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Non-conventional medicines supply chain – utility and the need for alternatives as exposed by COVID-19 induced lockdown

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Abstract: This qualitative study follows a root-cause investigation exposing COVID-19 induced national lockdowns' role in disrupting medication 'informal' supply chain. Although not widely documented, I submit that inter-city and intra-country buses are widely used non-conventional medicines' 'couriers' in Zimbabwe. Buses bridge medicine supply and accessibility gaps by taking deliveries throughout the country and beyond. This reduces supply-side induced medicine non-adherence which disturbs pharmacotherapy management of chronic ailments. Lived and observed narrations presented herein clarify this modus operandi. To reinforce medication 'courier' disruptions effects, literature findings illuminate consequences of induced non-adherence in chronic illness management which might outlive COVID-19 pandemic's direct effects. As a matter of urgency, help must be rendered to salvage what remains of affected patients' chances. In addition, a bottom-up proactive online based tool to ensure equitable nationwide medicines accessibility is recommended to ensure effective drug distribution and availability to those in need not merely those within reach.

Keywords: medicine supply chain; COVID-19; chronic illness management; medicines' non-adherence; digital health; healthcare delivery; pharmacotherapy.

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Biographical notes: Felistas Ranganai Zimano holds, *inter alia*, a PhD from the University of KwaZulu Natal, Durban, South Africa and Master's in International Relations from the University of Zimbabwe. Her research interests revolve around an integrated combination of public administration, political science, international relations and international transnational law. She places specific focus on trade facilitation, peace and conflict resolution as well as the African indigenous knowledge systems relevant to those areas. She has keen interest in interrogating the efficacy of classical theories of politics to the contemporary systems. Occasionally, she reads and writes on educational matters with special interest in juvenile delinquency and inclusive education matters.

1 Introduction

At the end of 2019 news filtered in that a novel virus was causing untold deaths in Wuhan City, Hubei Province of China. The virus was first named Coronavirus then later COVID-19 (WHO DONs, 2020). By early 2020, reports of COVID-19's spread to other parts of the world emerged. The virus' presence was picked up in 'China (278 cases), Thailand (two cases), Japan (one case) and the Republic of Korea (1 case)' [WHO Sitrep 1, (2020), p.1]. The most plausible explanation was that the virus was being transported by people travelling out of Wuhan. Once imported into a new place, the virus would further spread through human to human, local and community transmissions (WHO, 2020). The virus can spread from asymptomatic people (WHO, 2020).

To halt the virus' spreading, most policymakers embraced the need to institute controlled movement of people. Accordingly, Zimbabwe and its neighbouring countries joined the lockdown bandwagon. This chapter appreciates the reasoning informing the lockdown but submits that the lockdown disrupted supply chain systems with unforeseen negative consequences in some medical conditions. This paper illuminates lived experiences and observations to validate that long distance buses plying inter and intra country routes are a reliable and widely used prescribed medicines 'courier' system. By stopping inter and intra country traffic, measures to curb COVID-19's spread inadvertently stopped lifelines for several sick people, possibly forcing them into non-adherence. 'Medication non-adherence is a worldwide issue that can lead to poor clinical outcomes and increased healthcare costs' [Davidson et al., (2019), p.175]. According to Brown and Bussell (2011, p.304)

> "Factors contributing to poor medication adherence are myriad and include those that are related to patients, (e.g., suboptimal health literacy and lack of involvement in the treatment decision-making process), those that are related to physicians, (e.g., prescription of complex drug regimens, communication barriers, ineffective communication of information about adverse effects, and provision of care by multiple physicians), and those that are related to healthcare systems (e.g., office visit time limitations, limited access to care, and lack of health information technology)."

Although there are numerous causes as listed above leading to non-adherence, this paper is committed to those factors related to healthcare facilities only – access limitations. Through lived experience intelligence, the paper links these access issues to the courier disturbances caused by COVID-19 induced lockdown. Literature, phenomenology and root cause analysis herein validates that in the pandemonium to tame COVID-19, other 'horses' bolted out into the hills.

