Insights and Challenges from the Initial Implementation of Digital Health Initiatives in Gandaki Province, Nepal

Health Directorate, Ministry of Health, Gandaki Province

hd.gandaki@gmail.com

Abstract

Digital technology is rapidly evolving and providing an excellent opportunity improve efficiency of health systems. Gandaki Province initiated various digital tools to improve health systems and health care delivery. This paper summarizes key findings and lessons learned from rollout of these tools based on the review of relevant documents and presentation, in-dept interviews with key officials, and inputs from 28 field practitioners representing provincial, district, *palika* and health facilities. The implementation of digital health systems presents numerous opportunities and challenges. Opportunities include the availability of quality and real-time data for decision-making, timely data for program planning and monitoring, and ensuring health services reach all populations to promote equity. Enhanced feedback between providers and managers, reduced efforts for data recording, reporting, and compilation, and the potential for further research based on detailed databases are significant benefits. Additionally, digital tools enable predictive analysis of health system data. However, challenges include the need for initial investment and commitment, development of Information Communication Technology (ICT) infrastructure, and training health workers to be Information Technology (IT)-friendly while managing client/patient consultations. Rapid scale-up, monitoring, and support requirements, data security concerns, lack of standardized system/tools, and interoperability between different systems also pose substantial obstacles. Endorsing standards and Standard Operating Procedures, developing centralized system/infrastructure, managing competent human resources, providing continuous training, ensuring data security, fostering federal-provincial-local level collaboration, and establishing support services to maintain and improve the system are the priorities to institutionalize and strengthen the system.

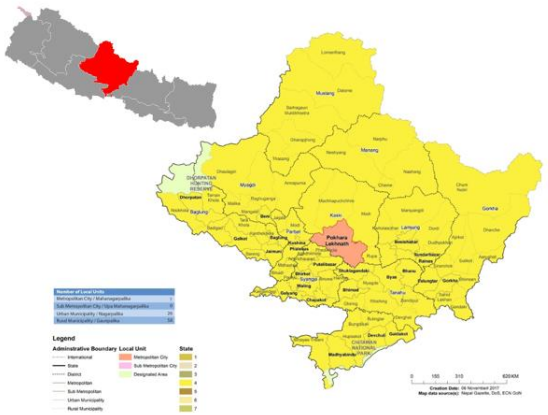
INTRODUCTION

Digital technology is advancing rapidly and the health sector is harnessing its benefits to enhance healthcare delivery. This includes the use of innovative diagnostic tools, efficient treatment, services to clients, patient care management, and the integration of information systems. The World Health Organization (WHO) has encouraged its member states to formulate a long-term strategic plan for the development and implementation of eHealth services.[i] This aims to build the necessary infrastructure for information and communication technologies in health, ensuring equitable, affordable, and universal access to their advantages.[ii] Nepal is a country with low-income and geographically challenged settings and digital technology offers both the opportunities and challenges for the health system.[iii] Nepal's Ministry of Health and Population is accelerating the use of e-Health in areas where it can bring about positive outcomes and has

developed a national e-Health strategy in 2017 for promoting optimal use of electronic and digital technology in health systems. [iv]

Gandaki is one of the seven provinces in Nepal (Figure 1) comprised of 2,466,427 population in central Nepal with mostly hilly areas (7 districts), and some mountain (2 districts) and terai/flat areas (1 district). Gandaki province has 41 hospitals, 71 primary health care centres, 478 health posts, 186 basic health care canters, 117 urban health centre, 130 community health units, 66 ayurveda health facilities and 116 private health facilities. The Health Directorate of the Ministry of Health of Gandaki Province initiated number of digital health initiatives since 2020 and the lessons learned from this province can be valuable for other provinces as well as other countries with similar settings and needs. This paper summarizes features of some of the initiatives and lessons learned from the implementation of these initiatives.

