

COVID-19, Health Care and Self-Medication Issues in Resource-Limited Settings: Findings and Implications Based on Experiences in Ghana

Israel Abebrese Sefah^{1,2}, Darius Obeng Essah¹, Mainul Haque³, Sylvia A Opanga⁴, Santosh Kumar⁵, Ibrahim Chikowe⁶, Dan Kibuule⁷, Enos M Rampamba^{8,9}, Aubrey C Kalungia¹⁰, Thuy Nguyen Thi Phuong¹¹, Zikria Saleem¹², Vanda Markovic-Pekovic¹³, Amanj Kurdi^{14,15}, Brian Godman^{8,14,16}

¹Department of Pharmacy Practice, School of Pharmacy, University of Health and Allied Sciences, Ho, Ghana, ²Department of Pharmacy, Keta Municipal Hospital, Ghana Health Service, Keta-Dzelukope, Ghana, ³Unit of Pharmacology, Faculty of Medicine and Defence Health, Universiti Pertahanan Nasional Malaysia (National Defence University of Malaysia), Kuala Lumpur, Malaysia, ⁴Department of Pharmaceutics and Pharmacy Practice, School of Pharmacy, University of Nairobi, Nairobi, Kenya, ⁵Department of Periodontology and Implantology, Karnavati University, Gandhinagar, Gujarat, India, ⁶Department of Pharmacy, Kamuzu University of Health Sciences Formally, College of Medicine, Blantyre College of Medicine, Blantyre, Malawi, ⁷Department of Pharmacy Practice and Policy, Faculty of Health Sciences, University of Namibia, Windhoek, Namibia, ⁸Division of Public Health Pharmacy and Management, School of Pharmacy, Sefako Makgatho Health Sciences University, Ga-Rankuwa, Pretoria, South Africa, ⁹Department of Pharmacy, Tshilidzini Hospital, Shayandima, Limpopo Province, South Africa, ¹⁰Department of Pharmacy, University of Zambia, Lusaka, Zambia, ¹¹Pharmaceutical Administration and Pharmaco Economics, Hanoi University of Pharmacy, Hanoi, Vietnam, ¹²Faculty of Pharmacy, University of Lahore, Lahore, Pakistan, ¹³Department of Social Pharmacy, Faculty of Medicine, University of Banja Luka, Republic of Srpska, Bosnia and Herzegovina, ¹⁴Department of Pharmacoepidemiology, Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow, UK, ¹⁵Department of Pharmacology, College of Pharmacy, Hawler Medical University, Erbil, Iraq, ¹⁶School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

Abstract

Introduction and Objectives: There have been concerns with the level of misinformation regarding coronavirus disease 2019 (COVID-19) and its treatment, drug shortages, as well as increased use and prices of anti-malarials, antibiotics and hygiene products during the recent pandemic. Community pharmacists can play a significant role in disease prevention and treatment in the fight against COVID-19 including providing hygiene information and medicine availability across Africa and generally. Consequently, there is a need to review the role of community pharmacists in preventing unintended consequences during any pandemic as well as the impact of COVID-19 on the demand, availability and prices of suggested medicines for its management. **Materials and Methods:** Multiple approaches involving a qualitative review of the management of COVID-19 across countries coupled with a pilot study in Ghana among six purposely selected community pharmacists during the early stages of the pandemic assessing patterns of demand, availability and prices of medicines suggested for the management of COVID-19. Alongside this, pharmacists' future role enhancing appropriate medicine use in Ghana and wider combined with the help of senior level co-authors. **Results:** The majority (five out of six) of pharmacists in Ghana reported increased demand for hydroxychloroquine, antibiotics and vitamins as immune boosters resulting in shortages with price increases particularly for anti-malarials. **Conclusion:** The global lockdown had impacted on the supply and prices of medicines in Ghana similar to other countries. Community pharmacists can play a key role with encouraging safe medicine use, reducing self-purchasing of medicines and planning workflows during future pandemics including vaccinations. They can also help address potential misinformation and its consequences as well as the unintended consequences of pandemics including better management of non-communicable diseases.

