الهيئة النقابية للأطباء السودانيين
بالمملكة المتحدة
SUDAN DOCTORS' UNION
U.K. BRANCH

SUDAN E-HEALTH & TELEMEDICINE

A NO REGRET STRATEGY DURING COVID-19 PANDEMIC

Scoping Document

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Executive summary

Previous attempts to develop an e-Health strategy for Sudan have proved challenging. In 2005 the Federal Ministry of Health and the East Mediterranean Regional Office of the WHO commissioned a paper to consider an e-Health strategy for the country. Despite the production of a comprehensive strategy document, tangible progress has not been made.

In the height of the current COVID19 pandemic, His Excellency, the Prime Minister Abdullah Hamdock asked the Sudanese medical diaspora to revisit this important strategy for the country.

The Sudan Doctors Union UK has prepared a discussion paper that considers the potential benefits of implementing e-health interventions during the pandemic. An attempt by Sudan to execute any aspects of Telemedicine now represents a “no regret” strategy that may serve as a proof of concept for more medium- and long-term development in digital health.

This paper is not intended to be a comprehensive review of e-Health in Sudan but to consider quickly various aspects of such a strategy within the context of COVID19 today and beyond. It is recommended that the actions outlined in this document regarding the COVID 19 pandemic be considered urgently.

Recommendations

1. All actions and recommendations which relate to the use and/or constraints of implementing an e-health service in Sudan which assists in responding to COVID19 should be pursued urgently through the appropriate channels and stakeholders.

2. One of the key enablers to success is easy access to commercially available video platforms across Sudan. Currently these platforms are not accessible to anyone in Sudan due sanctions placed on the country. Efforts should be made to seek temporary relief of these sanctions on humanitarian grounds from the United States government for these companies during the COVID 19 pandemic to aid in Sudan's response to COVID19.

3. This document outlines briefly the perceptions of the SDU UK which will need further development, building on previous contributions from others, in the medium and long term. It should be disseminated widely for feedback and consideration.

4. The Federal Ministry of Health should host a workshop with all key stakeholders such as Government organisations, the Private Sector, Healthcare worker representatives, International Organisations, Non-Governmental Organisations, the Pharmaceutical industry, and diaspora groups to reach a consensus for a roadmap for e-Health. The SDU is committed to working with all stakeholders and friends of Sudan in achieving this goal.

5. A full business case should be prepared (taking into consideration all stakeholder feedback) and be submitted to the office of his Excellency the Prime Minister within the next six months.

Introduction

In May 2018 the 71st World Health Assembly passed resolution WHA 71.7 on Digital Health. It outlined a Global strategy on Digital Health to promote healthy lives and wellbeing for everyone, everywhere, at all ages. The potential of this to advance sustainable development goals (SDG) and to support health systems in all countries in health promotion and disease prevention has been widely recognised. To deliver its potential, the WHO called on member states to develop digital health initiatives guided by a robust strategy that integrates financial, organisational, human and technical resources.

The beginning of 2020 saw the rapid spread of the COVID 19 pandemic. The World Health Organization has assessed each country's preparedness and found that many low and middle-income countries as not operationally ready. They identified significant gaps in preparedness and capacity for technical and operational responses. Sudan is an example of such a country.

COVID 19 is now spreading rapidly in the community in Sudan with a total of 4800 confirmed cases and 262 deaths as of 31 May 2020. This pandemic could not have come at a worse time for the nation. Following the popular uprising in Dec 2018, which led to the ending of the 30-year rule of Omar Al Bashir Sudan finds itself taking gentle steps on the road to change. However, the pandemic has exposed the significant socio-economic and health challenges that have plagued it for decades.

There are significant shortages of testing kits, personal protective equipment, ventilators and healthcare workers. The last 30 years have seen a significant brain-drain of healthcare professionals from the country now working all over the world. As such, the COVID 19 pandemic has put an unbearable strain on an already failing health system. In recent meetings, His Excellency Prime Minister Abdallah Hamdock reached out to the Sudanese medical diaspora asking to them to develop Telemedicine systems to support colleagues who may often be working in remote areas without access to specialist expertise. The prolonged lockdown has also created a potential crisis of access to care for non-Coved patients which may be equal to or greater than the risk to life posed by COVID19.