Figure 1: Map of Gandaki Province, Nepal



METHODS

A participatory data collection approach was used. Data were collected from designers, developers, users, and managers in the system who had various role in conceptualizing, developing, rollout, monitoring and use of different digital tools. A workshop at a provincial level was organized in January 2025 with users from health facility level, municipality level, district level and provincial level. Independent expert, as part of the author group guided the process in the workshop to collect information from participants. A brief overview was summarized and discussions were held to collect information from some of the respondents to trigger their thought process. Then a short data collection schedule was provided to each participant and asked them to fill in information on their role, their experience with digital tools in Gandaki Province, their specific feedback as facilitators and barriers for each specific tool and overall feedback and recommendation for scale-up and sustainability of digital tools. Data collection tools were anonymized with an option to note their contact number if they wish to be contacted for further detailed information by the study team. A total of 28 participants (five provincial level staff including two IT staff, 8 district level staff, 3 *palika* (municipal) level staff and 6 health facility staff, and remaining 6 didn't mention their duty station) filled in the form and submitted to the author group. Their responses were entered into the Excel sheet, summarized by an independent expert using thematic analysis approach and reviewed by all authors. In addition, detailed in-depth interview was conducted with the chief of the health directorate, IT focal person and software developers to collect key details of the system and its approach of design and rollout. Site visit was conducted in 3 health facilities to collect and verify information from other sources. Key documents published by the Health Directorate, Ministry of Health in Gandaki Province[v] and technical presentations were reviewed, and information were summarized for the paper.

DIGITAL TOOLS USED IN THE HEALTH SYSTEMS

Section below summarizes key software and tools initiated in the Gandaki Province:

Family Health Profile (FHP): In Nepal, up-to-date information on population, family structure, disability, pregnancy status and health care utilization by family and individuals is not routinely available. Most of these data come from the census and thus are updated only in every 10 years, and often lack all required information for the health system. The Family Health Profile is an initiative of Gandaki Province that collects information from each household and tracked regularly based on their vital events such as birth, death, migration and marriage by local health workers after orientation. The local elected representatives monitored data collection and verified and disseminated at local level. Each family and individual receive a unique identity number and are linked to the health information systems such as e-HMIS, EMR and pregnancy tracking system. The FHP is now completed for 70/85 municipal levels capturing 80% of the total population of the province. This also helps for any health-related planning, target setting for health services through DHIS2 and policy making, to identify and target unreached populations and to guide for local and provincial level prioritization.

Data from the Family Health Profile helps in the identification of the target population at the local level, down to individual wards, is vital for realistic public health goal setting and objective formulation. Accurate demographic and socio-economic information support local governments in creating comprehensive demographic profiles, facilitating the planning and budgeting of health programs. It enables the design of need-based programs, tailored to local requirements, and allows for effective monitoring by comparing indicators and targets. With accurate and secure data on family health history and individual details, it ensures the availability of exact statistics, eliminating dependence on federally provided targets. This precision in data helps in identifying the target population for health services, calculating indicators with real denominators, and ultimately supports future program planning, execution, and progress tracking. The FHP faces several barriers, including difficulties with regularly updating demographic information, such as birth, death, and migration data. Real-time data collection and tracking are not feasible from all sites, and a regularly migrating population further complicates maintaining up-to-date profiles. The lack of integration with vital registration and issues of data ownership and accuracy at the local level contribute to the challenges. Data is often not adequately used or standardized, and there are significant concerns regarding data security and storage because of the low storage capacity provided by the federal government. Additionally, obtaining personal information from people abroad and managing resources for regular updates is problematic. Seasonal population fluctuations and the reluctance of respondents to provide data also pose challenges. Ensuring data privacy and dealing with potential future federal software developments add to the workload of health workers, making continuity and timely updates of the FHP is difficult.

Electronic Health Management Information System (e-HMIS): Nepal has a strong Health Management Information System (HMIS) that collects, compiles and report data from more than 600 health facilities and more than 52,000 volunteers. Most of these data are recorded, compiled

and reported manually, and gradually reporting from the municipality to central HMIS database is done through the DHIS2 platform. The e-HMIS is an initiative to digitalize all HMIS recording (68) and reporting (7) tools and automated for real-time reporting. This makes the overall process of recording and reporting automated, minimizes errors in the process of recording and reporting and enhances data quality and data use. This has been rolled out to 68/85 municipalities covering 686 health institutions with 3273 users (health workers). Additionally, e-HMIS is already integrated with FHP for enhancing real time birth registration at ward level. The notification from e-HMIS to FHP support ward secretary to follow on and provide legal birth registration. So that FHP will also be updated on real time basis.