2 Problem statement

Supply chain systems in Zimbabwe, as in most developing countries, are still lagging behind (Zimano and Ruffin, 2017, 2018). With most people suffering from chronic ailments that require a protracted use of pharmacotherapy such gaps complicate ailments management. In trying to bridge the gap in the supply chain, some people resort to non-conventional 'courier' systems. As such, by halting movements of goods and people, the COVID-19 induced lockdown disrupted these vital medicines supply systems.

3 Study objectives

1 To expose the place of 'non-conventional' courier systems in medicines supply chain.

2 To investigate the effects of medicines supply chain disruptions in the management of chronic ailments.

3 To illuminate the effects of COVID-19 induced lockdowns on 'non-conventional' medicines supply chain.

4 To proffer recommendations to curtail effects of medicines supply disruptions as well as measures to ensure sustainable accessibility of medicines to all in need.

4 Study contribution

For years, issues of medicine access have been topical as fundamental to the realisation of health rights (Ahmadiani and Nikfar, 2016). There is evident lack of understanding on the predicament of people with limited means in accessing medication. These are people who normally go out of their way and sometimes use unconventional methods to get medication. By exposing the reasons for using buses to transport medication, this paper hopes to expose Zimbabwe medicines supply chain systems' gaps. The paper brings intelligence towards improving medicines distribution networks. There is evidence showing the existence of effective medicines in the management of most non-communicable diseases but these remain unavailable to most in need (Wells et al., 2020). This paper seeks to help in solving these distribution issues. Supply chain systems remain susceptible to disruptions despite several efforts made in managing risk (Nel et al., 2018; Patel and Patel, 2018). Any challenges in medicines distribution channels provide gaps that can be exploited by unscrupulous dealers to push counterfeit medicines into the system. The paper recommends scaling up the use of digital online systems in medicines demand and distribution mapping. Data gathered through digital systems can help in medicines distribution such that medicines are made available to those in need rather than those within reach. The paper also aims to direct those looking into COVID-19 effects to quickly put measures to help salvage what remains of all affected chronic patients' chances.

5 Methodology

This qualitative paper utilises two purposively extracted lived experiences and relevant literature review. This method of using lived experiences, phenomenology, helps scholars learns from the experiences of others' [Neubauer et al., (2019), p.90]. The two informants were interviewed telephonically to share their experiences in medicines access. This was possible because the researcher was privy to these two's contributions in managing their relatives' chronic conditions. This makes the respondents the most suitable to give relevant insights (Ames et al., 2019). To ensure respondents confidentiality, names and other identifying materials have been altered in the presentations herein. Literatures on various aspects related to chronic ailments management, medicines supply chain systems,

digital health and COVID-19 is used to reinforce the lived experiences and the realisation of this paper's objectives. The insights and literature feed into a root cause analysis. The study starts by establishing causal reasons that drive people into using unconventional 'courier' systems to transport medicines. That is followed by presentations into health effects that arise once drug supply is disrupted. Causes and timelines to the supply chain disruptions are enmeshed in the consequent discussion.

6 Insights on medication access: cases from Zimbabwe

Case 1 Scenario

Tunha is a factory worker in Harare, Zimbabwe's capital city. His parents live in Masvingo rural, some 400 kilometres from Harare. For various reasons, pharmacies in his rural area are not as stocked as those in the capital city. Tunha's mother suffers a combination of diabetes and hypertension whilst his father has mild prostate inflammation. Both are on chronic medication. Tunha's meagre earnings allow him to buy only one month's medical supplies since he has other pressing monthly expenses like rentals, transport and subsistence costs. To his convenience, there are buses plying Harare to Chiredzi route daily passing through via his home area. As such, Tunha 'couriers' parents' medication by bus for a nominal fee monthly. However, with the lockdown, Tunha found himself in a difficult place. The number of buses to his rural areas was reduced to one morning bus. In Harare, Tunha is far from the main bus termini. The lockdown in his area was more of a curfew. With his factory closed as non-essential, he did not have permission to move around. He could not make it to the 'courier' bus. To cut the long story short, Tunha's parents defaulted from taking their medication.

