



RESEARCH ARTICLE

E-GOVERNANCE AND IMPROVED HEALTHCARE MANAGEMENT SYSTEM IN SUB-SAHARAN AFRICA (SSA): LESSONS FROM THE ESTONIAN SUCCESS IN THE MANAGEMENT OF COVID-19 PANDEMIC

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ABSTRACT

Many commentators did not give Africa, particularly Sub-Saharan Africans, a chance of survival at the start of the Covid-19 pandemic in 2019, based on the existing weak healthcare system and the prevalence of other numerous underlying diseases and susceptibilities; there were shortfalls in hospital beds, physicians, and hospitals, making it difficult to manage sicknesses during the pandemic. As a result of these experiences, it was necessary to look into how e-governance strategies could be used to improve healthcare management systems in Sub-Saharan Africa in a period marked by pandemics or infectious diseases. The Estonian e-governance-based healthcare management system was investigated for lessons and possible use in Sub-Saharan Africa to improve the efficiency of the healthcare management system. The theory of policy learning is used as a framework for study by researchers. This research is based on a critical examination of the Estonian healthcare system's experiences with covid-19 pandemics. The findings show that Estonia's e-governance strategies are quite appropriate in health management during pandemics, and that they reduce the need for face-to-face health management and the challenges that come with it during pandemics; and that lessons learned from the strategies can be applied to effective healthcare management in Sub-Saharan Africa.

INTRODUCTION

Covid-19 is one of the worst global pandemic that has left the entire world helpless, and has significant negative effects on every facet of human existence – economy, politics, security, food production, health, education, psyche, sports, etc. The pandemic has aggravated certain conditions; resulting in more displacements, food shortages, malnutrition, decreased access to essential services, mental health problems and so on (WHO,2020). Covid-19 pandemic triggered unprecedented challenges to government in all parts of the world. Governments worldwide have responded differently to the pandemic (Baniamin, Rahman & Hasan, 2020). In the area of healthcare, it has caused a paradigm shift on how medical practitioners communicate and consult with their patients (Bokolo, 2021). Presently, in Sub-Saharan Africa people are afraid of going to hospitals lest they be slammed with COVID-19 infection accusation. This situation is worsened by governments' secrecy involving disclosure of information especially on COVID-19 issues. Sub-Saharan African continent has the weakest healthcare system and a large immune compromised population owing to high prevalence of malnutrition, anemia, malaria, HIV/AIDS, and poor economic discipline.

Experts noted that under the circumstances the pandemic in Sub-Saharan Africa could be challenging to control and the consequences could be dismal. From table 1 it would be seen that the hospital situations in Sub-Saharan Africa(SSA) is terrible, 0.2 physicians per 1000 persons, not even up to one. Then 1.8 beds per 1000 people. With this situation during this covid-19 pandemic how many will be accommodated in isolation centres? Who will attend to them? And so on. The outrageous numbers of people suffering from other diseases are overwhelming and geometrically more than the number affected by coronavirus. Healthcare workers are highly vulnerable to COVID-19 especially in face-to-face management of the diseases. Many of them have acquired SARS – COV-2 and some have died in Sub-Saharan Africa (SSA). Patients with unusual symptoms pose great risk to healthcare workers who may not be suspicious of these patients and adopt adequate protective measure (Chersich *et al*, 2020). Similarly, health workers and patients admitted for other reasons are particularly vulnerable to infection from COVID-19. In one instance in Wuhan, China, a large cluster of infections occurred in healthcare workers and patients (Wang *et al*, 2020). In many Sub-Saharan African countries, healthcare workers became infected. Inadequate hospital beds and the large geographical distances pose tremendous difficulties in transferring ill healthcare workers from rural areas to centres with facilities (Ren LL *et al* 2020; Chersich *et al* , 2020). Drawing experience from the 2014 Ebola virus disease crisis in West Sub-Saharan Africa, Sub-Saharan