The electronic e-HMIS offers numerous facilitators that significantly enhance health data management. It allows for real-time data reporting, visualization, and live tracking, which helps in maintaining data quality and reducing errors. The system supports easy data verification and quality improvement, facilitating the collection and reporting of basic health services provided in health facilities. With its paperless and accurate reporting features, e-HMIS enhances data consistency and minimizes errors. It enables faster decision-making, prompt feedback, and efficient resource allocation. The system's digital records, real-time monitoring, and feedback mechanisms are crucial for timely data collection, aggregation, analysis, and evaluation. By providing centralized and accurate data, e-HMIS aids in reviewing and planning health programs, such as nutrition, maternal and newborn care, and family planning. The user-friendly interface and fast data processing capabilities make it easy to use and beneficial for identifying gaps, ensuring the timely recognition of problems, and supporting report writing. The rollout of the e-HMIS encounters multiple challenges, including familiarizing health workers with the system and ensuring digital literacy among local-level users. Logistics supply issues, such as the availability of computers, routers, and other necessary equipment, along with managing or training IT-friendly human resources, add to the difficulties. Regular updates, data security, and sustainability are significant concerns, as is maintaining server capacity, electricity, and internet connectivity, especially in remote areas and during certain seasons. Limited health worker availability, particularly in Basic Health Service Centers, coupled with frequent system errors and a lack of timely software updates, further complicate implementation. Data quality and accuracy are affected by these challenges, reducing system reliability. Ensuring data privacy and ownership, and managing resources for regular updates, adds to the workload, while coordinating efforts across different knowledge levels among health workers remains a persistent issue.

Pregnancy Registration and Tracking System (PRTS): This system was developed to provide targeted services to pregnant women, postpartum women and their infants and track progress for resulting improvement in maternal and child health status. This program enables reaching to every mother and every child in the province using technology and community health workers and volunteers. The system is already integrated to the e-HMIS. So, e-HMIS is used by the health facility to record each pregnancy that comes into their contact and by using SMS by Female Community Health Volunteers (FCHVs) by entering women's basic demographic

information and last mensural period. When the woman visits the HF for antenatal check-up, her details are recorded in the system and their FCHV is also notified about her contact to the facility. A total of 1973 health workers and 5877 FCHVs were trained and mobilized.

The PRTS facilitates the identification and location of pregnant women, helping to monitor and analyze their status across the province. It provides information through SMS, encouraging pregnant mothers to visit health facilities for antenatal (ANC) and postnatal (PNC) checkups, and increasing institutional deliveries. By tracking every pregnant woman and ensuring real-time, result-based monitoring of maternal and newborn health, PRTS supports the prioritization of Basic and Comprehensive Emergency Obstetric Care (BEmONC, and CEmONC). The system helps manage pregnancy complications and other issues by providing real data and enabling client follow-ups, particularly for those with danger signs. It improves the utilization of safe motherhood programs, leading to timely follow-ups and enhanced healthcare services for mothers and children. By ensuring accurate line listing of pregnant women, PRTS aids in the effective implementation of health programs and improves overall maternal health outcomes. The PRTS faces multiple challenges, including the lack of timely reimbursement for SMS costs and the absence of a free SMS service for health workers. Mobilizing FCHVs, especially older ones, and ensuring adequate coordination with health workers is difficult. Additionally, capacity building and regular training arrangements for FCHVs and nursing staff are insufficient. The system's lack of integration with e-HMIS, data security concerns, and unfamiliarity with the software and revised versions further complicated its use. Tracking pregnant women in areas with poor network coverage and the reluctance of some individuals to disclose their pregnancy are also significant barriers. The additional workload for health workers, the difficulty in managing operations at the FCHV level, and the challenges of ensuring regular follow-ups from FCHVs and the community add to the complexity. Issues with digital literacy among FCHVs, the need for the tool to be functional at hospitals, and the duplication of work further hinder the system's effectiveness. Overall, the PRTS requires improvements in resource allocation, capacity building, training, and integration with existing health information systems to overcome these challenges.