The Sudan Doctors Union in the United Kingdom and Ireland has looked to respond to this by working to develop a strategy for Telemedicine supported by Sudanese diaspora worldwide. Khartoum is currently the epicentre of the pandemic, but there remains the opportunity to support many of the cities outside the capital, which are 2 to 3 weeks behind.

The development of an E-health program in Sudan during the COVID 19 crisis will be challenging on many levels but represents a no-regret strategy in that it provides the opportunity to support in the short, medium and long-term wellness and health of the population

E-health definition

The WHO defines e-Health as the cost-effective and secure use of information and communication technologies in support of the health and health-related fields including healthcare, health surveillance and health education, knowledge and research. It is an emerging field at the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies.

Importantly the term characterises not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve healthcare locally, regionally, and worldwide by using information and communication technology.

The European Commission definition identifies the different levels where the need is required "...the use of modern information and communication technologies to meet needs of citizens, patients, healthcare professionals, healthcare providers, as well as policymakers".

e-Health encompasses a wide variety of sub-domains of digital health such as:

- Electronic Health Records (EHR)
- Electronic Medical Records (EMR)
- Telehealth and Telemedicine
- Health IT systems
- Consumer health IT data
- Virtual healthcare
- Mobile Health (mHealth)
- Big data systems used in digital health

The application of the platforms can be filled out to different levels of stakeholder interaction:

1- Patient – Health care worker (HCW)

2- HCW-HCW

3- HCW-Executive

The recent emergence of COVID-19 pandemic has tested all health systems of the world, not only in combating the pandemic but by maintaining the non- COVID services.

ZIMBABWE CASE STUDY

In Zimbabwe, the United Nations agency ITU, funded virtual health deployment across the country in a Telemedicine pilot programme created to help the country cope with COVID-19. Over 65% of the population live in rural areas. GlobalMed, an international provider of virtual care solutions, worked with the Zimbabwean Ministry of Health, Ministry of ICT and the telecommunication regulatory agency in making this happen. GlobalMed delivered complete virtual care equipment and solutions - including mobile exam stations, software application and various medical examination devices, all accessible through one platform. Participating health providers used GlobalMed's Transportable Exam Station® (TES), a fully mobile virtual care platform containing a tablet PC. The TES enabled video conferencing, also including several cameras and medical devices in an impact and weather-resistant portable case. The TES is said to have worked in nearly any environment.

Central to the control of the pandemic is a social distancing policy to control transmission. E-health provides an immediate solution by maintaining services while ensuring social distancing.

Dimensions of a digital strategy

- *Decision support and standardised workflows*. Systemising care this way can reduce variation and improve the accuracy of decision making.
- *Patient engagement and self-management*. 'Self-service' options can create more meaningful participation of users, more satisfying outcomes, and reduce the workload of paid staff.
- *More proactive and targeted care*. It reduces costs and allows providers to intervene earlier to keep people well, supported by powerful analytics.
- *Better coordinated care*. It reduces the costs and harms of fragmented and duplicative services. It further supports providers to collaborate more effectively.
- *Improved access to specialist expertise.* Reducing referrals and readmissions by improving the ability of providers to get things right the first time.
- *Improved resource management.* Using technology to plan staff rosters, patient flow, match capacity to demand and improve scheduling.
- *Continuous cycles of learning and improvement*. Creating this through a combination of analytics, improvement science and organisational development.

Telehealth systems and their applications in the COVID-19 pandemic

- Care guidance: Platforms that arms patients with relevant information and reminders at crucial points in their interaction with the healthcare system
- Remote Telemedicine: the remote diagnosis and treatment of patients and digital pathology platforms, using video conferencing over a mobile device or a web portal, allowing them to access physicians, specialists or care professionals from their home
- Patient networks: Health networks that help people find new treatments, connect with others and take action to improve their health outcomes.
- The digitalisation of health data, together with the advent of advanced data mining techniques, has brought forward the possibility of automating and even improving the tasks that healthcare professionals have traditionally conducted in a qualitative or semi-quantitative way. This is essential for computational predictive models for COVID-19, which was created to predict the size of the pandemic concerning time and helps in the prediction of the healthcare resources needed. Challenges of the quality of data can be avoided by providing the necessary unified training for data collection and aggregation. This requires cross-disciplinary, national agreements for data sharing, standardisation, curation, anonymisation, validation, and continuous monitoring.