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African leaders were keenly aware that failure to contain Covid-19 would threaten health, prosperity and security (Parpia, *et al*, 2016) (Massinga, *et al*, 2020). A country's healthcare capacity plays a vital role in COVID-19 management and control. In comparison to the developed nations such as USA, the UK and China, which have advanced health care systems but are still struggling to cope with the current pandemic, the majority of Sub-Saharan African countries have a weaker healthcare sector (Mo, 2020; OECD, 2020 & McKeenzie, 2020). The limited testing capacity, shortage of trained staff required for diagnostics and intensive care units (ICU), inadequate ventilators and ICU facilities (needed in severe cases of COVID-19), lack of personal protective equipment (PPE) for healthcare workers and scarcity of funds for the health sector, are some of the continent's core healthcare related issues, which make it more susceptible to the COVID-19 pandemic (OECD, 2020; Boston Group, 2020 & McKenzie, 2020). We had earlier noted that public institutions in the continent are disjointed in carrying out their functions; therefore to contain the COVID-19 pandemic requires unique responses to COVID-19. The response could be drawn from lessons from Estonia's e-governance strategies in health management. We use Estonia as a case in point as one of the most advanced countries in e-governance. Estonia built one of the world's most advanced digital society long before the COVID-19 pandemic, providing services such as electronic voting, online learning in schools, digital bureaucracy and healthcare. When the coronavirus crisis struck, this investment paid off as Estonia's digital public services continued mostly uninterrupted (Silaskova & Takashi, 2020).

Table 1. Health Situation in Sub-Saharan Africa (SSA)

Issues	Situation
1. Health Expenditure	2% of \$9.7 trillion spent globally on health
2. Disease Burden	26% of the global disease burden
3. Physicians	0.2 per 1000 people
4. Hospital beds	1.8 per 1000 people
5. Tuberculosis	2.5 million people (WHO, 2020)
6. Malaria	213 million people
7. HIV	26 million people
8. Infectious disease vulnerability	22 countries out of 25 countries of the world
9. Hepatitis B or C	71 million

Source: Nos 1-4 UN Policy Brief, 2020; No's 5-9, WHO, 2020

Pandemics provoke panic, fear, and motivate people to seek help across public healthcare systems creating service waves that can trigger further problems for the service ecosystem, such as overcrowded emergency departments in hospitals, which struggle to handle high demand and constrained capacity (Higor, Ian, & Thorsten, 2020). This becomes a vicious cycle, as according to Gainer (2020), the excessive presence of patients in emergency departments creates even greater contamination in populations. While face-to-face interactions undoubtedly play a central role in the physician-patient relationship (Duffy & Lee, 2018), this is untenable in managing pandemics. This raises a key dilemma for healthcare professionals and organizations: how to provide healthcare without physical interactions with patients (Higor, Ian, & Thorsten, 2020). The study anchors on policy learning theory, which helps policy makers to compare one set of policy problems to others within their own area or in other jurisdiction (it helps in understanding why a policy was implemented, the policy's effects, and how the policy could be adopted to the policy makers' jurisdiction (Moran *et al*, 2009).

Policy learning is a common learning process whereby knowledge, policies, or administrative arrangements shift from one nation or policy domain to another (Zhang, 2017). Policy learning has its derivatives such as policy-oriented learning, policy transfer, policy convergence, and lesson drawing. The concept of policy learning or its derivatives is an umbrella term for explaining and understanding a process in which knowledge about institutions, policies, or delivery systems at one sector, level of governance or country is used in the development of institutions, policies, or delivery systems at one sector, level of governance or country (Rose, 2005; Carroll and Common 2013; Zhang, 2017). Bennett (1991) refers to policy learning as the process in which solutions that worked elsewhere are adopted and implemented to solve domestic problems. Bennett's approach to policy learning suggests that evidence of success in policy, policy strategy and administrative arrangements in country A if learnt leads to the adoption of same in country B. In the case of COVID-19 pandemic health management, the policy makers in Sub-Saharan Africa would compare the policy problems (Covid-19) health management in Estonia and that of Sub-Saharan Africa. This includes studying and understanding of why the e-governance policy on health management was made in Estonia, the effectiveness of the various policy instruments (telemedicine, e-prescription, virtual healthcare and e-prescription and the implementation strategies used. It is the conviction of the researchers that the conviction and understanding of the success of e-health management in Estonia would enable Sub-Saharan Africa countries to enact such policies and effectively implement them. This study examines such policy strategies and instruments in Estonia and presented them in such a way that they could be learned and adopted in Sub-Saharan Africa. Paintsil (2020) declares that Sub-Saharan Africans shall not be forgiven by posterity if we fail to learn the need to improve the epidemic preparedness, infrastructure and health systems of Sub-Saharan Africa, especially the Sub-Saharan Sub-Saharan Africa countries. The World Health Organization (WHO) Joint External Evaluation reports that most SSA countries are not equipped to respond adequately to an International Health Regulations (IHR) hazard, such as covid-19. (WHO, 2020) despite the fact that the region is perennially plagued with epidemics and pandemics.

