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Abstract

Background: Harnessing digital technology for health service provision is inevitable, especially after the dramatic increase in demand during the COVID-19 pandemic and the observed global disruption of health services especially for People Living with Noncommunicable Diseases (PLWNCDs).

Aims: To document and share experiences, challenges and lessons learned from the use of digital health interventions (DHIs) for noncommunicable disease (NCD) service delivery during the COVID-19 pandemic in the Eastern Mediterranean Region (EMR).

Methods: We conducted a documentary research on the use of DHIs for continuity of NCD services during the COVID-19 pandemic in EMR. We collected our data using a questionnaire that was developed and administered by email to WHO NCD focal persons at the ministries of health of all EMR countries. Using the WHO classification of DHIs we then mapped the various interventions and the stakeholders involved.

Results: Seven countries – Islamic Republic of Iran, Jordan, Oman, Qatar, Saudi Arabia, Sudan, and United Arab Emirates – shared their documentations. Documented DHIs used by countries to overcome the disruption of services during the pandemic were mostly on the use of client-to-provider telemedicine for NCD services. The level of implementation varied between countries. NCD and mental health helplines and COVID-19 prevention awareness campaigns for PLWNCDs were the most mentioned interventions.

Conclusions: DHIs for NCD service provision were implemented during the COVID-19 pandemic in all settings: high- middle- and low-income countries in the EMR. There is a high potential for incorporating DHIs within health systems to increase access to health services beyond the pandemic. Documentation, regulation and national capacity-building for mainstreaming DHIs in public health services in the EMR are strongly encouraged, based on each country's needs.

Keywords: digital health, telemedicine, noncommunicable disease, NCD, COVID-19, Eastern Mediterranean Region, EMR

Citation: Elrayah EE, Fouad H, Mandil A, Nour M, Hammerich A. Experiences and lessons from using digital technology for noncommunicable disease services during the COVID-19 pandemic in the Eastern Mediterranean Region. East Mediterr Health J. 2024;30(3):173–181. https://doi.org/10.26719/emhj.24.009.

Received: 21/06/23; Accepted: 30/11/23

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Introduction

Digital technology has been in use for health, humanitarian and emergency service delivery for some years (1–3). It has been extensively used to optimize and track humanitarian assistance reach and efficacy (2). However, the COVID-19 pandemic was a trigger for the boom of digital solutions for health worldwide (4). The sudden onset of the pandemic and the need to limit peoples' movement and physical interaction resulted in massive disruptions to the delivery of health services, especially for People Living with Noncommunicable Diseases (PLWNCDs) given their need for continuous uninterrupted care and their increased risk of severe COVID-19 (5–8). Hence, effective interventions to alleviate the suffering of affected people were urgently required. Digital health and telemedicine were principal interventions to replace in-person consultations and bridge the physical cleft between healthcare providers and beneficiaries (9).

Digital health intervention (DHI) is “a discrete functionality of digital technology that is applied to achieve health objectives and is implemented within digital health applications and information and communications technology”, while client-to-provider telemedicine DHIs entail the “provision of health services at a distance; delivery of health services where clients/patients and health workers are separated by distance” (10). Fostering technology for the health of the people and the use of DHIs has been firmly advocated for and supported by WHO(11). The regional vision 2023 for the WHO Eastern Mediterranean Region (EMR), states that one of the main approaches of the organization is to “invest in technological advances that are appropriate for national needs and that support the achievement of the regional priorities” including the achievement of Universal Health Coverage (UHC) (12).

A WHO assessment of service delivery for NCDs during the COVID-19 pandemic in the EMR conducted in mid-2020 indicates that significant disruption occurred to NCD services in all EMR countries with varying intensities, mainly affecting services for cardiovascular diseases, diabetes, cancer, chronic respiratory diseases, and mental illnesses (13). Innovative approaches were adopted by countries to reach thousands of PLWNCDs through these fostered methods (13). Those interventions played a critical role in safeguarding the practice of effective physical distancing and restriction of population movement. This research documents the use of digital health with specific focus on telemedicine interventions for NCD service delivery in the EMR during the COVID-19 pandemic. This will help understand the scope and reach of the interventions, the associated challenges and lessons learnt.

Methodology

Beginning from May 2020, 6 months from the onset of the COVID-19 pandemic, and after the reporting of NCD services disruption in EMR (13), the WHO Regional Office for the Eastern Mediterranean (WHO/EMRO) initiated a process to retrospectively document, describe and map the use of DHIs for continuity of NCD services in EMR countries. EMR countries include: Afghanistan, Bahrain, Djibouti, Egypt, the Islamic Republic of Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, the West Bank and Gaza Strip, Qatar, Saudi Arabia, Somalia, Sudan, the Syrian Arab Republic, Tunisia, the UAE, and Yemen (14).