Electronic Medical Records (EMR): EMR system is an approach to digitally record patients' health records such as prescription, history, investigations, pharmacy, follow-up visits and treatment outcome. This has been currently operational in 12 district-level hospitals and in few local hospitals. Servers are being set-up, local and wide-area networking is being strengthened and health workers are being trained to record data and use the EMR system.

The implementation of EMR facilitates the streamlining of hospital services by tracking patient clinical information, capturing standardized diagnoses with ICD codes, and facilitating smoother health insurance claims. It supports the collection of patient information for ICD-11, aiding in diagnosis, treatment tracking, and timely intervention. The digitalization of hospital services and record-keeping ensures secure and easy access to digital records, reducing the chance of data

being lost. EMRs provide valid and real-time reports, enhance efficiency, interpretability, analytics, and continuity in hospital data management. They enable the secure keeping of patients' medical history and facilitate future retrieval, linking comprehensive information such as test results and prescribed medicine. EMRs ensure timely and accurate data availability, supporting institutional memory and serving as a base for comprehensive Electronic Health Records (EHR). The rollout of EMR faces several barriers, including the lack of standard guidelines and the centralization of the EMR system. Integrating all health programs into EMR has not yet been achieved, posing a challenge to comprehensive data management. Motivating health workers, medical officers and consultants to record all details on EMR is difficult, compounded by the high initial costs and concerns over data security. Additionally, the absence of an API to link to DHIS2 hinders seamless integration. The varied technical ability and training levels among health workers, combined with the inadequate budget for managing hardware and internet access, further complicate the rollout. Staff shortages and the high workload in hospitals make it challenging to fully utilize EMR, affecting data completeness and quality. Interoperability within and with other systems remains a persistent issue, alongside the need for consistent updates and support post-software handover.

Other: There are additional digital tools used in the Gandaki Province such as Surveillance Outbreak Response Management and Analysis System (SORMAS), reporting of Maternal and Perinatal Death Surveillance and Response (MPDSR) in online system, Electronic Logistics Management Information System (e-LMIS), Minimum Service Standard (MSS) and Early Warning and Reporting System (EWARS). The SORMAS is an open source mobile eHealth System used for disease control and outbreak management procedures including surveillance and early detection of outbreaks by real-time digital surveillance from peripheral health facilities and laboratories.[vi] MPDSR system has been digitalized for recording and reporting maternal and perinatal deaths from hospitals to allow for identification, notification, quantification and determination of causes and avoid maternal and neonatal deaths and stillbirth with the goal of orienting the measures necessary for their prevention.[vii] e-LMIS is digitalized version of the existing system to enable logisticians and program managers to quickly collect the data needed to make informed decisions for forecasting, budgeting, procurement and supply systems with an aim to improve customer service by minimizing losses and stock imbalances.[viii] EWARS is a hospital-based sentinel surveillance system currently identified in 81 hospitals covering all districts to complement the country's HMIS by providing timely reporting for early detection of selected vector-borne, water and food borne diseases with outbreak potential.[ix]