E-governance adoption in healthcare management has utilities in telemedicine, e-prescription, virtual healthcare approaches in consultations and management of patients' health, and the protection of healthcare practitioners from contracting diseases and for the decongestion of hospitals. Telemedicine is the application of technology in healthcare to enable 'healing from afar' (Strehle & Shabde, 2006; Leite *et al*, 2020). Telemedicine, in the context of e-healthcare, offers a new way to support and promote long-distance clinical care, education, and healthcare, from initial response to recovery, at a cheap cost and with broad coverage. The enormous surge in telemedicine use during the epidemic is not only here to stay, but it has also found applications outside of its original aim of delivering remote patient care (Mohammed & Duarte, 2021; Humphreys *et al*, 2020). Telemedicine improve access to care, reduce the burden on health care systems, and minimize the risk of direct person-to-person transmission of COVID-19 between patients as well as to providers. It can also be used for effective screening and triaging of patients with suspected or established COVID-19, thereby protecting other patients, clinicians, and communities. Although telemedicine precludes the physical examination of a patient, it allows collection of a range of information and can be utilized for outpatient visits as

well as before surgical admission and may therefore be used in preoperative assessment.(Chauhan *et al.* 2020; Mihaji *et al.*, 2020; Charles, 2000; and Wright & Caudill, 2020). Telemedicine can deliver appropriate access to routine care without exposing prone patients (especially those with underlying health conditions) (Hollander & Carr, 2020; Anthony Jnr, 2020; & Bokolo, 2021). Telemedicine has the potential to reduce the exposure of patients and medical practitioners to COVID-19 transmission (Bokolo, 2021). E-Prescription is an electronically issued prescription for a medicine or a medical advice. A doctor fills in a digital prescription on the computer. E-Prescription is understood as the process of the electronic transfer of a prescription by a health-care provider to a pharmacy for retrieval of the drug by the patient. A digital prescription is not printed out on paper, but sent directly from the doctor's computer to the prescription center via the Internet. E-prescription (electronic prescription services) saves both time for both patients and doctors and reduces paper work in hospitals and pharmacies. There are three types of Digital Prescriptions: Private prescription, Delegated prescription and Public prescription. There was a shift to virtual care due to an increase in demand for digital front tools such as patient-facing Chabot to direct the patients to the right care(Arm, *et al.*,2019). In virtual care chatbot, patients, doctors and those who suffered ailments and have been cured, share their experiences and also help in diagnosing ailments and suggesting appropriate care. Virtual care solves many problems such as cultural, religious and social inhibitions that may not allow a male doctor to treat a female patient. It can be suitable in handling cases that go with stigma like deadly diseases, COVID 19, HIV/AIDS. E-residency is a government issued digital identity (ID) and status that gives foreigners the ability to apply for a secure digital residency in the issuing country even though they don't actually live there.

The following questions will be investigated:

- What lessons can Sub-Saharan Africa (SSA) draw from the Estonian e-governance in health management during pandemics?
- What made the Estonia e-governance strategies and instruments in health Management of Covid-19 pandemic effective?

METHODS

In the first phase of the study, a narrative review of e-governance utilities in healthcare management was conducted to identify those practices that are suitable for healthcare management during a pandemic. The key e-governance practices reviewed are telemedicine, e-prescription, virtual healthcare and e-residency. Peer reviewed journals were critically reviewed in extracting the utility of these practices in healthcare management during a pandemic. The second phase was a systematic search of peer-reviewed literature and electronic databases on Estonian model of e-governance in healthcare management e-Estonia, E-health-fact sheet, ViveoHealth, Helmes, Hackthons, Korooakaart, Etonian Mobile HealthNews, etc. Viveo Health (Estonia health tech innovator), created telemedicine platform: It is a Virtual Office for patients, doctors and medical professionals worldwide. The Virtual Office accommodates chat, phone and video functions and works both offline and online, meaning that patients have optimal access to their care providers and a choice of consultation method according to how they feel most comfortable.