Case 2 Scenario

Ravi is a teacher in Harare, Zimbabwe's capital city. Her twin sister, Ruvhe is an illegal immigrant in a neighbouring country doing menial jobs. Ruvhe tested positive for human immunodeficiency virus (HIV) long before becoming an immigrant worker. She is on antiretroviral therapy (ART). Being an illegal immigrant, Ruvhe cannot readily access optimum medical cover in that country. The sisters devised drug courier modus operandi that has worked for years. Ruvhe only comes home once per year and gets her viral load rechecked and records updated. Ravi, the teacher, keeps Ruvhe's pre-filled prescription and collects refill ART supplies on her behalf. Sometimes she gets one month refill whilst on fortunate days she gets three-month refill supply and 'couriers' them by cross-border bus. Although illegal, this is a common 'underworld' practice across the country that has worked for the good of many. Just like in Tunha's case, the lockdown stopped this 'courier' system. Although there was an option for Ruvhe to come back home, it was not as helpful. Returning citizens were expected to go through mandatory quarantine before leaving the neighbouring country and on arrival back home. This would amount to more than 30 days before getting back home. Ruvhe unwillingly defaulted from her routine ARV medication.

Note: Disclaimer: The names and places have been changed to protect the respondents' identity. Any similarities are mere coincidence.

The above are informants' lived experiences giving intelligence on the existence of unconventional medicines supply chain. It is up to the reader to judge the usefulness and uprightness of the above practices. However, the bottom line is in recognising the existence of these channels. The 'courier' system has worked in bridging the medication access for people in rural areas and for some in the diaspora. This is not a one way system. Although not documented herein, the writer is privy to cases in which those working abroad buy medication for their relatives back home and send through cross-border buses. As such, effects of the lockdown measure on this unsanctioned prescribed medication supply chain are substantial as exposed in the forthcoming embedded literature review and discussion section.

7 Medicines access, adherence and management of chronic illnesses

With proper management, HIV joined such ailments as diabetes and hypertension in being non-fatal illnesses (Rosenfeld et al., 2014). Developments in the medical fields have moved it to a chronic illness (NMTPAC & MOHCC, 2016). The use of ART has significantly reduced mortality rate in HIV positive patients (Takalani et al., 2020). This has seen most HIV positive people progressing with their normal lifestyles which include participating in available economic activities. In their pursuit for more lucrative opportunities, some cross borders even without proper documentation. Without proper documentation, immigrants' chances of getting into formal systems are highly unlikely. This movement to other countries may come with difficulties in accessing medication especially for illegal immigrants. Failure to access medication compromises adherence especially for those with chronic ailments. The treatment of chronic illness usually entails a protracted use of pharmacotherapy (Brown and Bussell, 2011). Pharmacotherapy is when a disease is treated using pharmaceutical drugs not those other treatment methods like surgery, radiation and so forth (Recovery Research Institute, 2020). Whilst the prescribed therapies may be good, failure to adhere to proper schedules reduces their effectiveness, reduces therapy safety whilst increasing cost of subsequent therapies (Thorneloe et al., 2017; Gast and Mathes, 2019). It becomes advisable and sensible that one must always take the medication as prescribed. This entails getting the right drugs, sticking to correct doses, intake times and recommended lifestyle. Such demands mean the drugs must always be available to avoid non-adherence.

In terms of drug access for immigrants, each country abides by its own protocols and procedures on who gets access to medication. Most importantly, countries usually guard against illegal foreigners readily accessing locally funded medication. This means for most illegal immigrants, getting chronic conditions' medication may be very expensive or impossible. In all chronic and other illnesses, 'non-adherence to protocol-directed oral medications may place patients at increased risk for morbidity and mortality' [Coyne et al., (2019), p.219]. Non-adherence reduces the effectiveness of medical therapies (Thorneloe et al., 2017).

For various chronic ailments especially HIV medication, countries may also be using different antiretroviral (ARV) regimens. 'Adherence to treatment regimens and schedules is crucial to the success of this therapy' [NMTPAC & MOHCC, (2016), p.10]. As such, one will find it difficult to easily switch from one country's ARV line to another country's line as this can have life threatening side effects. To ensure continued supply of

the same ARV regime, people of means may occasionally travel home or order through foreign offices. For those of limited means and illegal immigration status, use of unconventional medicine 'courier' systems becomes handy.