Keywords: Community pharmacists, COVID-19, Ghana, misinformation, self-medication, supply chain

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic was first identified in Wuhan, China, in December 2019.^[1] Since then, the outbreak became a global health emergency with more than 175 million cases by mid June 2021 and nearly than 3.8 million deaths.^[2] The first confirmed case of

Address for correspondence: Prof. Brian Godman, Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow G4 0RE, UK. E-mail: brian.godman@strath.ac.uk

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COVID-19 in Africa was reported on the 14th of February 2020 in Egypt, with the first reported case in the World Health Organisation (WHO) African Region on 25 February 2020 in Algeria.^[3,4] As of 13th June 2021, there were 3.66 million confirmed COVID-19 cases and 89,674 deaths among the 47 affected countries in the WHO African Region, giving a case-fatality ratio of 2.5%.^[2] Some of the most affected countries in sub-Saharan Africa as of the 13th June 2021 were South Africa (1.74 million cases), Kenya (175176 cases), Nigeria (167059 cases), Zambia (110332 cases) and Ghana (94493 cases).^[2] Testing has increased across Africa with for instance the laboratories in Ghana running continuously with multiple samples being tested concurrently to cope with demand.^[5-7]

There have been varied responses to the pandemic across countries.^[7-11] This follows differences in resources in terms of both funding, health-care professionals and health-care facilities, which have typically been lower among African and Asian countries versus higher income countries. However, typically, lockdown and other measures were introduced early among African and Asian countries building on the experiences with previous infectious diseases. This helped to limit the spread of COVID-19 and its impact certainly initially, with this trend continuing among African countries.^[2,6-11]

However, there have been a number of concerns with COVID-19 management among low-and middle-income countries (LMICs). These include the level of misinformation regarding potential treatments for patients with COVID-19 with a resultant impact on shortages of medicines and their prices.^[9,11-13] Lockdown measures have also appreciably impacted on the routine vaccination of children across Africa as well as increased the prevalence and mortality from non-communicable diseases (NCDs) with cancelling of clinics and transport restrictions.^[14,15]

There have been numerous studies regarding the prescribing of chloroquine and hydroxychloroquine in patients with COVID-19 following the initial studies in China which showed early promise.^[16,17] However, there were the concerns with the lack of comparisons in the early studies and the level of side effects such as cardiac side effects seen with hydroxychloroquine.^[18-20] Recent studies have also failed to demonstrate any clinical benefit from hydroxychloroquine resulting in its use no longer being routinely recommended for patients with COVID-19.^[21-23] There have been similar concerns with lopinavir and remdesivir.^[23-26] In fact, only immune modulators including dexamethasone as well as tocilizumab have been proven to date to be beneficial for the management of hospitalised patients with COVID 19.^[17,27-29] However, the public endorsement and misinformation regarding chloroquine and hydroxychloroquine have resulted in appreciably increased prices in a number of LMICs fuelled by shortages alongside increased hospitalisations and deaths from poisoning.^[7,10-12,30] Misinformation about potential herbal cures for COVID-19 has also been rampant.^[31-34] The misuse of medicinal plants for

patients with COVID-19 is a concern as this can potentially be more harmful than helpful,^[35,36] and misinformation can also fuel stigmatization and discrimination.^[37] These concerns have resulted in African countries including Botswana and Zimbabwe starting to fine companies, with potentially a prison sentence, regarding misinformation surrounding COVID-19 and its treatment.^[9]

Ghana has also experienced misinformation concerning the potential benefit of treatments for patients with COVID-19. As a result, the Ministry of Information in Ghana is now working closely with the media to ensure credible and timely information to counter misinformation.^[7,38] The Ghana Medical Association and Pharmaceutical Society of Ghana have both issued cautionary statements regarding the possible adverse effects of taking prescription medicines without advice from health-care professionals. There have also been directives from the Ghana Association of Medical Herbalist advising against the indiscriminate use of herbal medicines with the potential for adverse effects with irrational use.

Community pharmacists and others can play a considerable role with assisting patients with hand hygiene and other sanitisation measures during current and future pandemics as well as address misinformation.^[39-41] This is because community pharmacists are often the first health-care professional that patients in LMICs consult with regarding their health conditions.^[42,43] Community pharmacists can also play a key role with reducing inappropriate dispensing of antibiotics for essentially viral infections where this is a problem.^[44,45] This is because self-purchasing of antibiotics can occur in up to 100% of pharmacies among African countries and can account for 93% or more of antibiotics dispensed among LMICs.^[44,46-48] We are aware that excessive use of antibiotics, which includes high rates of self-purchasing of antibiotics within African and Asian countries, enhances antimicrobial resistance (AMR).^[45,48] Excessive use of antibiotics fuelling AMR is a particular concern in patients with COVID-19 despite concomitant bacterial infections occurring in <4% of patients.^[30,49-52] Consequently, unnecessary self-purchasing of antimicrobials should be avoided where possible. This can be addressed by ensuring qualified staff are present during patient consultations in community pharmacies coupled with the availability of robust guidelines to optimise treatment advice.^[42,53-56]