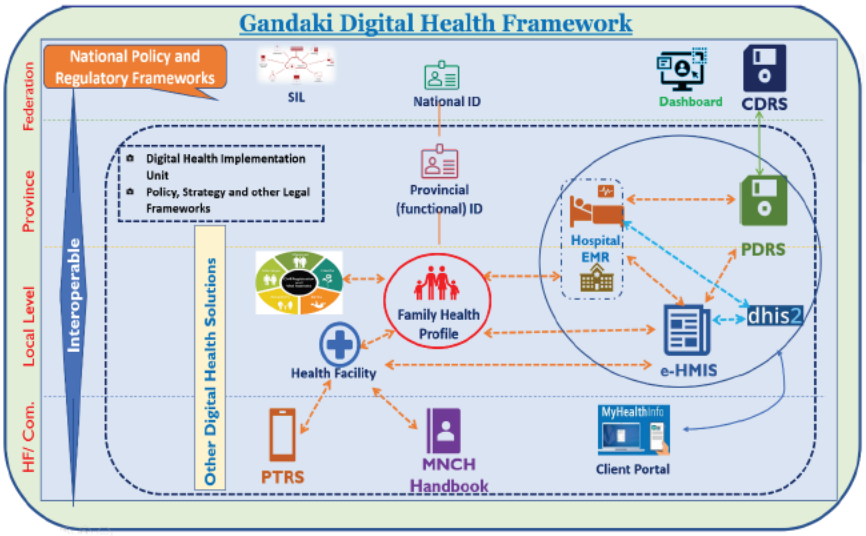
However, these systems are implemented throughout the country and are more matured than the tools reported above. Thus, this paper summarizes major digital tools used primarily in the Gandaki Province. However, the authors group feels that most of the facilitators and barriers are common to these tools and systems as well.

Inter-operability of systems

Though these systems are established as stand-alone initiatives, they are being connected to ensure inter-operability between these systems as well as other health information system of the

country such as DHIS2, e-LMIS, National ID system, Central Data Repository System (CDRS). Figure 2 below, the Gandaki Digital Health Framework displays linkages between these systems and their level of operation in federal context and its linkages with existing non-health information system such as National ID and Civil and Vital Registration System (CVRS).

Figure 2: Gandaki Digital Health Framework



IT REQUIREMENTS

Setting up the digital platform may require initial start-up investments but that may eventually save cost required for routine recording, reporting cost. Table below summarizes key requirements for each of the systems mentioned above.

System	IT requirements
FHP	Initial data collection for a typical ward of 500 Households 2 data collectors (preferably with health background) with 5 days of training for 10 days with Android Tablet (8-10 inch display, 3-4GB RAM, 64-128GB ROM) with COBO software and internet (at least 3G/4G mobile data or wifi connection) Regular update based on the vital records and PTRS
e-HMIS	Typical set-up for a facility with ~50 patients/clients per day 1-2 OPDs, 1 pharmacy, 1 registration desk 5 desktop/laptop computer (4GB RAM and 128GB ROM) with internet connectivity (500mbps bandwith) 1 server computer (4GB RAM and 128GB ROM) with local area network to all computers within the facility
PTRS	Provincial servers and other set-up: Health Facility: At least one desktop/laptop computer (4GB RAM and 128GB ROM) with internet connectivity (500mbps bandwith)

	FCHV: mobile phone, credits for SMS
EMR	Typical set-up for a 15-beded hospital with 4 OPDs, 1 inpatient department, 1 pharmacy, 1 lab, 1 radiology, 1-2 registration desk 10 desktop/laptop computer (4GB RAM and 128GB ROM) with internet connectivity (500mbps bandwith) 1 server computer (4GB RAM and 128GB ROM) with local area network to all computers within the facility

BENEFITS OF DIGITAL TOOLS FOR HEALTH SYSTEMS

Overall, the facilitators of implementing digital health systems include reducing human errors in reporting to DHIS2 and decreasing the workload for health workers. The availability of IT-friendly, young health workers with digital literacy enhances the efficiency of these systems. Commitment to commodity availability, leadership, and providing the necessary infrastructure, such as computers, internet, and software, along with training, are crucial. Digital tools significantly streamline patient and service management, improve data quality, and ensure data consistency. They offer real-time data reporting and visualization, which supports decision-making, program planning, and monitoring. These tools ensure the reach of health services to all populations, promoting health equity, and facilitate improved feedback between providers and managers. Additionally, they reduce efforts for data recording, reporting, and compilation, and create opportunities for further research based on detailed databases. The use of predictive analysis enhances health system data management. The enthusiasm of a digitally literate workforce, continuous technical support, and the eco-friendly, paperless nature of these tools further enhance their effectiveness. Addressing data security concerns, providing reliable power supply, and integrating digital tools into the entire health system are essential for successful implementation. These tools also facilitate efficient resource allocation, better planning, and accurate, timely data analysis, which are vital for program planning and improving overall healthcare services.