- Remote cross consultation and clinical decision support like in case of X-ray and CT reading and reporting for early clinical intervention and maximise the use of the current clinical resources.
- Regulation must move quickly to legalise the use of technology and set the legal rules of its application to ensure the right of patient and healthcare providers. Government support for telehealth: Gaps in legislation and the lack of clearly defined regulations for telehealth practices posed uncertainties not only for patients but for doctors as well.

1. Ongoing education tools for HCW: virtual meetings, a glimpse of the future of medical education
2. Regulate and control the unauthorised use of social media platforms to prevent the dissemination of rumours and control the validity of the information which reach the community

Emergency and ICU medicine:

1. Clinical decision-Making Support for COVID19:
    a. Unified updated protocols for the following are essential:
        i. Visual triage
        ii. Patient triage
        iii. Case definition
        iv. Clinical pathways (Suspected and non-suspected cases)
    b. Resources to support the decision (international resources egg. UpToDate. NICE)
    c. Access to consultation remotely with senior clinicians.

2. Training and Research: online training and the following resources are recommended to provide free knowledge training for COVID-19 related topics
    - Class Central
    - Open University
    - Coursera
    - Carnegie Mellon
    - Open Culture
    - Harvard
    - Go High Brow
    - EdX
    - UNESCO Library
    - Amazon Kindle Free Books

The following topics are recommended:

1. Standard precautions: Environmental cleaning and disinfection
2. Decontamination and sterilisation of medical devices
3. Standard precautions: Waste management
4. Standard precautions: Hand hygiene
5. Introduction to Go. Data – Field data collection, chains of transmission and contact follow-up
6. COVID-19: How to put on and remove personal protective equipment
7. Severe Acute Respiratory Infection (SARI) Treatment Facility Design
8. COVID-19: Operational Planning Guidelines and COVID-19 Partners Platform to support country preparedness and response
9. Operational Planning Guidelines to Support Country Preparedness and Response.
10. Infection Prevention and Control (IPC) for novel coronavirus (COVID-19)
11. Introduction to emerging respiratory viruses, including novel coronavirus
12. Clinical Care Severe Acute Respiratory Infection
13. WHO-ICRC Basic Emergency Care: approach to the acutely ill and injured
14. WHO Medical Emergency Checklist
15. Acute conditions, such as severe difficulty in breathing.
16. Resuscitation Area Designation Tool

Successful interventions will generate large amounts of data that will be invaluable in disease surveillance and population health management. Access to e-Health provides opportunities for research collaboration and support:

- Resource planning:
    1. Workforce planning and scheduling to ensure the maximised use of human capital
    2. Planning for consumables, material and medication needs based on surge planning capacity and the current utilisation.

- Demand management:
    1. Using the actual data and the available models to predict the needs over the next days, weeks for proper allocation of the central resources. By continuous revision and update of the available models to predictions for the number of tests needed, Hospitals beds (General and ICU Beds), healthcare workers, PPEs, ventilators, mediation and materials.
    2. Taking the timely decision to regulate the social distancing, curfews, and partial quarantines for the infected territories. To ensure flattening the curve of infected cases using the right decision at the right time.

Business Continuity for non-COVID patients:

Access to high-quality primary health care (PHC) services remains one of the major challenges in the health care system in Sudan. Secondary care driven health policies, lack of financial investment in PHC, lack of managerial capacity, lack of broad population insurance have led to poorly functioning PHC services in Sudan. The impact of poorly functioning PHC system is clearly felt during the COVID19 pandemic.

With the COVID19 pandemic rapidly spreading in the country and the closure of secondary care facilities with COVID patients, a notable surge in non-COVID mortality has been observed. Due to the underdeveloped PHC services there has been a historical reliance on secondary care facilities for the management of both communicable and non-communicable diseases.