As a result, we believe that there is the need for governments and policy-makers to take steps to improve self-medication, especially during the pandemics where there are concerns with the impact of misinformation and absences of cures, as well as the potential for inappropriate management including the high use of antibiotics for essentially viral infections.^[45,49-51]

In view of this, the objectives of this article are firstly to briefly review the role of community pharmacists with regard to improving the prevention and management of patients with possible COVID-19. Second, assess issues of shortages and prices of medicines reported to help with treatment and

suggest potential ways forward to address identified concerns including misinformation. Ghana was chosen for this study as they had already introduced measures to improve the management of patients with infectious diseases including reducing AMR as well as measures to reduce the morbidity and mortality associated with chronic NCDs including diabetes.^[45,57] Ghana was also very active with testing and lockdown measures during the early months of the pandemic and has been held up as a model country in Africa for managing patients with COVID-19.^[5,9] There has also been considerable self-purchasing of antimicrobials in Ghana in the past.^[45] We believe our findings will help assist the authorities in Ghana and from other LMICs in better planning of campaigns regarding this and future pandemics.

METHODOLOGY

Study design

We employed multiple approaches similar to other studied countries across Africa and Asia.^[7,8,10,11,53,56] First, a limited qualitative review of the situation with COVID-19 across LMICs including Ghana was undertaken. This included the potential role of community pharmacists based on the knowledge and experience of the senior level co-authors. Second, a pilot study was conducted among six purposively selected community pharmacists in Ghana. Finally, the feedback from the community pharmacists, combined with the considerable experience of the co-authors, was used to provide future guidance on how to improve the care of patients during a pandemic. In addition, reduce the level and influence of misinformation and its consequences. We are aware that antimicrobial stewardship programmes (ASPs) have been successfully introduced in hospitals to improve future antimicrobial use including reducing their prolonged use to reduce surgical site infections.^[48,58-60] However, it is recognised that ASPs are more difficult to introduce among hospitals in LMICs due to workforce and resource issues, as well as issues of knowledge among clinicians and pharmacists.^[61-63] Consequently, we believe these barriers need to be addressed first as part of national action plans to reduce AMR before seeking to instigate ASPs among the considerable number of community pharmacies and drug stores across Africa. Such initiatives have started among hospitals across Africa including Ghana in recent years,^[64,65] and this will grow.

We have successfully used this multiple approach in different disease areas and issues in previous studies. These include potential ways to reduce inappropriate prescribing and dispensing of antibiotics for essentially viral infections.^[45,48,60,66,67] Consequently, we adopted this approach for this study.

Our hypothesis, based on the findings in other African and Asian countries, is that there would be shortages of antimicrobial medicines including antimalarial medicines in Ghana, coupled with and an appreciable increase in their

prices, given the initial hype and government endorsement of their efficacy in the prevention and treatment of COVID-19. However, this remains to be seen in practice in Ghana.

Study site and population

Ghana, a country located in West Africa, has a population of approximately 30 million people with 16 administrative regions. Community pharmacists for this pilot study were purposively selected from three regions (i.e., Greater Accra, Ashanti and Volta) in Ghana which had confirmed COVID-19 cases with two (i.e., Greater Accra and Ashanti) of the regions having some of the highest prevalence rates at the time of the study.

Data collection

The six community pharmacists were E-mailed a self-administered questionnaire containing key open-ended questions to assess the patterns of demand, availability and price changes of carefully selected medicines (antimalarial tablets, antibiotics, herbal medicines, analgesics and multivitamin supplements) as well as the potential role pharmacists with addressing inappropriate self-medication.