Helmes: E-estonia software development project for e-prescription), Hackthons, Korooonakaart Platform: This allows users to take a simple quiz to see whether they have any of the Covid-19 symptoms. It allows any user to track the epidemic's progress. It provides real-time monitoring of several indicators, including the number of confirmed cases (at the national level and by county), the number of tests performed, and the number of deaths. It is simple to use and constantly updated. COVID-help is a platform established by the Estonian start-up Zelos, a volunteer team management platform founded in 2019, that connects elderly persons in need of specific support with volunteers. The study used data from the platforms and sources listed above. The interviews with Estonian Prime Minister Kersti Kaljulaid (Harvard Business Review) and Estonian Minister of Health and Labor Rima Sikkut (EuropaHealth) were thoroughly analyzed and important materials extracted. Data was extracted based on the policy instruments/strategies. Data on each policy instrument used in Estonia were based on the evidences of the utility of the strategy adopted.

Theoretical Perspective: Policy learning is the framework of this study. It is an understanding that provides basis for better policies. The concept of Policy learning as espoused by Bennett and Howlet (1992), May (1992) and Rose (1991) sees learning of a policy as a useful tool in the hands of organizations, institutions and governments in order to achieve the same objective if not better objectives of the learnt policy. Etherge (1991) calls policy learning governmental learning. Learning can be at the micro (individual), meso (organizational) and Macro (Governmental or country) levels. In this study we are concerned about the country level policy learning. The basic issues addressed in learning are the learning object, who learns, the basis for learning. Major issues in Policy learning are the strategies for implementing the policy, the environment of the policy and implementation designs. May (1992) and Zhang, (2017) grouped the issues in policy learning into two: instrumental and social learning. Instrumental learning entails lessons about the viability of policy instruments or implementation design. Social learning entails lessons about the social construction of policy problems, the scope of policy, or policy goals (Loeber & Grin, 2006). Learning from the Estonian healthcare policy therefore, entails an understanding of the policy instruments such as telemedicine, e-prescription, virtual healthcare and e-residency (the policy instruments and design). It also includes a clear understanding of the social problem and policy goals of limiting face-to-face contacts and arresting the spread of the coronavirus disease. In order to foster policy learning, management tools and techniques are adopted such as policy and implementation analysis. Policy learning does occur from haphazard actions. To achieve the social construction of the policy problems requires citizen participation.

Literature Review: E-governance/electronic governance connote the use of information and communication technology (ICT) to deliver various government services citizens in a manner that is convenient, fast, and more transparent. Fang(2002) defines e-governance as a most innovative way for governments and her agencies to use technology to process information and communicate within a web-based environment. In that environment, government use the internet to provide businesses and her citizens with more convenient access to government services and information, improve the quality of the services enable a platform for citizens' participation and contribution in democratic processes

(Alshehri & Dew, 2011). They also see e-governance as the use of ICT in providing information speedily to all citizens, fostering transparency, improving administrative efficiency, improving public services such as transportation, power, health, water, security and municipal services (Milakovich, 2012). E-governance definition can be adapted from the definition of governance. It is the use of ICTs and internet in the exercise of authority in directing, controlling and transforming the process of managing a country's or business' affairs including citizens' or members' articulation and communication of their interests and exercise of their legal rights. We previously mentioned that public institutions on the continent are disconnected in their functions, therefore containing the COVID-19 pandemic will necessitate a distinct reaction to COVID-19. Lessons from Estonia's e-governance standard in health management could be used to develop a response. Because of the near-term economic crisis in Sub-Saharan Africa (SSA) prior to the pandemic, the situation deteriorated to the point that national lockdowns and social distance were blatantly ignored by individuals struggling to survive.

Estonia Model of E-Governance in Health Management: The United nation global index, 2020 on e-governance placed Estonia third (0.95) after South Korea (0.96) and Denmark first (0.98). This was based on indices of telecom infrastructure and human capital development. However, Estonia came first in e-participation and e-residency rankings (1.000) and followed by Denmark (EGDI, 2020 & UN, 2020). Estonia, unlike every other country of the world that was affected by the coronavirus pandemic, but the country used an already existing e-governance analytics; their artificial intelligence powered warning systems and intensive observation methodology helped to bring the coronavirus situation in the country under control in a short time. Our interest in Estonia is on their level of telemedicine, e-participation, virtual health care and e-residency status. All bring out the major virtue of e-governance-citizen centrism.

