiotics (Basel). 2021 Feb 9;10(2):172. https://doi.org/10.3390/antibiotics10020172

18. Kamba PF, Mulangwa J, Kaggwa B, Kitutu FE, Sewankambo NK, Katabira ET, et al. Compliance of Private Pharmacies in Uganda with Controlled Prescription Drugs Regulations: A Mixed-Methods Study. Substance Abuse Treatment, Prevention, and Policy. 2020 Dec;15:1-3. https://doi.org/10.1186/s13011-020-00261-x

19. Nambasa V, Ndagije HB, Serwanga A, Manirakiza L, Atuhaire J, Nakitto D, et al. Prescription of Levofloxacin and Moxifloxacin in Select Hospitals in Uganda: A Pilot Study to Assess Guideline Concordance. Antibiotics. 2020 Jul 23;9(8):439. https://doi.org/10.3390/antibiotics9080439

20. Ngongoni RF, Gan G, Deng Y, Agaba G, Akiteng AR, Schwartz JI. Prescribing and Dispensing Practices for Medicines Used to Treat Non-Communicable Diseases in Uganda: A Cross-Sectional Study. The Lancet Global

Health. 2018 Mar 1;6:S23. https://doi.org/10.1016/S2214-109X(18)30152-9

21. Marwah U, Huettenmoser D, Patel S. Prescription Drug Advertising and Promotion Regulations and Enforcement in Select Global Markets. FDLI Update. 2017:4. https://heinonline.org/HOL/LandingPage?handle=hein.journals/fdliup2017&div=35&id=&page=

22. Alosaimi F, AlKaabba A, Qadi M, Albahlal A, Alabdulkarim Y, Alabduljabbar M, et al. Acceptance of Pharmaceutical Gifts. Saudi Med J. 2013;34(8):854-60.

23. Khazzaka M. Pharmaceutical Marketing Strategies' Influence on Physicians' Prescribing Pattern in Lebanon: Ethics, Gifts, and Samples. BMC health services research. 2019 Dec;19:1-1. https://doi.org/10.1186/s12913-019-3887-6

24. Urias E. The Contribution of the Pharmaceutical Industry to the Health Status of the Developing World. International Business & Management 2017 Sep 25 (pp. 41-67). Emerald Publishing Limited. https://doi.org/10.1108/S1876-066X20170000033003

25. Nanteza D. Promotional Strategies and Sales Performance of Private Pharmaceutical distributors in Uganda: A Case of Surgipharm (U) ltd (Doctoral dissertation, Uganda Management Institute). https://hdl.handle.net/20.500.12305/793

26. Sekuła, A. (2012). Promotion and its Tools in Territorial Marketing. Service Management Vol. 8, ed. A. Panasiuk, "Scientific Journal" No. 681, University of Szczecin, Szczecin 2012, pp. 123-137. https://depot.ceon.pl/handle/123456789/5976

27. Leonardo Alves T, Lexchin J, Mintzes B. Medicines Information and the Regulation of the Promotion of Pharmaceuticals. Science and Engineering Ethics. 2019 Aug 15;25(4):1167-92. https://doi.org/10.1007/s11948-018-0041-5

28. Mintzes B, Fabbri A, Grundy Q, Spurling GKP, Lexchin J, McKenzie JE, et al. Information and Promotional Strategies by Pharmaceutical Companies for Clinicians. Cochrane Database Syst Rev. 2020 Mar 4;2020(3):CD013423. https://doi.org/10.1002/14651858

29. Jacob NT. Drug Promotion Practices: A Review. Br J Clin Pharmacol. 2018 Aug;84(8):1659-1667. https://doi.org/10.1111/bcp.13513

30. NDA Uganda. (2017). NDA Guidelines on Control of Publication and Advertisement Relating to Drugs. https://www.nda.or.ug/wp-content/uploads/2022/03/Control-of-Publication-advertisement-Regulation.pdf

31. Kiconco G, Turyasiima M, Ndamira A, Yamile OA, Egesa WI, Ndiwimana M, et al. Prevalence and Associated Factors of Pneumonia among Under-Fives with Acute Respiratory Symptoms: A Cross Sectional Study at a Teaching Hospital in Bushenyi District, Western Uganda. African Health Sciences. 2021 Dec 14;21(4):1701-0. https://doi.org/10.4314/ahs.v21i4.25.

32. Nascimento-Carvalho CM. Community-Acquired Pneumonia among Children: The Latest Evidence for An Updated Management. Jornal de pediatria. 2020 Apr 17;96:29-38. https://doi.org/10.1016/j.jped.2019.08.003

33. Metlay JP, Waterer GW. Treatment of Community-Acquired Pneumonia during the Coronavirus Disease 2019 (COVID-19) pandemic. Annals of internal medicine. 2020 Aug 18;173(4):304-5. https://doi.org/10.7326/M20-2189

34. Furukawa Y, Luo Y, Funada S, Onishi A, Ostinelli E, Hamza T, et al. Optimal Duration of Antibiotic Treatment for Community-Acquired Pneumonia in adults: A Systematic Review and Duration-Effect Meta-Analysis. BMJ Open. 2023 Mar 22;13(3):e061023. https://doi.org/10.1136/bmjopen-2022-061023.

35. Uganda National Institute of Public Health, 2023. https://uniph.go.ug/trends-and-spatial-distribution-of-pneumonia-admissions-and-deaths-among-children-under-five-years-in-uganda-2013

36. Muwanguzi TE, Yadesa TM, Agaba AG. Antibacterial Prescription and The Associated Factors among Outpatients Diagnosed with Respiratory Tract Infections in Mbarara Municipality, Uganda. BMC Pulmonary Medicine. 2021 Dec;21(1):1-1. https://bmcpulmmed.biomedcentral.com/articles/10.1186/s12890-021-01739-5

37. Agrawal A. Diagnosis and Treatment of Community-Acquired Pneumonia in Children and Adults. AMA Journal of Ethics. 2011 Aug 1;13(8):551-4. https://journalofethics.ama-assn.org/article/diagnosis-and-treatment-community-acquired-pneumonia-children-and-adults/2011-08

38. Buusman A, Andersen M, Merrild C, Elverdam B. Factors Influencing GPs' Choice between Drugs in a Therapeutic Drug Group. A Qualitative Study. Scandinavian Journal of primary health care. 2007 Jan 1;25(4):208-13. https://doi.org/10.1080/02813430701652036

39. Uganda Clinical Guidelines, 2023. http://library.health.go.ug/file-download/download/public/1698

40. Hopewell PC, Pai M, Maher D, Uplekar M, Raviglione MC. International Standards for Tuberculosis Care. The Lancet Infectious Diseases. 2006 Nov 1;6(11):710-25. https://doi.org/10.1016/B978-1-4160-3988-4.00063-9

41. King M, Bearman PS. Gifts and Influence: Conflict of Interest Policies And Prescribing of Psychotropic Medications in the United States. Social Science & Medicine. 2017 Jan 1;172:153-62. https://doi.org/10.1016/j.socscimed.2016.11.010