The results on the purchasing pattern of patients, issues of shortages and price changes, were compiled into a tabular format for ease of reference. This included herbal medicines given their high use in Ghana including masada, taabea and rooter mixture.^[68] We are also aware that Centre of Awareness Food Supplement (COA FS) is registered in Ghana as an immune booster for general well-being, with potential for use during a pandemic.^[69]

Changes in purchasing patterns and prices will be broken down into categories including increasing, decreasing and no change as well as potentially high demand where pertinent. This is because of the sensitive nature of some of the questions and we were not paying pharmacists for their time. This approach will also allow comparisons with other African and Asian countries.^[7,10]

The questions included:

- Geographic location of the Pharmacy (Region)
- What change in medicine purchasing patterns have you noticed from the beginning of March until mid-May 2020 for antimalarials, antibiotics, analgesics, herbal medications and multivitamins (their impression based on sales/invoices)? Multivitamins could include potential immune boosters
- What change in medicine prices have you noticed from the beginning of March until mid-May 2020 for antimalarials, antibiotics, analgesics, herbal medications and multivitamins (please give examples of the most common medicines within each category if pertinent based on your impression/invoices)?
- What shortages/availability concerns have you noticed from the beginning of March until mid-May 2020 for antimalarials, antibiotics, analgesics, herbal medications and multivitamins (again give examples of the most

common medicines within each category if pertinent)?

- Any suggestions for addressing inappropriate self-medication for the future including addressing misinformation from patients?

Ethical consideration

Pharmacists' confidentiality was maintained throughout. We did not seek ethical approval as this study did not involve patients directly. This is in line with previous studies undertaken by the co-authors in this and related areas.^[8,10,45,57,66,70]

RESULTS

General findings and the role of community pharmacists as part of the response to COVID-19

The global lockdown due to the COVID-19 pandemic impacted on the supply chain of medicines with the over-stocking of prescription and over-the-counter medicines such as painkillers, hydroxychloroquine to treat lupus and rheumatoid arthritis, antibiotics and chronic medications for self-medication, exacerbated by manufacturers curbing supplies and exports.^[71] The Ghana Government facilitated a loan of US\$5 million from EXIMBANK Ghana to Entrance Pharmaceuticals and Research Centre for the local production of antimicrobials, with similar initiatives in other African countries for pertinent medicines and vaccines to help reduce potential shortages.^[9,72,73]

In general, community pharmacists in Ghana have an appreciable role to play not only in helping with the prevention and management of COVID-19 but also dealing with the unintended consequences. Unintended consequences include concerns with the effective management of patients with NCDs including access to medicines and adherence exacerbated, as mentioned, by patients' unwillingness or inability to attend ambulatory care clinics due to a lack of public transport and other lockdown restrictions as well as fears of contracting COVID-19 when attending clinics, similar to other LMICs.^[39,74,75] Strategies to address these concerns could include measures to protect the supply chain for medicines to treat NCDs, extend the time for refilling prescriptions as well as potentially seeking new methods to improve adherence to medicines. Potential measures also include offering home-delivery services for prescribed medicines, instigating online or phone counselling services for patients, using telemedicine and other approaches to enhance adherence rates as well as potentially offering vaccination services.^[40,75-77]

Community pharmacists can also give guidance and reinforce the messages regarding hygiene and social distancing as the key measures to prevent the spread of COVID-19 as well as provide PPE to patients mindful of their own needs.^[39,56,75] Pharmacists can also play a key role in symptom management, especially mild symptoms as well as encourage the referral of patients with more severe symptoms.^[42,56] In addition, community pharmacists can help prepare or disseminate government information to help clarify and reinforce government guidelines relating to COVID-19.^[75] Through their

professionalism, community pharmacists can also promote the safe use of medicines by addressing misinformation, reducing inappropriate dispensing of antimicrobials for essentially self-limiting conditions as well as ensuring a balance between demand and supply of medicines.^[40,54,56,75]

Specific findings from Ghana

Six community pharmacists from across Ghana took part in this pilot survey. Their responses are contained in Tables 1-3.

As shown in Table 1, there was appreciable (5 out of the 6 respondents and in most cases all 6) demand for hydroxychloroquine, antimicrobials including azithromycin and penicillins such as co-amoxiclav and flucloxacillin, herbal medicines including COA FS, and vitamins especially Vitamin C during the initial pandemic (early March to mid-May 2020). Alongside this, there was typically no change in the demand for analgesics. Increased patient demand for hydroxychloroquine and antibiotics was in line with expectations.

As shown in Table 2, half of the respondents reported an increase in both retail and wholesale prices of antimalarials, antimicrobials, herbal medicines and multivitamin supplements with almost no change in the price of analgesics during the initial period of the pandemic.