CHALLANGES OF DIGITAL TOOLS FOR HEALTH SYSTEMS

The implementation of digital health systems faces significant barriers, including infrastructure and resource constraints, such as limitations in internet connectivity, power supply, and building facilities. A lack of IT skills and digital literacy among some health workers, coupled with resistance to change, further complicates the rollout. Challenges also arise from insufficient public knowledge regarding IT systems in healthcare, the need for extensive training, and maintaining data security and confidentiality. Technical issues like server downtimes and high turnover among temporary staff add to the difficulties. Workload overload, especially in Basic Health Service Centers with limited staff, and misconceptions regarding software ownership at the local level hinder progress. e-HMIS being in its developmental phase and containing errors in some tools, along with the need for integration of multiple tools, exacerbates these issues. Geographical challenges in remote areas, seasonal variations affecting internet connectivity, and

the necessity of continuous updates to human resources pose additional barriers. Initial investment and commitment, development of ICT infrastructure, and training health workers to be IT-friendly while managing time during patient consultations and maintaining eye contact are essential yet challenging. The rapid scale-up, monitoring, and support requirements further strain resources. Ensuring data privacy, addressing the skill gap, managing digital literacy, and dealing with various software rollouts simultaneously are also critical concerns. Lack of standardized tools, interoperability between different systems, and difficulties during public procurement due to complex laws add to the complexity. Weak governmental infrastructures, issues with data literacy, and internet access impede effective use of digital tools, ultimately impacting the reliability and effectiveness of digital health systems.

WAY FORWARD

To effectively implement digital health systems, it is essential to ensure adequate resource allocation from the provincial, local, and federal levels. Regular training and onsite coaching should be provided to health workers, and proper orientation about digital tools should be given to health facility management committees and staff. A comprehensive IT framework must be developed, integrating different health information systems and linking them with dynamic recording systems. Emphasis should be placed on enhancing digital literacy and ensuring data security to build trust and accessibility. Standard guidelines for digital tools should be established, and all tools should be integrated into a single framework with offline compatibility. Data analysis must be made easy to understand, offering actionable suggestions to health workers. The federal government should take ownership of the digitalization of health services nationwide, tracking clients and services through national IDs. Continuous onsite coaching, improving data security, and developing a legal framework are crucial. Strengthening training programs, managing human resources, and increasing coordination and collaboration to ensure local ownership are necessary. Planning should be data-driven, with sustainable funding through supportive policies. Finally, a single, integrated digital platform should be developed to simplify usage and reduce expenditure.

Key recommendations for rollout of digital health tools:

- **Develop a proper IT framework** and ensure the availability of IT-friendly staff in the health sector, focusing on enhancing digital literacy and ensuring data security.
- **Create standard guidelines** for developing and using digital tools, and integrate all tools into a single framework with offline compatibility.
- **Promote digital tools** across all health facilities, with the federal government taking ownership and ensuring tracking of clients and services through national IDs.
- **Provide continuous support and training**, including legal frameworks for data security and regular updates, to ensure data is easily understandable and actionable.
- **Facilitate planning and implementation** by ensuring budget allocation, human resource management, and coordination at all levels to promote ownership and accountability.

- **Develop a single, integrated digital platform** to avoid multiple logins, streamline resource use, and support system sustainability.
- **Ensure adequate resource allocation** from the province, local, and federal levels.
- **Provide regular training and onsite coaching** to health workers, along with orientation on digital tools for health facility management committee members and staff.
- **Integrate various health information systems** into a dynamic recording system to accurately determine target populations and enhance data analysis.
- **Increase collaboration and fund allocation**, ensuring sustainable policies, monitoring, and supervision to meet health objectives and goals effectively.

Following are key steps to streamline the implementation and operation of digital health systems in Gandaki Province by ensuring a robust and efficient healthcare infrastructure.

