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COVID-19 Pandemic and the South African Podiatrist

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Abstract

The Coronavirus disease 2019 (COVID-19) pandemic is clearly taking a firmer grip on South Africa and more podiatrists will face the potential transmission of SARS-CoV-2. Government response was swift with the implementation of a travel ban, strict national lockdown as well as social distancing and hygiene protocols in line with international health regulations. Co-morbidities such as tuberculosis and HIV/AIDS, endemic to South Africa, are considered a dangerous combination with COVID-19, making many South Africans vulnerable to contracting the COVID-19. Patients with diabetes as well as the aged are vulnerable, both in terms of potential combined complications and challenges in continuity in foot care. The demands of the pandemic may outstrip the ability of the health systems to cope. Should this time arrive, all healthcare practitioners, including podiatrists, would have to step in and take on a role beyond their scope of practice in order to ensure that the healthcare system does not get overwhelmed. It is important for podiatrists to keep abreast with the developments around the COVID-19, in order that they may institute appropriate clinical practice which will ensure maximum protection for themselves, staff and patients as well as providing quality foot health care.

Keywords: SARS-CoV-2; Coronavirus; podiatry; foot

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1. Introduction

Coronavirus disease 2019 (COVID-19), the disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), continues to spread worldwide. South Africa reported its first three confirmed cases in the week starting 2 March 2020, and at the time of writing has over 638 517 positive cases, 563 891 have recovered and 14 889 deaths as at 7 August 2020. At this time, according to the Worldometer (https://www.worldometers.info/coronavirus/), South Africa is the seventh worst affected country in the world. However, the mortality rate is much lower than any similarly affected country, and less than many countries with a lower infection rate. Government response was swift with the implementation of a travel ban, strict national lockdown as well as social distancing and hygiene protocols. The pandemic is clearly taking a firmer grip on South Africa and more foot care practitioners will face the potential transmission of SARS-CoV-2. South Africa is the only African country to date that trains and practices podiatric medicine similar to that of the United Kingdom, Australia, New Zealand, Ireland and Malta [1,2]. Yet, very little information is condensed into appropriate, profession specific resources and management of this outbreak. Here, we review the available evidence to deliver the latest information concerning this pandemic facing the podiatry profession in South Africa.

In 2009, for the first time in history, non-communicable diseases have become the leading cause of global mortality (60%); of these, 80% occur in low to middle income nations [3]. Now, in 2020, for the first time, our disease stricken world is facing a significant communicable disease. Since the advent of the pandemic in Wuhan, China in November 2019, many sub-Saharan African countries stepped up in their preparedness to cope with possible COVID-19 importations. Sub-Saharan Africa has over 1 billion people living there, being particularly vulnerable to the pandemic due to several sociocultural, health care, economic, and political factors [4-13].

Co-morbidities such as tuberculosis and HIV/AIDS, endemic to South Africa, are considered a dangerous combination with COVID-19 [14,15]. HIV and AIDS are still a significant epidemic in South Africa, and the co-infection with COVID-19 results in significant diagnostic challenges [16]. The first critically ill patient admitted to Tygerberg hospital in Cape Town during the COVID-19 pandemic, was co-infected with HIV and SARS-CoV-2 [16]. HIV has been a concern and constant consideration for podiatrists in South Africa [17], as it is for all health workers

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in whom the incidence is high [18]. Diabetes, as in most parts of the world, is a significant co-morbidity in COVID-19, both in terms of potential combined complications [19] and challenges in continuity in foot care [20].

The highest priority of all government authorities should be how to protect the health and safety of the population in the absence of a vaccine [21]. The possibility of transmission of COVID-19 by asymptomatic carriers is contentious [22-27]; they are however potentially a fertile host responsible for spreading the disease in the community. The uncontrolled spread of the virus in an inherently vulnerable population could be disastrous. Extensive community testing advocated by the World Health Organization (WHO) should be a priority in South Africa to identify those carrying the virus and proceed to quarantine them. An appropriate public education campaign should be made available through print and electronic media to inform the citizens about the symptoms of the disease and methods of prevention [6,28].