We conducted a documentary research using a questionnaire that was developed for data collection. We shared the questionnaire by email with WHO NCD focal persons in all EMR countries who coordinated data collection with the ministries of health. The questionnaire elicited information on the scale of the effect of the pandemic on NCD service provision, description of the country’s DHIs for NCDs, DHI components, stakeholders involved, resources, implementation processes, challenges, and lessons learned. WHO/EMRO followed up the data collection process with the focal persons at country level.

Content analysis

The NCD surveillance team at WHO/EMRO reviewed and analysed collected data and classified the interventions (15). We reviewed filled copies of the questionnaire to produce documentation narratives and shared the narratives with the respective countries for validation and approval. We then analysed the approved narratives thematically according to the type of intervention implemented and categorized and classified them using the WHO DHI classification (15). The classification groups interventions into 1.0 for client interventions, 2.0 for healthcare provider interventions, 3.0 for health system manager interventions, and 4.0 for data services interventions, with different subclasses for each category (15). We used this classification to review, classify and map the scope of the interventions shared by the countries. We then mapped the methods used for each intervention and listed the stakeholders involved in the implementation of DHIs in the countries.

Results

By August 2021, 7 countries – Islamic Republic of Iran, Jordan, Oman, Qatar, Saudi Arabia, Sudan, and United Arab Emirates (UAE) shared their documentations.

The interventions documented were as follows (Table 1):

Islamic Republic of Iran

Telemedicine was implemented in phases through the Ministry of Health (MoH), starting with COVID-19 screening services at the primary healthcare (PHC) level and then extended to include outpatient clinics. Community health workers (CHWs) followed up and guided PLWNCDs on self-management using a people-centred approach with the engagement of local communities and involvement of stakeholders at the local level (Table 2). Nongovernment organizations (NGOs) were responsible for responding to the needs of cancer patients and providing counselling and advice via telephone, including providing guidance on selfcare at home and during emergencies and preventive practices in public places and health facilities. Private companies provided telemedicine services, including online booking and tele-consultations, using telephones and other mobile devices.

Jordan

Hotlines were established and operated through a collaboration between the MoH, associations of psychiatrists and psychologists and NGOs to ensure continuity of mental health services and consultations during the lockdown. MoH, in collaboration with the Centre for Strategic Studies at the University of Jordan, with the support of the WHO country and regional offices, conducted a

web-based assessment of accessibility to NCD medications during the pandemic and as a result, helplines and home delivery of medications for PLWNCDs were established with the support of UNICEF. Patient record systems were improved with the support of a nursing syndicate to overcome the challenging and frequently incomplete, outdated or missing patient records.

A helpline was established by MoH in collaboration with the Ministry of Digital Economy and Entrepreneurship and the National Call Centre to provide remote tobacco cessation services to Jordanians and refugees. Nicotine replacement therapy (NRT) was added through collaborations between the government, Access Initiative for Quitting Tobacco (16), the private sector, and others. Additionally, “Florence”, WHO's first artificial intelligence virtual health worker for tobacco cessation, was launched in Arabic language (17).

Oman

The MoH re-oriented health services to triage NCD patients according to the control levels of their conditions; remote health services were made available to those with controlled conditions. Hotlines were introduced for people living with mental health conditions including healthcare workers and the public. Social media were used to provide information on self-management of NCDs and mental health conditions. Consequently, 2 rapid assessments were conducted online to evaluate the newly established methods and inform improvements, including the incorporation of virtual consultations into the national information management system (Alshifa System) and the development of standard operating procedures (SOPs) to standardize practices for eHealth and telemedicine for NCD services in PHCs.

Qatar

The Ministry of Public Health fast-tracked digital health implementations and several established programmes for NCD services, including virtual video consultations, medications home delivery, COVID-19 self-assessment chatbot, remote sick leave application, and others. A helpline was launched to support people experiencing mental health challenges through a collaboration between the Ministry of Public Health, the Primary Health Care Corporation and the Mental Health Service at Hamad Medical Corporation. This collaboration was fundamental to the success of the intervention (Table 2). The helpline was staffed by a team of mental health professionals who could assess and provide the needed support to callers. The helpline received more than 13000 calls during the lockdown.