1. **Standardization and Regulation**: Endorsement of standards, guidelines, and regulatory oversight to ensure uniformity and compliance across the health system.
2. **Comprehensive SOP**: Development and endorsement of comprehensive Standard Operating Procedures (SOP) for interoperability among various health information systems.
3. **Infrastructure Development**: Establishment of a centralized data center, enhance data hosting capabilities, upgrade local servers, and provide networking and recording devices at implementation sites.
4. **Human Resource Management**: Implementation of Operations & Management (O&M) for regular IT staffing, build specialized and support teams, offer incentives, and enforce regulations.
5. **Training and Capacity Building**: Development of training materials, manage the behavioral transition, and provide ongoing training and orientation for health workers.
6. **Support Services**: Fostering collaboration between federal and provincial health authorities, establish an Electronic Health Record (EHR) Support Desk, and ensure preventive and corrective maintenance.

CONCLUSION

This study summarizes key accomplishments, lessons learned and potential opportunity for using digital technology to promote health care. Proper planning, piloting, implementation and maintenance of digital technology can improve efficiency of health system to provide timely care, to avoid misuse and wastage of resources, to ensure reach to underserved populations. In addition to many benefits, digital tools also have number of challenges and they have to be closely monitored and mitigated through appropriate system.

Acknowledgements

We would like to thank all responded who provided valuable information for this study and to staff at the health facilities for their cooperation during data collection for their willingness to participate in the study.

References

Bekele TA, Gezie LD, Willems H, et al. Barriers and facilitators of the electronic medical record adoption among healthcare providers in Addis Ababa, Ethiopia. DIGITAL HEALTH. 2024;10. doi:10.1177/20552076241301946

Paudel D, Ahmed M, Pradhan A, Lal Dangol R. Successful use of tablet personal computers and wireless technologies for the 2011 Nepal Demographic and Health Survey. Glob Health Sci Pract. 2013 Jul 11;1(2):277-84. doi: 10.9745/GHSP-D-12-00056. PMID: 25276539; PMCID: PMC4168579.

Bhavnani SP, Narula J, Sengupta PP. Mobile technology and the digitization of healthcare. Eur Heart J. 2016 May 7;37(18):1428-38. doi: 10.1093/eurheartj/ehv770. Epub 2016 Feb 11. PMID: 26873093; PMCID: PMC4914890.

Stoumpos AI, Kitsios F, Talias MA. Digital Transformation in Healthcare: Technology Acceptance and Its Applications. Int J Environ Res Public Health. 2023 Feb 15;20(4):3407. doi: 10.3390/ijerph20043407. PMID: 36834105; PMCID: PMC9963556.

---

[i] WHO. Global Straegy in Digital Health 2020-2025 https://www.who.int/health-topics/digital-health#tab=tab_1

[ii] https://iris.who.int/bitstream/handle/10665/344249/9789240020924-eng.pdf?sequence=1

[iii] Paudel D, Ahmed M, Pradhan A, Lal Dangol R. Successful use of tablet personal computers and wireless technologies for the 2011 Nepal Demographic and Health Survey. Glob Health Sci Pract. 2013 Jul 11;1(2):277-84. doi: 10.9745/GHSP-D-12-00056. PMID: 25276539; PMCID: PMC4168579.

[iv] MoHP. National e-Health Strategy 2017. https://km.mohp.gov.np/sites/default/files/documents/2019-04/Nepal_e_health_strategy_2017_final.pdf

[v] HD/MoHP Ganaki. Annual Report https://hd.gandaki.gov.np/list/report/annual

[vi] https://sormas.org/sormas/overview/

[vii] https://www.who.int/teams/maternal-newborn-child-adolescent-health-and-ageing/maternal-health/maternal-and-perinatal-death-surveillance-and-response

[viii] USAID/GHSP. eLMIS Selection Guide. https://www.ghsupplychain.org/sites/default/files/2019-07/elmis.cfm_.pdf

[ix] MoHP. Early Warning and Reporting Systems Guidelines. https://km.mohp.gov.np/sites/default/files/2018-07/%28EWARS%29%20Guidelines.pdf