As shown in Table 3, 5 out of the 6 respondents reported stock-outs for about 2 months for anti-malarials (especially hydroxychloroquine), multivitamins (such as oral formulations of Vitamin C) and herbal medicines (especially COA FS). There were greater shortages of herbal medicines including COA FS, especially after the safety warnings from the Ghanaian FDA.

Suggestions for addressing inappropriate self-purchasing of medicines and misinformation among the selected community pharmacists are included in Box 1.^[7,10,13,56,78,79]

Box 2 summarizes potential activities that community pharmacists could undertake to help with the COVID-19 pandemic including addressing the unintended consequences.^[7,10,13,41,48,56,78,80-82] This builds on the feedback from the community pharmacists coupled with, as mentioned, knowledge of the senior level co-authors.

DISCUSSION

We believe increased demand for hydroxychloroquine in Ghana, which occurred in almost all the community pharmacies studied resulting in non-availability and price increase [Tables 1-3], is a reflection of the misinformation surrounding hydroxychloroquine. We have seen similar increases in Bangladesh, Nigeria and Pakistan.^[10,11,30] There was also increased requests for anti-malarials and antibiotics in Kenya; however, these were not dispensed and alternatives suggested. This builds on the experiences of the community pharmacists involved.^[53,54] The professionalism among community pharmacists in Kenya provides an exemplar across countries on potential ways to reduce inappropriate

Table 1: Impact of COVID-2019 on patient purchasing patterns beginning March to mid-May 2020

Pharmacist and location	Antimalarials	Antimicrobials	Analgesics	Herbal medicines	Multivitamins
1 - Ho Volta region	High requests for hydroxychloroquine leading to stock outs	All normal except azithromycin with appreciable purchases by health workers for prophylaxis	No change	High demand, e.g., COA FS	High especially for Vitamin C and immune boosters leading to stock outs
2 - Kumasi Ashanti region	No change	Increased demand for broad spectrum antibiotics to manage respiratory tract infections	No change	High demand, e.g., COA FS	High especially for Vitamin C and immune boosters
3 - Accra, Greater Accra region	High for hydroxychloroquine due to hoarding by patients	Increased demand especially for co-amoxiclav and flucloxacillin	No change	High demand, e.g., COA FS	High especially for Vitamin C and immune boosters
4 - Spintex, Greater Accra region	High demand for artemether and lumefantrine as well as high demand for hydroxychloroquine even though it is supposed to be prescription only	Increased demand especially for co-amoxiclav and flucloxacillin but limited change for antifungals	No change	High, e.g., COA FS and other herbal medicines	High especially for Vitamin C, D and E and immune boosters especially those containing zinc and selenium
5 - Sakumono, Greater Accra	High demand for hydroxychloroquine	High demand for Azithromycin	High demand for paracetamol and diclofenac	High demand, especially for COA FS	High demand especially for Vitamin C and immune boosters especially those containing zinc and general multivitamins
6 - Kumasi, Ashanti region	High for hydroxychloroquine	Increased demand for azithromycin	No change	High demand, especially for COA FS	High demand for Vitamin C and zinc

COA FS is a dietary supplement registered in Ghana as an immune booster. COA FS: Centre of Awareness Food Supplement

Table 2: Impact of COVID-2019 on prices in key medicine categories beginning March to mid-May 2020

Pharmacist and location	Antimalarials	Antimicrobials	Analgesics	Herbal medicines	Multivitamins
1 - Ho Volta region	Increase in the price for hydroxychloroquine	No price change because most azithromycin is available as generics	No apparent price changes	Increase in prices specifically, COA FS	Increase in price for Vitamin C and immune boosters
2 - Kumasi Ashanti region	No change	Slight increase in prices for broad spectrum antibiotics	No change	No change	Increase in prices for Vitamin C
3 - Accra, Greater Accra region	Increase in the price for hydroxychloroquine	Increase in price due to increased cost of transportations and closure of ports and borders	No change	No change	No change
4 - Spintex, Greater Accra region	No change	No change	No change	No change	Increase in prices for Vitamin C as well as multivitamins containing zinc and selenium
5 - Sakumono, Greater Accra	Price for hydroxychloroquine tripled during the study period	No change	Slight increase	Price of COA FS have doubled	Increase in prices for Vitamin C
6 - Kuamsi, Ashanti region	No change	No change	Slight increase	High prices now for COA FS	High prices for Vitamin C

COA FS is a dietary supplement registered in Ghana as an immune booster. COA FS: Centre of Awareness Food Supplement

self-purchasing of antimicrobials without resorting to fines.^[45,48,53,54] This is important especially in rural communities in LMICs where pharmacy personnel (pharmacy technicians, pharmacy assistants, and pharmacists) may be the only health-care professionals that are available and where there are concerns with affordability and access to public health facilities.