Saudi Arabia

The MoH used technology and mHealth to provide remote health services. Telephone hotlines and many smartphone applications, including e-booking, medical consultations, e-prescriptions,

contact tracing, and other applications were used to facilitate physical distancing and respond to health-related queries. A health volunteering platform was established to train healthcare professionals on how to provide services at all levels through the digital platforms. Recently, other applications were developed to facilitate and regulate the rollout of COVID-19 vaccine and vaccination.

Sudan

The Federal MoH and WHO Sudan Country Office established telemedicine services through a hotline for PLWNCDs during the pandemic to provide consultations, triage, counselling, diagnosis, and referral. This initiative included online training of family physicians on remote health service provision to prepare them to be the primary providers, with a secondary objective to advocate for the role of family physicians within the health system. Messaging services were activated to share prescriptions and laboratory test results and these were linked to the electronic patient records to allow retrieval and follow-up. Collaborations, public-private partnerships and early involvement of key stakeholders were key to the success of these interventions, including partnerships with the academia, medical associations and telecommunication service operators (Table 2).

UAE

The Ministry of Health and Prevention started using telemedicine and mHealth to transform NCD services. Hotlines for mental health consultations were established and medication supply chains were protected and prioritized and continued to function efficiently, including the introduction of medication home delivery services. Health awareness messaging through social media platforms was activated. Capacity-building and e-learning activities were implemented to support the services. All process, outcomes and strategic indicators related to the implementation of digital health and telemedicine were monitored by the Office of the Prime Minister.

Table 1 presents the main categories of DHIs imple-mented by countries and Table 2 presents the stakehold-ers involved in implementation.

Main challenges reported by countries

Countries highlighted the key challenges they faced during implementation of DHIs as follows:

There were challenges with infrastructure, technological and internet capacity, and the readiness of health systems to incorporate service digitalization. Countries expressed concerns about data and information security breaches associated with information-sharing, as well as incomplete, outdated, or missing NCD patient records and contact information. There were issues with acceptability of telemedicine and digital methods by beneficiaries especially older PLWNCDs, unexpected high demand for remote and virtual NCD and mental health services. There were also concerns about the sustainability of DHIs for NCDs beyond the pandemic, considering the limited crisis-specific and/or time-bound funding. Regulation and guidance on the use of DHIs are limited.

Lessons learned

Remote service provision and DHIs are vital for health service delivery and access, where conventional channels are compromised. Political commitment is a core pillar in mainstreaming DHIs for health and for the sustainability of interventions. Multisectoral partnerships and key stakeholder engagement are mandatory to build consensus on priorities and strategic planning for effective and sustainable foundation. There is also a need to focus on locally generated content and approaches as population-specific interventions are more likely to be accepted and used.

Discussion

This paper highlights the wide range of DHI initiatives for NCDs in some EMR countries and the potential to provide remote NCD services during the COVID-19 pandemic and beyond across countries with different income levels. Most of the documented initiatives fall under the client-to-provider telemedicine category, given that the disruption of services was the main trigger. Generally, the interventions cut across most categories of DHI classification: NCD patients and PLWNCDs, NCD services and healthcare providers, health system managers, and NCD-related data collection, management, and utilization. However, the level and objectives of implementation and methods varied between countries based on the capacity of pre-existing infrastructure and preparedness of the telecommunication and health systems (10). To be efficiently implemented, DHIs need to be embedded in established digital technology infrastructure and well-equipped health systems (10). These fundamental requirements must be secured beforehand for DHIs to succeed as described in the first WHO guidelines on digital interventions for health system strengthening (10).

EMR countries had different baseline points on which to build their DHI initiatives in the wake of the pressure and demand for complementary DHIs at the beginning of the COVID-19 pandemic (18,19). Some countries, like Qatar, Saudi Arabia and UAE already had well-established digital technology and communication infrastructure and in some cases only needed to accelerate already existing initiatives. However, other countries needed to invest in establishment of the needed infrastructure.

Nowadays, digital access and connectivity infrastructure are considered a fundamental part of health determinants (19). They are prerequisites for the success of DHIs, in addition to the fair levels of technology literacy among the beneficiaries (20,21). Therefore, a rising concern is that another gap may arise regarding equity in access to healthcare with the increased use of technology because of the current uneven distribution and access to internet and information technology resulting from socioeconomic disparities. Unless this is tackled, this digital divide will increase the deeply rooted inequitable access to healthcare, which has been exposed by the COVID-19 pandemic (21–23). The diversity in uptake and acceptability of modern methods by the different age groups and societies, as highlighted by many of the countries in this exercise, can contribute to this gap and potentially defeat the purpose of increasing service reach and coverage and easing access. This concern has been cited in the literature as an issue to be considered when mainstreaming telemedicine and other DHIs (23).