Drawing on international and national experiences the *Gezira Family Medicine Project* **(**Mohamed et al 2015) Telemedicine was trialed between specialist and family physicians to support management of complex cases with great success. E-health including Telemedicine can fill the gap in PHC services during the COVID19 pandemic and provide future opportunities for development of these in Sudan. This is especially so in remote parts of the country where there is a significant shortage of trained primary health care personnel.

- Primary Health support:

During the COVID-19 crisis, Teleconsultation can be an effective tool in preventing virus transmission in a Primary healthcare setting. It can also be a useful tool for service delivery provided that the necessary resources, governance and skilled health worker engagement is secured. With the support of colleagues in Primary Care from the UK and elsewhere, meaningful collaboration with the PHC sector in Sudan, through the virtual clinics, can be achieved.

A structured training and education program can be delivered through E-health for family physicians and registrars. “The Family Medicine Hub” run by Sudanese GPs in the UK, is a meaningful example of such an initiative.

An integrated primary health care approach can be adopted to deliver PHC services during the COVID19 pandemic. Virtual training for allied health professional can take place to include nurses, pharmacist, midwives, health care assistants. This can be an effective way to enable knowledge transfer to remote areas using mobile-based applications.

With over 105 languages and dialects are spoken in Sudan, dissemination of public health notices has been difficult, particularly regarding COVID 19. In collaboration with Public Health services, pre-recorded health guidance in local languages can be delivered via microphones and speakers in different regions.

Conflict Zones and Displaced populations

These areas have a unique set of very challenging health and social inequalities that make access to primary healthcare a priority area for health authorities. Telemedicine provides the opportunity to support Healthcare workers on the ground through training, clinical decision

making support and logistics. The SDU remains committed to improving this population's equitable access to health services in these conflict areas.

- Create a Telephone Directory of Services for patients

  With the surge of demand on health care services during pandemics, it is paramount to have an effective triage system to enable directing patients to the right level of health care required and to prevent the influx of patients on the very centralized secondary and tertiary health services.

  Training can be provided for call handlers to perform telephone triage and signpost patients to the appropriate level of service. Triage services worldwide, for instance, 111 in the UK or Saudi Arabia 937 can be useful examples of learning. In collaboration with the state Ministries of Health easy to follow clinical pathways can be developed to allow the direction of patients through health services with an emphasis on PHCs'.

- Vaccination strategy

  While the COVID19 pandemic is diverting available funds and attention, it is paramount that the established childhood and adult immunization programs are uninterrupted in PHCs'. Any shortage in the regular supply and delivery of childhood vaccines can be highlighted and acted on promptly to prevent possible future outbreaks. Furthermore, the high hopes that a vaccine for the COVID19 will become available in the market in the coming months mandates a clear strategy in advance. A plan outlining resources and finance for the sourcing of the vaccine, stratifying patients according to vulnerability and priority for vaccination and the delivery process through primary care is required. A dedicated taskforce supported by the SDU on a vaccination strategy for COVID19 that sits under FMOH can be set up now using remote teleconferencing during the pandemic. Face to face meetings are discouraged during the pandemic, yet there are no facilities for video conferencing jeopardising the wellbeing of the health leadership team and thus the nation.

- Continuing provision of time-sensitive Surgery and Endoscopy

  The COVID pandemic has stopped for a time all elective surgery worldwide. There has also been a worrying decline in emergency surgery rates which has raised concerns that many patients are suffering poorer outcomes. There is a global effort amongst surgeons to draw up guidelines around the continuing provision of surgery in the current state of affairs. Much of this is done online in Webinars and other web-based platforms. A number of new COVID related surgical conditions have also been described and been shared widely and quickly between surgeons across the world. Currently, surgeons in Sudan are not able to participate in this andragogy and find it challenging to understand what current best practice is. Many countries are also beginning to resume elective activity but under very specific and closely monitored conditions. The SDU Telemedicine project will allow remote access to train and support colleagues in Sudan in achieving this. Furthermore, many facets of the 'new surgical norm' are based on virtual consultations in both pre and post-operative care. It is hoped that the system will eventually allow intraoperative support to surgeons in remote areas, giving access to advise from specialists.