While other countries scrambled to use their online services that did not cover many aspects of life and battling with how to go about it, Estonia just continued what they had already been doing. Estonia built one of the world's most advanced digital society long before the Covid-19 pandemic, providing services such as electronic voting, online learning in schools, digital bureaucracy and healthcare. When coronavirus struck this investment paid off as Estonia's digital public services continued mostly uninterrupted (Arm, et al, 2019). In this coronavirus crisis most countries started introducing online services especially in education, health and banking. However, because Estonia was already online in almost all the facets of the public services they did not find the coronavirus crisis very challenging. Interestingly, Estonians know how to access and use them. Citizens had already embraced the digital revolution because it was transparent fair and benefit of all. In Estonia, during the lockdown, 99% of government services remained available online. These services have been online every day before the lockdown. Estonia is probably the only country in the world where 99% of the public services are available online 24/7. E-services are only impossible for marriages, divorces and real-estate transactions – you still have to get out of the house for those. Estonia has reached an unprecedented level of transparency in governance and built broad trust in its digital society. Certain benefits such as family benefits are even triggered automatically by events such as the birth of a

child and its registration. In the area of health, digital health records and e-prescription services freed up Estonia doctors, nurses and administrators for the fight against the pandemic. Estonia was the first country to start the usage of digital identity. The Estonian e-health system integrates data from different health care providers to generate a single electronic file providing a comprehensive record for each patient. It looks like a centralized national database, it actually retrieves data as needed from the various services providers, who may be using different systems themselves, and presents it in a standard format. The system also compiles relevant data for national statistics, so that relevant ministries can measure health trends, track epidemics and make sure that national health resources are allocated wisely (Arm, et al 2019).

E-Prescription and face-to-face health management: The digital prescriptions are one of the key innovations in Estonia's cutting edge e-health care system. The electronic prescription service is the most popular e-service with Estonia citizens. It is a naturalized paper-free system for issuing and handling medical prescriptions, which are handled electronically via online forms. Every hospital and pharmacy in Estonia is connected to the system.

In the search for efficiency and excellence, the Estonian Health Insurance Fund and the Ministry of Social Affairs launched an e-Prescription project in Estonia in 2010. The central e-Prescription system was developed by the Estonian state in cooperation with Helmes. The Prescription Centre is a centralized database with the necessary services that provides access for doctors and pharmacies. The Prescription Centre is linked to the Health Information System (EHR), Estonian Insurance Fund and different Health Care Providers via the X-road. All digital prescriptions are collected in the Central Prescription Centre in Estonia. The main goal of the Centre is to provide access to all prescriptions issued in Estonia so that medicine can be bought from any pharmacy in Estonia. A doctor prescribes the medicine in their info system for a patient (everybody in Estonia has their personal ID-code) and sends to the Prescription Centre via the X-road. (Helmes, 2021).

The benefits of this system include:

- Significantly reduced administrative bureaucracy for doctors
- Access to time-critical information in emergency situations
- More patients-friendly health care services
- Increased health care system efficiency
- Automated collection of health trends data
- Drastic reduction in face-to-face contact

This is awesome. They have covered almost all aspects of public service delivery and governance. 100% of schools and local governments have computers, 99% of bank transfers are made electronically, 98% of medical prescriptions are issued online and 98% of the population have ID cards (Homes, 2020). Practically everything and everyone in Estonia is connected to the internet: as measured in 2017 91.4 percent of its citizens are internet users; 87.9% of households have computers, 88.4% use it regularly (Keen, 2018).

E-Residency: Estonia is the first country to offer e-Residency, a government-issued digital ID available under certain conditions, to anyone in the world. E-Residency offers the freedom to easily start and run a global business in a trusted EU

environment. All e-Residents receive a smart ID card, which provides electronic identification and enables the electronic signing of documents. The e-resident ID card and services are built on state-of-the-art technological solutions, containing two security certificates: one for authentication and another for electronic. However, it is not equivalent to citizenship or permanent residency. It does not give the right to vote in elections, nor does it give the holder the permission to enter Estonia or the European Union without a visa (Arm, *et al*, 2019).