Harnessing technology for combating NCDs and other health conditions is necessary and inevitable in bridging the gap in health services provision, especially in low- and middle-income countries (21), however, many concerns have been raised in that regard. Data security and the potential threats of violation and privacy breach have been highlighted by many countries (20). Regulation and legislation are not advancing at the same pace with the progressively increasing use of digital methods for healthcare, opening a window for intentional and unintentional misconduct (20). However, some of the countries have gone further to provide guidance on the use of telemedicine with national guiding documents (24,25). For effective and sustainable implementation, every country needs to develop national regulations and guidance for DHI implementation in line with global norms and standards (11).

Countries have been using DHI broadly for health education, counselling and behavioural change messaging targeting NCD risk factors and COVID-19 control measures and practices. In such interventions, content and approach contextualization is mandatory. For example, behavioural studies can be conducted on the use of DHIs for communication to ensure that they are culturally sensitive and appropriate. This approach was adopted in an intervention implemented by the World Food Programme in Nigeria in 2018, in a humanitarian emergency setting where mobile phone technology was used to tackle malnutrition and improve nutritional behaviour among beneficiaries (26). Implementation was preceded by qualitative formative research to develop a social behavioural change communication (SBCC) strategy for the planned intervention. SBCC through mHealth has been tested for other purposes, including increasing vaccine coverage and malaria treatment and prevention (27,28). The use of this combination can enrich DHIs for NCDs and NCD risk factors communication using locally generated data.

The pivotal role of political commitment and ratification for mainstreaming and sustaining digital technology for NCD service provision have been highlighted by countries (10). In this regard, a collective decision was made in 2018 by WHO Member States during the World Health Assembly to recognize and endorse the use of digital technology for the health and wellbeing of the people and to serve and advance the UHC agenda in countries with different economic levels (11). Countries were encouraged “to improve health for everyone, everywhere by accelerating the development and adoption of appropriate, accessible, affordable, scalable and sustainable person-centric digital health solutions” (11). This decision represented the highest level of political commitment for the use of technology for health.

All the countries that responded to this documentation mentioned the involvement of different stakeholders as an enabling factor for the implementation of DHIs for NCDs during the pandemic (Table 2). We therefore encourage all relevant entities, government institutions and ministries, UN agencies, academia, telecommunication companies, communities, the private sector, and others to intensify collaborations to scale-up DHI in the EMR in alignment with the WHO/EMRO Vision 2023 goal of “Health for All, by All” (12).

Study limitations

This assessment did not cover all EMR countries and may not have accurately analysed the uptake and impact of the reported DHIs in the reporting countries.

Recommendations

In conclusion, we recommend that DHIs should be brought to the forefront of the agenda of governments, policymakers and stakeholders to enhance sustainability of essential NCD services. Strategic health planning should include remote health service provision and telemedicine, it should not replace orthodox service provision but reinforce the health system, especially in the face of barriers, movement restrictions, cost, extreme climate, conflict, etc. Countries should establish collaborations, especially between the public and private sectors, in addition to the involvement of key stakeholders throughout the planning stages to ensure sustainability of DHIs. Regulatory procedures for DHIs should be initiated and activated, including evidence-based policies and frameworks. Clinical practice and training guidelines should be adapted to include the use of DHIs. Regulation and enforced compliance to ethical norms and data security as well as governance, protection, storage, and sharing should be reinforced and optimized to safeguard patient safety, privacy and traceability. Countries need to minimize gaps in access to technology and connectivity to facilitate the implementation of DHIs and enable patients to benefit from them. Evaluation of the impact of DHIs on access to healthcare service and patient satisfaction is needed to appraise the cost-effectiveness of DHI interventions for NCDs in EMR countries.

Acknowledgment

We acknowledge the contributions of the focal persons and informants at the country level to the documentation of the case studies, specifically, Dr Alireza Moghisi from Iran, Dr Refqi Mahmoud from Jordan, Dr Shadha Al Raisi from Oman, Dr Kholood Ateeq Al Mutawa from Qatar, Dr Shaker A Alomary from Saudi Arabia, Dr Eiman Hag from Sudan, and Dr Buthaina Abdulla Bin Belaila from UAE.

Funding: None.

Competing interests: None declared.