Challenges

- IT platforms access

  There are many significant constraints currently. The widely used video conferencing platforms such as Zoom, Microsoft teams, WebEx, are not accessible as a result of sanctions placed on Sudan which do not allow these companies to provide their product to an IP address originating in Sudan. Attempts should be made to seek temporary relief of the sanctions on humanitarian grounds from the United States government for these companies during the COVID 19 pandemic to allow the medical response. This is a critical success factor in saving many lives during the pandemic in Sudan.

  Access to reliable Internet coverage at acceptable speed is variable in the country. In particular, in the more remote areas of Sudan, this will prove a significant challenge. The Internet providers in the country have already, however, demonstrated a strong desire to support Telemedicine. On 2 June 2020, a Telemedicine ICU project was launched in Khartoum. This provided a link between the Al Jabra Isolation and Treatment Centre and remote ICU physicians to provide clinical decision-making support. This is sponsored by MTN Internet provider and acts as a proof of concept. It is now the opportunity to build on such projects to scale across the country into smaller, more local networks. It is the objective of this paper to scope access also from outside Sudan.

- Professional registration

  In order to protect patients and healthcare professionals providing advice and guidance, users should be registered with an appropriate professional licensing body in Sudan. Many of the clinicians who will support the Telemedicine program from outside Sudan no longer hold medical registration with the Sudanese Medical Council. Although they hold registration to practice medicine in other countries, currently there are no arrangements for portability. Discussions with the Sudan Medical Council(SMC) are required to see if this is possible. It may be feasible that for a temporary period of time, the SMC can recognise professional registration in other countries such as the United Kingdom, the United States or elsewhere for Sudanese. There are precedents for this when the General Medical Council of United Kingdom automatically activated registration for doctors who in the past had been registered to practice with them but had forfeited it for a number of reasons. Such an arrangement could be reached in the Sudan Medical Council.

- Indemnity

  Concerns have been raised by healthcare professionals that the care and advice they provide will not be covered by their existing medical defence societies in their home countries. Although some of these provide cover for Good Samaritan acts, it is unclear whether this work will fall into that category. It should, therefore, be the objective that these virtual consultations take place with a locally registered and indemnified practitioner where present

on the virtual consultation who will be the responsible medical officer for the patient's care. Although this does not absolve the practitioner outside the Sudan providing advice of all medico-legal responsibility due to vicarious liability, it does go some way towards mitigation of risk.

Alternatively, practitioners may choose to secure local indemnity insurance either individually or as a group in which the SDU UK may be able to help. Local legal advice in Sudan should be sought.

- Funding

  At this time, there is no clear understanding of how this project will be funded. Possible sources of funding may be from the government of the Sudan, charitable donations from Sudanese diaspora and businesses within Sudan. Upon completion of the scoping process, a more detailed business case with full financial requirements needs to be undertaken quickly.

Governance

All stakeholders should focus on using what is already available on the market. Building ecosystems of existing solutions that support all stages of the coronavirus patient's 'lifecycle' might be more a*ppropriate than developing something from scratch.*

Performance Improvement & Optimisation: We will support the public sector and other healthcare providers improve their performance from a clinical, operational, and financial sustainability perspective.

Ecosystem Transformation & Implementation: we will help regulators, healthcare providers and payers in the development and implementation of target operating models and transformation of the 'ecosystem' of players within the KSA health economy.

Leadership & Workforce Development: We will develop leadership capacity and human resources succession planning, training and change management.

Private Sector Participation & Growth: We will assist clients in the development of deals, transactions, (public/private) partnerships, restructuring, and post-merger integration in the healthcare and life sciences sector.

- First-line stakeholders: Telemedicine providers.
- Second-line stakeholders: Digital services providers (companies),
- Third line stakeholders: Enablers

GROUP 1: Primary Group of Digital Health Service Providers

This group offers services, and its rule is to reduce the load on the healthcare system.

*Telemedicine service providers***:** Depending on the available resources in the state, the status of the telehealth services differs significantly. In general, a good expansion strategy for telehealth companies during the crisis is based on two elements:

Waive license fees for coronavirus triage calls, SMS and/or internet connectivity.

Offers technologies to services for hospitals, including remote training courses.