RESULTS

What made the e-governance strategies in health management effective were analyzed along the themes of telemedicine, e-prescription virtual health and e-residency.

Estonia and Telemedicine: Data for telemedicine strategy were collected from the studies of Vihma (2021), Haynes, (2020), Bokolo(2020), and solutions of Viveo Health operations, Suve Chatbot, Covid-help platform, Helmes and koroonaraat. The telemedicine strategy in Estonia has been found to be delivering appropriate access to routine care without exposing prone patients(people with pre-existing ailments)in hospital waiting rooms. The use of online questionnaire enables the citizens to know their Covid-19 status on time. The telemedicine company in Estonia is Viveo Health that provides a virtual office for various purposes ranging from prescription to medical labs. Physicians conduct physical examinations maneuvers using audio and image capturing devices to assess the pulmonary, cardiac and dermatologic systems (DiGiovanni *et al*, 2020; Watson *et al* 2020).

Findings from studies show that 95% of patients who were treated via telemedicine rated it to be more useful than conventional office visit (Kojima & Klausner, 2020). It was discovered that Estonian telemedicine applications and projects were built up in cooperation with Sweden and German-Estonian projects (Kohler *et al*, 2014). The difference between Estonian approach and other countries in telemedicine is its international networking with foreign centres of excellence. Sikkut, Minister of Health and Labour asserts that more than 95% of Estonian citizens enjoy access to their own medical records, prescriptions and the most suitable health professionals online. Health providers in Estonia closed their waiting rooms at the beginning of the pandemic and doctors and patients turned to their phones and various internet environments.

Virtual care solves many problems such as cultural, religious and social inhibitions that may not allow a male doctor to treat a female patient. It can be suitable in handling cases that go with stigma like HIV/AIDS. Where it is effectively adopted, it could be a while before patients feel comfortable to go to hospitals and clinics for care which may last beyond the current COVID-19 crisis. The shift to virtual care creates more access points to care, which will drive the need for continued virtual care services post pandemic.

Estonia and E-Prescription: Data collected from (Eurohealth, 2020), (Karin Kõnd and Anett Lilleväli, 2021), (Peeter Vihma, 2021) Maarja Kaasik, 2021), e-estonia, 2020 were analyzed. Prior to the e-prescription system, paper prescription system was in use in Estonia. The paper system wasted the time of all parties involved in the prescribing, buying and the selling of medications; some prescriptions got lost. The doctor's time

was wasted on writing recurring prescriptions and the patients had to spend time awaiting for their appointment in a face-to-face scenario. With the introduction of the e-prescription project in Estonia Physician visits are no longer needed for routine, repeat prescriptions. Patients contact the doctor by e-mail or by phone and then collect the medicine from the pharmacy. In addition, patients don't need to worry about carrying a paper prescription or losing it. Through the patient portal they have a complete overview of their medicines and also a data log for every prescription.

Medical appointments are not required for routine refills, saving time for both patients and doctors. The e-Prescription project makes the health-care system environmentally friendlier. Since the data communications are digitized, it significantly reduced paper usage throughout the health-care sector. E-prescription benefits the patient, pharmacist, state and physician in Estonia. All the hospitals and pharmacies in the nation are connected to the system. By 2012, just 2years after launching e-prescription 84% of prescriptions in Estonia were issued digitally and now 97% prescriptions are digitally done and all the pharmacies readily processing e-prescriptions. According to a survey of citizens' satisfaction with health and healthcare in Estonia, 97 percent of users of digital prescriptions are satisfied with the service. From patient perspective, the main benefit is convenience (Karin Kõnd and Anett Lilleväli, 2021). With approximately 8 million prescriptions issued each year, the e-Prescription solution enables the saving of a significant amount of time for all parties (Peeter Vihma, 2021). This frees up time for both the patient and the doctor and reduces administrative strain on the hospital. The lives of doctors are simplified by the fact that the discount percentage is selected by the system. Face-to-face contact is avoided.