Expériences et enseignements tirés dans le cadre du recours à la santé numérique pour les services de prise en charge des maladies non transmissibles pendant la pandémie de COVID-19 dans la Région de la Méditerranée orientale

Résumé

Contexte : La mise à profit de la technologie numérique pour la prestation de services de santé est inévitable, en particulier après l'augmentation spectaculaire de la demande pendant la pandémie de COVID-19 et la perturbation mondiale de ces services, notamment pour les personnes vivant avec des maladies non transmissibles (MNT).

Objectifs : Documenter et échanger des données sur les expériences, les défis et les enseignements tirés dans le cadre des interventions de santé numérique pour la prestation de services relatifs aux MNT pendant la pandémie de COVID-19 dans la Région de la Méditerranée orientale.

Méthodes : Nous avons mené une recherche documentaire sur le recours aux interventions de santé numérique dans le cadre du suivi de ces services durant la pandémie dans la Région. Nos données ont été recueillies à l'aide d'un questionnaire élaboré et administré par courriel aux points focaux de l'OMS pour les MNT au sein des ministères de la Santé de tous les pays de la Région. À l'aide de la classification OMS des interventions de santé numérique, nous avons ensuite cartographié les différentes interventions et les parties prenantes impliquées.

Résultats : Sept pays – l'Arabie saoudite, les Émirats arabes unis, la République islamique d'Iran, la Jordanie, Oman, le Qatar et le Soudan – ont partagé leurs documentations. Les interventions de santé numérique recensées qui ont été menées par les pays pour surmonter la perturbation des services pendant la pandémie concernaient principalement le recours à la télémédecine entre patients et prestataires dans le cadre des services liés aux MNT. Le niveau de mise en œuvre variait selon les pays. Les lignes d'assistance téléphonique consacrées aux MNT et à la santé mentale ainsi que les campagnes de sensibilisation et de prévention contre la COVID-19 pour les personnes vivant avec des MNT étaient les interventions les plus mentionnées.

Conclusion : Dans le domaine de la santé numérique, des interventions pour la prestation de services liés aux maladies non transmissibles ont été mises en place pendant la pandémie de COVID-19 dans toutes les structures de la Région de la Méditerranée orientale, qu'il s'agisse de pays à revenu élevé, intermédiaire ou faible. Ces interventions ont un fort potentiel d'intégration dans les systèmes de santé et peuvent améliorer l'accès aux services au-delà de la pandémie. La documentation, la réglementation et le renforcement des capacités nationales pour l'intégration des interventions de santé numérique sont fortement encouragés, en fonction des besoins de chaque pays.

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السارية في إقليم شرق المتوسط . وقد جمعنا بياناتنا عن طريق استبيان أُعد وأرسل بالبريد
الإلكتروني إلى مسؤولي التنسيق المعنيين بالأمراض غير السارية في وزارات الصحة في
جميع بلدان إقليم شرق المتوسط . وباستخدام تصنيف منظمة الصحة العالمية للتدخلات الصحية
الرقمية، حددنا التدخلات المختلفة وأصحاب المصلحة المعنيين .

: قدمت سبعة بلدان وثائقها، وهي جمهورية إيران الإسلامية والأردن وعُمان وقطرالنتائ ج
والمملكة العربية السعودية والسودان والإمارات العربية المتحدة . وكانت التجارب
الموثقة للبلدان بشأن التغلب على تعطُّل الخدمات خلال الجائحة تتعلق في معظمها
باستخدام " التطبيب عن بُعد " الذي يتيح التواصل المباشر بين العملاء ومقدمي الخدمات
لتلقي خدمات الأمراض غير السارية . وتباينت البلدان في مستوى التنفيذ . وكانت أبرز
التدخلات المذكورة هي خطوط المساعدة الخاصة بالأمراض غير السارية والصحة النفسية
وحملات التوعية بالوقاية من كوفيد -19 في صفوف المتعايشين مع الأمراض غير السارية .

: نُفِّذت التدخلات الصحية الرقمية لتقديم خدمات الأمراض غير الساريةالاستنتاجات
خلال جائحة كوفيد -19 في جميع المواقع، ويشمل ذلك البلدان ذات الدخل المرتفع والمتوسط
والمنخفض في إقليم شرق المتوسط . وثمة إمكانية كبيرة لدمج التدخلات الصحية الرقمية في
النظم الصحية لزيادة إتاحة الخدمات الصحية بعد الجائحة . ومن الموصى به بشدة الالتزام
بالتوثيق والتنظيم وبناء القدرات الوطنية، من أجل تعميم التدخلات الصحية الرقمية في
خدمات الصحة العامة في إقليم شرق المتوسط، وذلك بناءً على احتياجات كل بلد .

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