The main challenge is to scale up capacities by training and hiring new healthcare professionals (HCPs) who would be able to manage COVID-19 related/ Non-COVID-19 calls. Moreover, getting agreements with government firms to legalise the services.

Triage and patient direction service providers: hotline to do tele-triage and direction of the patient to the healthcare facility, which can help the patient if he/she are clinically eligible.

Tracking and tracing service providers: central record for both patient and healthcare providers who are tested positive and who are under home isolation/self-management to ensure that he/she would be receiving hospitalisation in case the clinical condition necessitates. And that they are back to work when he/she is clinically free to cover the shortage in HCWs.

GROUP 2: THE SECOND LINE OF DIGITAL HEALTH SERVICE PROVIDERS

Information technology service providers

Telecommunication companies

Call centre service provider's companies

Online training companies

Clinical decision websites and portals

International organisations responsible for updating clinical guidelines, e.g. WHO

GROUP 3: ENABLERS

This group of players is currently in the first line of fighting the pandemic. They hold the keys to make digital health a core component in improving quality (triage, testing), reducing the workload and the infection risk of the people working in the healthcare system.

Hospitals, HCPs, caregivers: Governmental hospitals, university hospitals, institutional hospitals, medical syndicates, independent physician groups, and NGO and they will be the service providers.

Governments: They have started to see the potential of digital health tools to reduce testing and in-hospital patient numbers. They should waive restrictions on telehealth services, by allowing first-time visits and extending geographic reach, as well as screen, select, promote and financially support digital health tools along the entire coronavirus crisis value chain.

Pharmaceutical companies: support by providing home medication packages, help in promotion/ community awareness about the digital heal services of the digital services and how to use. And this can be a part of companies' corporate social responsibility.

Central Governing body

A central governing body should be formed with equivalent representatives in the districts and states which contains and is not limited to the following stakeholders:

- Clinical board
- Administrative Authorities Board
- Information technology and Infrastructure Board
- Community representatives and patient advocacy

The role and responsibility of the governing bodies:

1. Defining the scope and function of the group
2. Drafting the regulation and policies for government approval
3. Performance Improvement & Optimisation: we support the public sector, and healthcare providers improve their performance from a clinical, operational, and financial sustainability perspective.
4. Ecosystem Transformation & Implementation: we help the regulators, healthcare providers and payers in the development and implementation of target operating models and transformation of the 'ecosystem' of players within the KSA health economy.
5. Leadership & Workforce Development: we lead the way in leadership and human resources succession planning, training and change management.
6. Private Sector Participation & Growth: we assist clients in the development of deals, transactions, (public/private) partnerships, restructuring, and post-merger integration in the healthcare and life sciences sector.
7. Setting the detailed strategy and in initiatives based and best practice considering the available resources
8. make the action plan with the identification of the accountable stakeholders and responsibilities of each of them with a defiant time frame
9. Securing the resources needed for action plan implementation and ensure the success
10. Following up the implementation and providing the guidance for the execution group for issues related to the implementation
11. Setting the performance measures and sets of KPIs which are easy to collect and reflect the actual performance of the groups and functions.
12. Change their scope as necessary to ensure the success of the initiative.

Recommendations:

1. Creation of Telemedicine services both for COVID-19 screening and managing non-COVID-19 cases via telephone/mobile.
2. Creation of virtual chatbots and webbots for COVID-19 patients.
3. Delivering Out-Patient and post ED visit follow up care by virtual visits.
4. Tele-intensive care units using the support of ICU consultants and specialists' services remotely.
5. Offer diagnostic support (Pathology, Radiology, Physiological testing)
6. Public dissemination of information related to COVID-19 infection (SMS, chatbots and webbots, Social Media)
7. Integrating the rapidly evolving treatment protocols into clinical decision-making tools (Telegram, WhatsApp, portals, SMS, chatbots and webbots, Social Media)
8. Administrative support to HCW using digital tools
9. Digital technology systems to connect regional authorities with the Federal Ministry of Health Command and Control COVID Centre. This will allow the creation of a dashboard to inform the decision-making processes. Such tools can help set up interactive two-way communication between even in remote areas with their respective administrative portals for real-time information exchange, data management and resource management solutions.

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