From June 1, 2021 the Estonian digital prescription is accepted at Finnish pharmacies. When purchasing a prescribed medicine, the person only needs to submit an ID card or passport. In exceptional circumstances, such as home visits or power cuts, a doctor will still be able to write a paper prescription. You can purchase medicines with a digital prescription at any pharmacy in Estonia. The acknowledgement of the proficiency and utility of e-prescriptions manifested in the awards it got. The e-prescription system ranked first in the category of e-health projects at an e-service contest, which included 71 new Estonian e-solutions. The e-prescription service is thus representing Estonian e-services at the World Summit Awards. The Estonian Health Insurance Fund also received a quality innovation award in 2011 in the public sector organizations category for the creation and implementation of the Estonian e-prescription system (Kaasik, 2021)

Benefits

- Medical appointments aren't required for routine refills, saving time for both patients and doctors
- Patients don't need to keep track of paper prescriptions
- Reduced paperwork in hospital and pharmacies

Shift to virtual care: Due to the pandemic, with the social distancing prescription there has been a shift to virtual care which is health service deliver through ICT technologies. For instance the shift to virtual care was significant, since there was an increase in demand for digital front tools such as

patient-facing chatbots to direct the patients to the right care. Even after the COVID-19 pandemic the virtual care stays in case of another pandemic. The in-person care will not be suitable in pandemic or disease that are infectious and require social distancing.

E-Residency: Estonia is the first country to offer e-residency—a government issued digital identity (ID) and status that gives foreigners the ability to apply for a secure digital residency in Estonia even though they don't actually live there. The benefits include access to Estonian e-health services from anywhere you may be. In Estonia, e-residency offers opportunity to non-residents to access healthcare anywhere they are. In addition, one can establish a company in Estonia online, and administer it from anywhere in the world. There were 47000 e-residents from 150 countries and 5000 companies owned by e-residents as at 2020.

Lessons from the Strategies: Analyzing what made the Estonian e-governance health management model highlights three lessons.

Long-term digital transformation: Estonia discovered that online government has come to stay and for over 25 years have been developing the system. Two pronged approaches were adopted for this mission namely, digital ecosystem and sensitization of the population to learn and trust in digital tools. Every year a new initiative is launched in Estonia. The ICT infrastructure of Estonia and e-government solutions (including digital authentication and signature) facilitated social distancing while enabling public organizations to continue working without major disruptions (Alamäe, Kitt & Helm, 2020). In 2002, the digital ID-card, which became a global authentication system, was launched. The provision of many public services could continue owing to the digital authentication and signature possibilities, which allow most of the public services to be provided in a digital form, without a physical presence (Alamäe et al., 2020; Salter, 2020). There were already existing structures for e-schooling, e-courts, applying for social insurance benefits, e-prescriptions for medicines, etc (Salter, 2020). There were no major interruptions in internet services and - partly owing to the availability of e-services linked to citizens' identity cards (e.g. digital signature and authentication) – a considerable portion of people were able to work at home.

For instance, E-Banking, E-Tax. Board, E-Cabinet, M. parking, E-school, E-Geoportal, e-esteem-Gateway to e-Estonia, E-Ticket, e-Police, I-voting, E-Justice, E-Notary, E-Business, E-Health, E-Residency, E-Democracy, and Estonian: E-society management in Estonia and cyber security management. These were launched yearly..The lesson there from is that Sub-Saharan African countries should know that e-governance has come to stay, and should embark upon long-term digital transformation. The other prong-sensitization of the citizens to learn and trust digital tools is another thing learnt.

User Experience (UX): The second lesson that the Estonian e-governance strategies in health management is impressive user experience (UX). The Estonian government websites are user friendly, unlike what obtains in most national government websites. The websites, applications and software are all easy to use, and information and services are quickly accessed. This made the citizens to easily and quickly learn and trust the tools.

In a digital world where hundreds of millions of sites can be accessed in a matter of seconds, UX is probably the most important factor in how successful a website is, i.e. its adoption by users. In Estonia it is the KORROONAKAART platform, the prime source of data on the evolution of the epidemic that made UX simple and made the information it provides easy to be utilized by the users. The platform presents the precise evolution of the pandemics on daily basis. This helps in decisions about traveling, latest approach to stay safe, latest effective drugs and treatments, etc.