One of the fundamental factors in managing chronic illnesses is social support. In the context of the twins, Ravi and Ruvhe, the disclosure of the latter's HIV serostatus to her sister is in sync with health experts' advice. 'Serostatus disclosure is an important component of secondary HIV prevention with potential benefits for both the individual by experiencing increased social support and society by reducing HIV transmission risk behaviours' [Shacham et al., (2012), p.29]. Such disclosure opens avenues for support. In Case 2 above, the HIV positive sister made a decision to reveal her status to her sister. That allowed her sister to offer necessary support in her HIV positive living. Accordingly, the plan to have refill medication collected on behalf of the positive sister was guided by the need to support a sister. Although this will not sit well with health ethics, the practise has sustained Ruvhe's life whilst she plies her economic exploits away from home.

There are numerous factors that motivate users to join various drug distribution networks employed legally and illegally across the world (Søgaard, 2019). Some of the factors include availability and accessibility of the drugs in a user's locality. Various ART dispensing models are devised to reduce burden on healthcare facilities and ensure more people access available drugs whilst more stocks are sourced (Fatti et al., 2018). In Zimbabwe the recommended ARV refills are three months' supply. However, to ensure that all get drugs in times of limited supplies, refills are sometimes dispensed monthly. For those working in the diaspora it becomes costly to come monthly for drug refill. This has made the practise of using proxy in medication collection a viable and rife alternative. Once a proxy has collected the refill, the cross-border bus 'courier' system comes in handy. The option to use 'couriers' is also preferred as these regular cross border buses' crew are more knowledgeable in managing border related challenges. The abrupt disruption due to the COVID-19 induced lockdown brought unforeseen complications.

The consistency of ART supply has a bearing on a patient's adherence (Dhliwayo, 2019; Chilunjika et al., 2022.). Buses were bringing a flawless consistency in the supply of chronic medication to several in and outside the country. Disturbances in the consistent use of ART medication can result in viral resistance. As such, it is crucial for authorities to ensure a smooth supply of drugs (ibid.). The resumption of medication after a break may not help the patient (ibid.). The effects of drug resistance in HIV positive individuals are dire if the individuals are still sexually active. Once patients' systems develop resistance, it begins to make a more resistant HIV strain which can then be passed to their sexual partners. ART medication may not work for persons infected with a more resistant HIV strain (ibid.). Therefore, non-adherence in ART medication should be everyone's worry as it has a bearing on controlling new HIV cases.

The health system and challenges in Zimbabwe is highly representative of the situation in developing countries. In most developing countries health facilities are concentrated and comparatively better in urban areas (Ekeigwe, 2019). In rural areas, people usually travel long to the nearest health facilities which are usually poorly resourced (Ekeigwe, 2019). As such, most urban dwellers like Tunha in Case 1 have taken it upon themselves to source and 'courier' medication on behalf of their rural folks. This goes a long way in alleviating the hustles of walking long distances as 'couriers' can just drop parcels at schools closer to bus routes. In turn, school children will pick up these

parcels for delivery to the older citizens effectively removing the long distance travelling burden.

8 Online platforms promise in drug distribution management

For years, issues of medicine access have been topical as fundamental to the realisation of health rights (Ahmadiani and Nikfar, 2016). In Case 1 above, Tunha's predicament in providing parents' medication was compounded because pharmacies in his home area are poorly stocked. According to Vledder et al. (2019, p.158)

> "Despite increased investments in procurement of essential medicines, their availability at health facilities remains extremely low in many low-and middle-income countries. The lack of a well-functioning supply chain for essential medicines is often the cause of this poor availability."