Quarantine is a very effective method for containing the spread of highly infectious diseases in large populations during a pandemic, but it is only effective if properly implemented [29,30-32]. A state of National Disaster was declared in South Africa on 25 March, 2020, and its national lockdown appears to have had some success; however, the true effectiveness of this intervention will only be determined in months to come. Even though South Africa has one of the world's most vulnerable populations, it appears that the anticipated morbidity and mortality rate has to date not materialized, making the country something of an anomaly in this regard. Mbuvha and Marwala [32] suggest two plausible hypotheses for the relatively slow spread of the virus in South Africa - either the COVID-19 pandemic is still at very early stages of progression or a combination of prompt mitigating measures, demographics and social factors have resulted in a slowdown in its spread and severity. Another possibility is the evidence that the Bacillus Calmette-Guérin (BCG) vaccine's immunomodulatory properties can protect against respiratory infections [33]. The puzzling variation in COVID-19 morbidity and mortality worldwide can be partially explained by national policies on BCG vaccination, but there may be a correlation in countries with a universal BCG vaccination policy [34]. BCG has been used in South Africa since 1973, primarily given to protect against tuberculosis. There is, however, also evidence that BCG vaccination may not protect against COVID-19 infection [35]. These recent studies have, however, not been evaluated, and should therefore not be used to guide clinical practice.

There are no easy answers in terms of the tenuous balance between quarantine of an entire population, the resulting economic hardships and their associated legal and ethical considerations [30,36, see also 37]. Mathematical modelling in South Africa provides helpful references for planning and instituting interventions, but are only as good as the available data gathered over only a few months [9,38-42]. Across most scenarios studied, the results suggest that it may be hard to enact realistic, socially and economically feasible countermeasures without exceeding ICU capacity, and that more drastic measures beyond the current default are needed.

2. The role of the podiatry profession in the management of COVID-19

Podiatrists are not as "at risk" as some other specialized professions, such as oral health care practitioners, who carry the greatest risk of COVID-19 acquisition. This results from face-to-face communication with patients [43], and podiatrists have a distinct advantage in avoiding this direct form of contact. However, in common with oral health care, there is frequent exposure to body fluids such as pus and blood together with fomites (such as surgical instruments), as well as bioaerosols in podiatry clinics [44]. Van Doremalen et al. [45], in an *in vitro* study on the viability of the SARS-CoV-2 virus in aerosol and on different surfaces showed that the virus remains viable for up to 3 hours. However, this experiment only lasted three hours, so the time may be longer. When surface viability was assessed, the virus was detected up to 72 hours later. The virus was more stable on plastic and stainless steel surfaces than on copper and cardboard. This indicates that aerosol and fomite transmission routes are entirely possible [45]. To this end, special efforts to protect or reduce transmission should focus on susceptible populations including healthcare providers, in this case, podiatrists. Figure 1, adapted from the dental model by Koutras et al. [43], provides clinical guidelines for podiatric healthcare personnel on measures to prevent the transmission of the virus in their practices and the public health care sector. The strategies for precautions are intended to guide clinicians with key clinical activities including patient assessment and treatment procedures, personal hygiene measures, infection control and disinfection, pre-operative procedures, isolation, barrier control techniques, and waste management (COVID-19 Disease: Infection and Control Guidelines version 1 April 2020; [46,47]).

Clinical manifestations of COVID-19 are rare or absent in children and adolescents [48,49], therefore early clinical detection is vital to prevent further spreading [50]. Anecdotal findings of skin manifestations have been noted by several healthcare providers who postulated a possible correlation to COVID-19 [50-57]. Guameri et al.

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[50] report three young patients presenting with chilblain-like lesions who were diagnosed with SARS-CoV-2 infection, two of them asymptomatic. Erythematous rashes, urticaria, and chicken pox-like vesicles, were reported by Recalcati et al. [54] in 18 (20.4%) of 88 patients with COVID-19. Lower limb manifestations were found by Basatneh and Vlahovic [51] and another study found a rash on 2 patients without further details [52]. Piccolo et al. [58] noticed an outbreak of chilblain-like lesions on feet and hands contemporaneous with the COVID-19 epidemic in Italy. Of 63 patients, the feet alone were mostly affected (85.7%) followed by feet and hands together (7%) and hands alone (6%) [58]. Information about COVID-19 status was available in a minority of cases; swabs were taken in 11 patients (17.5%) and were positive in 2 cases (3.2%); serology was available in 6 cases (9.5%) and was positive in the 2 patients with positive swabs; cohabitants with confirmed COVID-19 infection were reported in 2 cases and infection was not confirmed in 8 cases [58]. These preliminary results could be useful to define the phenotype of this peculiar skin manifestation. Similar cases were reported in the Middle East [59]. This appearance is quite similar to chilblains, but as there was no history of exposure to cold and no previous personal history of similar lesions, these cutaneous findings were defined as chilblain-like lesions [57,58].