Collaboration Between the government and Private Operators: The third lesson is the platform model and the fruitful cooperation between the public and private sectors. The most effective platform for this collaboration in Estonia is HACKATHONS. The platform organized an online collective brainstorming event for students, developers, government officials and business leaders. This event yielded useful ideas that took care of the technical and functional feasibility of solutions suggested in the platform.

DISCUSSION

From the Estonian practice of e-governance in the health sector it could be observed that all the attendant fire brigade approach to COVID-19 pandemic were not there. The healthcare system continued to flow. In Sub-Saharan Africa, the ban on international travels restrained those who would have traveled overseas for treatment. If they had gotten e-residency in Estonia they would still be able to access health services. The former chief of staff of the Federal Government of Nigeria, Abba Kyari, who died of Covid-19 during the peak of lockdown, was an example. Sub-Saharan Africa can start serious collaboration with e-governance advanced countries to fully adopt e-governance especially in the area of health. They should apply to countries with e-residency such as Estonia. As a matter of urgency the Sub-Saharan Africa(SSA)n Centre for disease and control (CDC) should try and connect Sub-Saharan Africa(SSA)ns to countries with full e-health (virtual healthcare, telemedicine, e-prescription, and e-pharmacy) so that they can be getting high quality healthcare services. The system is suitable for people who are ashamed of the stigma that will be attached for going to the hospital. This system offers a more friendly health services, reduced administrative burden on doctors, increased health care efficiency and automated collection of health data.

E-governance especially in the health sector will help Sub-Saharan African countries in the fight against fraud in the health sector. The amount of money government officials claim that they spent on the treatment of COVID-19 is alarming. It wouldn't be so with e-healthcare. The online healthcare such as virtual healthcare or telemedicine care is very suitable during lockdown. The people will still be accessing health services from their locations. Sub-Saharan Africa also had lessons to be learnt from other countries and from the previous outbreaks, to act urgently on specific weaknesses and implement strict measures of detection, prevention, and control to enhance preparedness for COVID-19 pandemic. E-healthcare services, as being practiced in Estonia is a clear alternative and solution to inadequate hospital beds, physicians, hospitals and other infrastructural facilities. Many patients have died due to these inadequacies in most Sub-Saharan African countries. Even US and Europe which have advanced health care systems are still struggling to cope with the current pandemic in terms of

delivery of services. However, Estonia has not much stress in handling the health challenges because e-health systems are already operational and strong. Sub-Saharan Africa can manage corona virus by going online in her healthcare system. This will reduce burden on the doctors, nurses and other health officials. They can create virtual healthcare visits where people will interact and learn from other people's experiences. According to the IT minister of Republic of Benin, the country has taken the lead in partnering with Estonian government on e-governance and both countries have implemented the interoperability platform of X-Road. Finally as noted in table 1, there are many other ugly situations in regards to health in Sub-Saharan Africa. E-governance in the health will not end with coronavirus pandemic. It will be there to take care of any subsequent pandemic. Just as Estonia was already using it before the pandemic. There was no stampede when the lockdown was put in place.

CONCLUSION

Diseases and poverty are perennially harassing Sub-Saharan African countries and they have no concrete measures working to overcome these monsters. Then COVID-19 came in such a way that every country of the world is involved and no one to help another. The situation of Sub-Saharan Africa (SSA) countries is that they cannot effectively fight the pandemic with what they have at present. Looking at Estonia from e-governance perspectives we see that their e-healthcare is already in place before the pandemic and there was no stampede when the pandemic started in terms of citizens' access to health services now and after the pandemic. The e-residency made it possible for Estonians wherever they may be to continue to enjoy the healthcare services through e-governance. Sub-Saharan Africa should learn that e-governance in the health sector is for fighting coronavirus now, fighting other deadly diseases and guard against future pandemics. E-governance must be given serious consideration in Sub-Saharan Africa for its potential for fostering stronger institutional capacity building for better service delivery and reducing corruption through transparency. The Estonian model will help in solving the challenges of inadequate physicians, hospital beds, hospitals and others. It will also reduce corruption in the health sector. Estonian e-health system ensures that people get healthcare attention anywhere they are through virtual healthcare and telemedicine-healthcare, while e-residency makes it possible for citizens to take up residency in Estonia and enjoy healthcare services from anywhere.

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