Contrasting with Ghana, we saw limited increases in the utilisation of antimalarials and antibiotics reported in India, Malaysia, Namibia and Vietnam, which was attributable to ongoing activities by the governments in these countries to limit the self-purchasing of antimicrobials.^[8,10,56] These combined examples provide direction to other countries seeking to limit the self-purchasing of antimicrobials to reduce current AMR rates.

Table 3: Possible shortages in key medicine categories beginning March to mid-May 2020

Pharmacist and location	Antimalarials	Antimicrobials	Analgesics	Herbal medicines	Multivitamins
1 - Ho Volta region	Stock out for hydroxychloroquine for 2 months, no problem with other antimalarials	No stock outs	No stock outs	Stock out of COA FS for a month	Stock outs of Vitamin C and immune boosters
2 - Kumasi Ashanti region	No stockouts	No stockouts	No stockouts	No stockouts	There have been stockouts of Vitamin C
3 - Accra, Greater Accra region	Stock out for hydroxychloroquine for 2 months, no problem with other antimalarials	Shortage of branded antibiotics including augmentin and zithromax for at least a month	No stock outs	Reduction in availability due to Ghanaian FDA clamping down on some herbal preparations including COA FS due to safety issues	Shortage of Vitamin C and immune boosters for approximately a month
4 - Spintex, Greater Accra region	No change although some people were hoarding antimalarials. Hydroxychloroquine was available as it was prescription only in this pharmacy	No change	No change	Some reduction in COA FS	Fluctuating stockouts of Vitamin C
5 - Sakumono, Greater Accra	Stockouts of hydroxychloroquine	No change	No change	Shortage of COA FS	Shortage of Vitamin C
6 - Kuamsi, Ashanti region	No change	No change	No change	No change	Shortage of vitamin

COA FS is a dietary supplement registered in Ghana as an immune booster. COA FS: Centre of Awareness Food Supplement, FDA: Food and Drug Administration

Box 1: Potential suggestions for reducing inappropriate self-purchasing of medicines and addressing misinformation

Scientific experts should be more involved in disseminating information regarding medicines for use in pandemics versus politicians to enhance the credibility of any communicated messages. This can also include information on herbal medicines given current concerns regarding COA FS and herbal medicines generally and will necessitate greater professionalism among healthcare professionals including community pharmacists

Appropriate channels for the dissemination of information include videos and other media sources in pharmacies and other outlets

There should be greater regulation of the media concerning information on medicines/herbal medicines to address the issues of misinformation as well as enhance their appropriate use

There should be stricter enforcement regarding the self-purchasing and prescribing of antimicrobials; alternatively enhancing the knowledge and activities of community pharmacists through guidelines and other initiatives, especially in rural areas where community pharmacists maybe the only health-care professional available

Increased education of the public to address the issues of misinformation as well as regarding antimicrobials to reduce inappropriate requests

Patient organisations should be contacted where pertinent and in existence to help with dissemination of pertinent information especially given the level of misinformation already surrounding COVID-19

COA FS is a dietary supplement registered in Ghana as an immune booster. COA FS: Centre of Awareness Food Supplement

Another concern with the recent pandemic is the appreciable increase in the prices of medicines and other supplies that has been seen in some countries.^[7,11] This coupled with high demand can lead to a proliferation of falsified medicines [Box 2]. However, the extent of price increases was variable in Ghana [Table 2] compared with those seen in a number of other African and Asian countries.^[7,10,11] The introduction of pricing regulations and controls, as currently seen in India,^[8] is one way forward in countries with high patient co-payment levels where the financial impact on families when family members become ill can be devastating.^[83-85] In addition, we are aware of activities by the WHO and others to address concerns with falsified medicines.^[9,86] Such combined initiatives can enhance the potential for patients to access the medicines they need to treat their conditions. Alongside this, community pharmacists can play a key role enhancing adherence to prescribed medicines through new and existing technologies including

telemedicine and online counselling services.^[40,41,75] This is in addition to being a valuable resource to address misinformation and its consequences as seen with COVID-19.^[13]