As such, the need to use bus medication 'couriers' comes in handy to solve this unavailability of some prescribed medication in some parts of the country. If pharmacies in his home area were well stocked, Tunha could just send money through mobile money systems for his parents to get medication at their nearest health facilities. There is evidence showing the existence of effective medicines in the management of most non-communicable diseases but these remain unavailable to most in need (Wells et al., 2020). 'Access to (these) essential drugs is contingent upon well-functioning supply chain systems that move drugs from the manufacturer through to end use' [Vledder et al., (2019), p.158]. This brings the need to avail ideas on ways to correct these anomalies in the medicines supply chain. Medicine consumers must be given platforms to actively make inputs in the medicines distribution chain. Medical records from consumers can help in coming up with records on quantities and types of medication demands for a given community. The availability of health data is crucial in health surveying, plans and management systems (Mitchell and Kan, 2019). This information can be shared among players in the supply chain system. The sharing of information improves the system's performance (Ahmadiani and Nikfar, 2016; Ambilikumar et al., 2016).

This paper proposes the development of an online application for patients to upload their location and medicine demands. Information from such an application will be used to guide medicine distributors in their stocking and distribution of drugs. Most importantly, online platforms will bring 'personalised data' which can help providers avail 'customised treatment protocols' (Mitchell and Kan, 2019). This removes a stock-out scenario where a pharmacy can be available in a certain area but be without the right medication for the consumers in that particular area. The prevalence of stock-out scenarios can be traced to the use of naïve methods in which stores' managers use unreliable forecast methods (Govind et al., 2012). Prescriptions' online database will go a long way in ensuring medicines access which is critical in adherence and its benefits in chronic ailments management. This initiative is not purely new as other countries have already made more significant strides in embracing digital health. Digital systems have 'profound effect on health systems, changing the balance of power between provider and patient, enabling new models of care, and shifting the focus of health systems toward client-centred healthcare within low-and middle-income countries' [Mitchell and Kan, (2019), p.113]. Countries lagging behind in digital health initiatives can learn from and make evaluations of those already using them. This will help them launch an even more

relevant digital system to their needs. Some countries seem to overlook the utility of soft infrastructure systems in complementing the hard infrastructure components of the supply chains. As such, tangible aspects in the medicines supply chain may be there but still fail to deliver because they need to be informed by the soft infrastructure to complete the chain. There is urgent need to improve both soft and hard infrastructure components if any supply chain system is to be effective (Zimano and Ruffin, 2017).

The availability of such a platform to inform drug distributors also helps safeguard patients from falling prey to dodgy medicines' dealers. Unscrupulous drug merchants usually exploit gaps to bring in 'fake and substandard medicines to the supply chain, making it difficult for the rural, voiceless poor to access quality safe medication' [Ekeigwe, (2019), p.1]. Out of desperation some people fall prey to these counterfeit medicines which expose their health to serious medical complications. However, this proposed online drug request platform will not solve all supply chain challenges by itself. All stakeholders need to be committed and sincere in their various responsibilities in the supply chain. The need for a robust transport and communication infrastructure and reliable power supply cannot be overemphasised (Ekeigwe, 2019). Once a basic online drug platform is in place, digital developments can be expanded from there. Robust digital systems can be used to enhance e-collaborations in the supply chain management (Hove-Sibanda and Pooe, 2018).

9 Conclusions

The practice of collecting drugs for someone else remains illegal. However, the practise is rife and authorities cannot negate this fact. Lockdown provisions offset the unconventional prescribed drugs 'courier' systems. Once access to medication is compromised, cases of non-adherence spike. For people with chronic illnesses non-adherence reverses the gains made in their medical history. There is a need for governments to make deliberate efforts to track and check out people on lifelong pharmacotherapy to ascertain any non-adherence due to supply disruptions. There is need to appreciate differing economic levels in societies and their implications on people's ability to stock-ahead in times of crisis. There is need for all to acknowledge that due to economic hardships, some families have gone out of their ethical ways to devise survival strategies to help their sick in accessing medication. The use of proxies in ART refill collection is rife and is usually supported by unconventional 'courier' systems. Other challenges in medicines access are due to absence of information to inform the supply chain. This brings the need to develop robust data capturing methods like the online medicine request application suggested herein. This transition to embrace digital health systems comes with several benefits that can ensure medicines supply to those in need. This is unlike the obtaining scenario where medication is readily available in urban areas which make it available to only those within reach.

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