Subsequent reports of such lesions suggest that these are not isolated cases. The presence of microthrombi in patients with chilblains is consistent with the altered coagulation status observed in patients with severe COVID-19 [60], however, the number of tested patients does not allow firm conclusions to be drawn regarding a direct link between SARS-CoV-2 and these skin lesions[61]. The consideration of these factors and the potential for podiatrists to possibly be the first to suspect COVID-19 is still in its infancy and an association of these manifestations with COVID-19 are by no means considered to be established. The unexpected outbreak of acral skin lesions in this epidemic context requires further investigation.

3. Vulnerable patients: diabetes, older people

Diabetes and the aged are both populations that feature prominently in podiatric practice. Given the fragile health systems in most sub-Saharan African countries, including South Africa, new and re-emerging disease outbreaks such as the current COVID-19 epidemic can potentially paralyse health systems at the expense of primary healthcare requirements. The impact of the Ebola epidemic on the economy and healthcare structures is still felt five years later in those countries which were affected [4,62]. Effective outbreak responses and preparedness during emergencies of such magnitude are challenging across African and other lower-middle-income countries [62]. Rogers et al. [20] draw attention to the pandemic, driving significant change in the healthcare system and disrupting the best practices for diabetic limb preservation, leaving large numbers of patients without care. To this end, they developed a triage system for diabetic patients [20, see also 63] in which these patients may be divided into four categories – critical, serious, guarded and stable. In both the guarded and stable categories, homecare and telemedicine are advised [see also 64]. In this instance, the goal of podiatrists during the pandemic is to reduce the burden on the healthcare system by keeping diabetic foot and wound patients safe, functional, and at home. We feel that this is a viable option for the South African high risk patient. Rogers et al. [20] argue convincingly that the role of podiatry in the coming months and years as the full impact of COVID-19 plays out is to stand up and take a leading role in managing lower limb health in people with diabetes. Banerjee et al. [65] identified the barriers to diabetes self-management during the pandemic, and suggested possible solutions to overcome these. South Africa has a serious shortage of podiatrists and inadequate provision of foot care in both private and State Health Services. There are currently 515 registered podiatrists nationally, but probably only 300 practicing for a population of 53 million. Of these, there are only 42 podiatrists working within the state health services. The paucity of data and research into the needs of the South African healthcare sector with respect to the diabetic foot and podiatry in particular, is a concern [66](Clarke and Tsubane, 2008). The importance of podiatrists in this space cannot be overstated [20,63,67-69].

Porcheddu et al. [70] found the patterns of deaths in both Italy and China are similar with fatalities in mostly the elderly with known comorbidities. Older people, especially in lower to middle income countries are bearing the brunt of COVID-19 [71,72]. Mortality appears to be in the forefront of discussion, but the non-fatal burden of the disease must not be overlooked [73,74]. Corcoran et al. [75] investigated the use of telemedicine in the diagnosis and treatment of foot disorders. This was found to be an acceptable method of providing some aspects of podiatry care to patients living in residential homes for the elderly. It was an excellent triage mechanism, and facilitated earlier identification of and intervention for urgent problems [75]. Within the South African context, however, this is an option for only a small part of the elderly population with most not having access to resources [76].

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4. Clinical ethical issues

Concerns have been raised regarding protection of privacy and respect for rights of infected individuals. In the era of COVID-19, fear, misinformation and a detachment from one's calling put professionalism strongly to the test [77]. Triage decisions take an emotional toll on podiatrists. Unclear rules or rules that cause patient distress can lead to moral distress, especially in situations in which protocols require the withholding or withdrawing of treatment against the wishes of patients or their families [78]. The biggest challenge it presents in our context, relates to the existing inequalities in our healthcare system, where the private sector is far better resourced than the public sector. Organs of State ought to be considering ways in which the total pool of resources available in the country can best be employed to maximize the benefits for all citizens, not only the privileged. This can only be achieved through intense cooperation between the two health sectors. Patient confidentiality is entrenched in our relationship with our patients; however, within the context of the pandemic, being a notifiable disease, this obligation is slightly displaced. Results of COVID-19 have to be reported to the National Institute for Communicable Disease (NICD) and contact tracing initiated. Adherence to practice specific protocols to protect the practitioner, the patient and the public must be observed [79].