Overall, we believe this study highlights that knowledge, attitude and preventive practices related to COVID-19 can often be inadequate, with community pharmacists helping to address this.^[87] Suggested measures for addressing misinformation [Boxes 1 and 2] include scientific experts providing advice on potential treatments rather than non-scientific journalists and politicians, and the need for stringent controls for the advertising of medicines in social media and other sources. Community pharmacists can also make the use of their role as educators to minimise mass purchases and hoarding of medicines, which can minimise stock outs and price increases. Community pharmacists can also be active in addressing misinformation through public education [Box 2].

Box 2: Suggested activities among community pharmacists in the future (based on)

Short term

Community pharmacists can ensure that medicines, or suitable alternatives, that are helpful for patients with COVID-19 are routinely available through pro-active stock control and other approaches

Similarly, community pharmacists can help ensure a continued supply of medicines for other priority disease areas including both infectious and non-infectious diseases, and work with key stakeholder groups to ensure access to essential medicines including home deliveries if pertinent or other approaches building on initiatives including those in South Africa to improve the number of pick-up points for medicines

Work with Government agencies when falsified or sub-standard medicines are suspected to reduce their supply. This builds on current initiatives in Africa

Encouraging self-care/hygiene measures including the supplying and wearing of masks. In addition, emphasise the continued need for regular handwashing recognising this may be difficult where access to water is a concern

Continue to discuss appropriate treatments for presenting conditions including arguing against the need for antibiotics where this is a concern. In addition, encouraging appropriate referrals to other health-care professionals where pertinent and possible

Push for extended supply of medicines where appropriate especially for patients with chronic NCDs. Alongside this, actively take part in initiatives to enhance adherence to medicines using new technologies including telemedicine and messaging services. This especially given ongoing concerns with adherence to medicines in patients with NCDs without regular input from pharmacists and other health-care professionals. Pharmacists can also suggest alternative treatment approaches where shortages exist including potential OTC treatments

Community pharmacists can also become involved in vaccination programmes with research suggesting that when pharmacists provide immunizations, they substantially increase the number of vaccinated people in the community

Longer term

Increase development, retention and training of community pharmacists to be prepared/actively involved in the management of COVID-19 patients, and those in future pandemics, as well as addressing the unintended consequences of any pandemic including the use of technology to address issues with adherence/identification of diseases

Community pharmacists should be part of the development of any plans and workflows to deal with future pandemics and their consequences given their expertise and status among patients

In time, community pharmacists can also become involved in ASPs as such activities progress in hospitals as part of National Action Plans within countries to reduce antimicrobial resistance rates

ASPs: Antimicrobial stewardship programmes, NCD: Non-communicable diseases, OTC: Over-the-counter

We acknowledge there are limitations with our study. These include the low number of community pharmacists taking part in Ghana and issues of selection bias. In addition, the change in demand, price and availability of pertinent medicines including herbal medicines which was reported by the community pharmacists was typically based on their professional judgement and the study did not assess this quantitatively. However, considering reports of similar findings in other LMICs affected by the pandemic, we believe our findings are of interest and worthy of further investigation. We will be following this up in Ghana in the future as well as extending our research to other LMICs including the unintended consequences of COVID-19. We are also aware that falsified and sub-standard medicines can be an issue among African countries due to increased demand of medicines fuelled by misinformation in the midst of shortages, which also warrants further studying. We will also be following this up in the future.

CONCLUSION

We found in this study that majority of participating community pharmacists in Ghana observed increasing demand and prices of antibiotics, antimalarials, herbal medicines and vitamin supplements during the early stages of the COVID-19 pandemic. There were also reports of stock-outs for antimicrobials (especially hydroxychloroquine), multivitamins and herbal medicines especially COA FS.

The role of community pharmacists should go beyond providing medicines and advice on the appropriate use of

medicines. They should become increasingly involved with providing public education and awareness on key messages regarding personal hygiene and social distancing during pandemics. Alongside this, helping to disseminate objective clinical and public health information to clarify and reinforce government guidelines relating to prevention and treatment in future pandemics. This includes reducing requests for antibiotics for essentially viral infections. In this way reduce the impact of misinformation and its consequences.

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Conflicts of interest

There are no conflicts of interest.

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