Despite the reductions we have made in our office schedules, limiting work to what is considered to be essential services (Figure 1); we remain cognizant of the fact that all of the other conditions that we typically treat continue to affect our patients. While social distancing is observed [80] and visits are restricted to just those patients that are deemed to be urgent or emergencies, we should keep in mind that some patients be reticent to speak up enough about their foot or ankle condition, or they might fear potential exposure to the coronavirus to such a degree, that they allow an urgent condition to go unattended for longer than is necessary or safe to do so [81]. Here, we have no definitive answer to address this problem; however, awareness of a shift in the way patients perceive their needs is paramount.

5. Personal Protective Equipment

Airborne transmission as the dominant route for the spread of COVID-19 has been identified [82]. Research studies into personal risk factors for podiatrists have largely been limited to bioaerosols [44,83-87]. Podiatrists must make infection prevention a priority in any setting in which care is delivered [88]. Obviously, COVID-19 infection risks to the patient and provider have to be mitigated through the proper use of Personal Protective Equipment (PPE) [20,89]. PPE should be used based on the risk of exposure (e.g. type of activity) and the transmission dynamics of the pathogen (e.g. contact, droplet or aerosol). The overuse of PPE will have a further impact on supply shortages which have already been detected. According to the WHO, observing their recommendations will ensure rational use of PPE [90]. There has been some conflicting information and recommendation on the effectiveness of the use of face masks for COVID-19, including advice from the WHO [91]. The evidence base on the efficacy and acceptability of the different types of face mask in preventing respiratory infections during epidemics is sparse and contested [91-93], however, argue that it is time to apply the precautionary principle, and encourage people to wear face masks on the grounds that we have little to lose and potentially something to gain from this measure.

In the latest evidence review, by Howard et al. [94], as yet not peer-reviewed, public mask wearing is most effective at stopping spread of the virus when compliance is high. The decreased transmissibility could substantially reduce the death toll and economic impact while the cost of the intervention is low. Perhaps the most recent compelling evidence for the use of face covering, is a study by Zhang et al. [82], reveals that the difference with and without mandated face covering represents the determinant in shaping the pandemic trends in the three epicentres of Wuhan, New York and Italy. Other mitigation measures, such as social distancing implemented in the United States, are insufficient by themselves in protecting the public [82]. The adoption of public face covering has therefore been recommended as an effective form of source control, in conjunction with existing hygiene, social distancing, and contact tracing strategies [82,94].

Furthermore, it has been recommended that public officials and governments strongly encourage the use of widespread face masks in public, including the use of appropriate regulation [82,94]. As of 11 May, 2020, the South African government made the public wearing of facemasks mandatory.

For the practitioner, protection is achievable even without N95 masks or ramp-up of Powered Air-Purifying Respirator (PAPR) [95, see also 96]. In a study of outpatient health care personnel in diverse ambulatory practices, medical masks applied to both patient and caregiver provided effectively similar protection as N95 masks in the incidence of laboratory confirmed influenza among caregivers who were routinely exposed to patients with respiratory viruses [97]. This makes a good case for both the patient and podiatrist correctly

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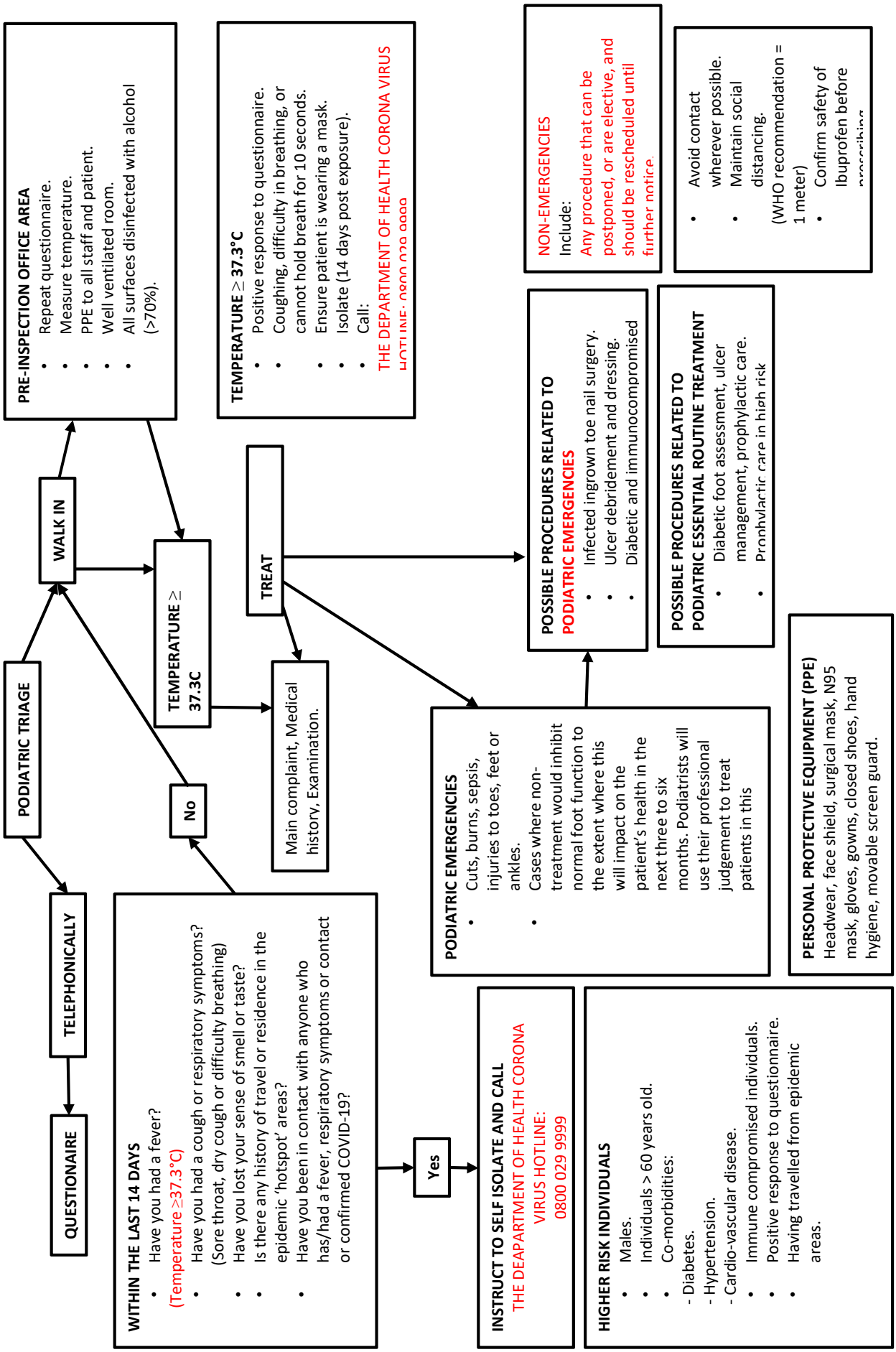

Figure 1: Triage schematic for podiatrists (adapted from Koutris et al. [43]. This flowchart offers some guidance to the practitioner on the management of the patient, staff and the workplace.

wearing masks throughout the entire consultation and treatment. In addition to a face mask, the podiatrist also has the option to wear a face shield (mandatory for some procedures), and a movable screen guard placed between the patient and the podiatrist. Whilst treating the patient, at least in adults, a reasonable social distance is maintained between the practitioner and patient. By correctly using PPE, following social distance and sanitizing protocols, the greatest level of protection may be achieved for both the patient and practitioner.

6. Education outreach and dealing with misinformation

During much of the care given to patients by podiatrists, there is an opportunity for the patient and practitioner to speak. Invariably, at this time, the conversation will turn to COVID-19. This will include the patient's opinion on the pandemic, often seeking validation from the podiatrist. As a health care practitioner with science literacy, it is the duty of the podiatrist to answer questions as accurately as possible. In mid-February, the World Health Organization announced that the new coronavirus pandemic was accompanied by an 'infodemic' of misinformation. Even though misinformation regarding science, technology and health is neither new nor unique to COVID-19, in the case of the current unprecedented pandemic, presents a serious risk to public health [98,99]. Brennan et al. [98], in an extensive analysis of 225 pieces of misinformation, noted a massive increase in fact-checks about COVID-19. Of the data examined, 59% was reconfigured content, based on fact, of which 29% was misleading, 24% was false and 6% misleading. Thirty-eight percent of the misinformation was fabricated, of which 30% was fabricated content, and 8% was imposter content. Finally, 3% of the misinformation was satire. Addressing the spread of misinformation about COVID-19 will take a sustained and coordinated effort by independent fact-checkers, independent news media, platform companies, and public authorities to help the public understand and navigate the pandemic [98]. It is therefore the duty of every scientist, researcher and health care provider, to assist in dispelling obvious misinformation concerning the pandemic. As we practice our profession on the principles of evidence based science and medicine, it is prudent for us to formulate our responses to misinformation, based on the available evidence supplied by *bona fide* scientific sources. As the pandemic is a new experience to the world and research in this field is only a few months old, much of the research output, even though available in open access format, has not been peer reviewed, and should therefore not be taken as definitive at this time [See also 100].

At the time of writing, South Africa is approaching its infection peak. To date, the outcomes of the pandemic in South Africa, are more positive than anticipated. Podiatrists are slowly returning to normal schedules of work. Nevertheless, strict COVID-19 protocols should be kept in place. It is not inconceivable that a second wave of infection may occur, and that we may have to revert to stricter measures. This is especially relevant in light of evidence that suggest that natural herd immunity may be unachievable [101-102]. Should this time arrive, all healthcare practitioners, including podiatrists, should be in a position to step in and take on a role beyond their scope of practice in order to ensure that our healthcare system does not get overwhelmed. Podiatrists should, where appropriate, potentially avail themselves as part of the national emergency volunteer service where triaging and screening of patients take place on all care levels in the country. The COVID-19 Primary Care Facility Preparedness Guide was drafted (revised 6 May 2020) and therein the triage and screening protocols currently underway in Gauteng, South Africa are highlighted [103]. This guide is a good model for podiatrists to follow in terms of how and where they can be of service.

Since the start of the national lockdown in South Africa, a need was identified for healthcare workers to increase their knowledge on and management of COVID-19, therefore the Foundation for Professional Development (FPD) has fast-tracked the development of a short online course. FPD, a South African organization established in 1997 by the South African Medical Association has partnered with The Health and Welfare Sector Education and Training Authority (HWSETA) to provide much needed financial support to make this program free to a limited number of healthcare professionals. In this online course, experts in the field discuss the spread of the virus, protection of self and others, management and treatment options and the public health perspective in containing the spread of the virus.
These talks were presented at the First South African COVID-19 Conference held on 24-25 February 2020 at the CSIR in Pretoria, with attendance by more than 250 Healthcare Professionals who obtained a scholarship from Health and Welfare Sector Education and Training Authority (HWSETA) and co-sponsored by the Foundation for Professional Development (FPD). The Conference was organized by the FPD in collaboration with the South African Medical Association (SAMA), South African Public Health Medicine Association (SAPHMA) and University of Pretoria (UP). By participating in this program, podiatrists will augment their current knowledge of

COVID-19 and contribute to the overall containment of the pandemic in South Africa and globally, whilst simultaneously keeping up to date with their mandatory Continuing Professional Development (CPD).

In times of national disaster, currently part of a worldwide pandemic, podiatrists may be required to carry out duties beyond their usual scope of practice, provided competency is demonstrated to do so. The better every healthcare practitioner is equipped in knowledge and access to resources, the better they are in a position to make a positive contribution.

7. Conclusion

The story of SARS-CoV-2 continues to evolve. South Africa received international acclaim for the speed and severity of its lockdown response to the SARS-CoV-2 pandemic that continues to severely affect the health, economic and social systems worldwide [36]. However, what is not featured, is the impact of this response on South Africa's already precarious health system and fragile economy [36]. This strategy is not sustainable, and the economy will have to open up completely in the very near future if the country is to recover. More pragmatic approaches are suggested, including emphasis on community mobilisation and education on COVID-19, and the widespread adoption of nonpharmaceutical interventions such as use of cloth masks, hand hygiene, and avoiding overcrowded settings [72,82]. It is important for podiatrists to keep abreast with the developments around COVID-19, in order that they may institute appropriate clinical practice which will ensure maximum protection for themselves, staff and patients. The decision about the nature and level of service to be provided remains the prerogative of each practitioner depending on the level of risk assessment and the readiness of the practice.

Conflict of interest
None

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