# EDITORIAL

# The Ethiopian Health Information System: Where are we? And where are we going?

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Health Information System (HIS) is a system that integrates data collection, management, and interpretation, including the use of the information to improve the quality of service and care through better management at all levels of health services (1). Early on, efforts to restructuring HIS to systematically collect, analyze, and report data for improved management in developing countries were undertaken by national program managers of vertically structured programs. In recent years, however, HIS in developing countries, including Ethiopia, has gained more and more attention as more effort by governments, international agencies, non-governmental organizations, donors, and other development partners seek to improve health care to reverse disease trends in these countries. The expansion of the health system, diagnostic capacity with the rapid transition of diseases epidemiology, and information technology played a crucial role in the increment of health data demand and information use in the health sector over the years (2). HIS encompasses a number of issues: data use, data quality, quality of care, e-Health and other relevant topics. This editorial provides a highlight of each of these topics and associated challenges. Because these entities are very much linked, it is not possible to expect successful progression in the use and quality of health information systems unless they are treated holistically.

The Government of Ethiopia in collaboration with stakeholders has made remarkable achievements in the standardization and implementation of routine health information systems (RHIS) over the years. In line with this, the Ethiopian government has undertaken an extensive reform and re-design of the HIS during twenty years of health sector development program implementation and in recent Health Sector Transformation Plan (HSTP) (3-6). The main aim of the reform is to improve the data quality and information use culture at all levels (4-5). The reform has taken major steps in response to the standardization, integration, and simplification of recording and reporting forms and indicators at all levels (6). The health sector transformation plan also identifies the information revolution as one of the four transformation agendas of the HSTP (6). This is an effort to respond to poor data quality that has affected the quality of care, planning, and management systems, as well as decision-making by managers at all levels of health care systems. It is, therefore, necessary to ensure quality and standardization of measurements, for better data – better decision-making, better performance of health systems, and improved health status (6).

As a result, the country has made significant progress in addressing data quality and information use (7-8). Nevertheless, results of studies have shown that data generated at different health system tiers are still inconsistent, incomplete and short of analytic perspective due to several issues related to information use (7-12). Thus, data quality, proper management, analysis, and meaningful interpretation at all levels remain a challenge in the Ethiopian health system (10-12). Moreover, the shortage of HIS workforce for data management, analysis, and meaningful interpretation is also a remaining challenge in the country (13-14). The quality of health care data is dependent on the underlying data management and reporting systems; stronger systems should produce better quality data (15). In other words, for good quality data to be produced by and flow through a data management system, key functional components need to be in place at all levels of the system, the points of service delivery, the intermediate level(s) where the data are aggregated (e.g., district, regional and national), and the program monitoring and evaluation at the highest level to which data are reported (13-14). To keep the progress on track, it is necessary to assess the health information utilization status, quality of data and their determinants at the health facilities and among health professionals of Addis Ababa city public health centers. Addis Ababa city public health centers are one of the main areas where HSTP is implemented.

The Federal Ministry of Health (FMoH) in collaboration with academic institutions initiated a Capacity Building and Mentorship Project (CBMP) in 2018 in line with University-Industry linkages to improve data quality and information use at all levels. In this regarding the human development model was designed and implemented to improve data quality and information use practice at service delivery point and administrative level.

Although medical records are important for effective and efficient management of medical information in the developing countries, it has never been given priority and has usually been undermined and miss-handled. It is astonishing to learn that in health facilities of Ethiopia only 45.7% of the medical information had been completed (16).

Quality as a comprehensive and multifaceted concept has now become part of everyday life. In health, quality could be defined as the ability to get the desired services from the chosen provider at the right price (satisfaction), at the right location and at the right time. This conceptualization of quality implies that quality plays a bridging role between customers and the organization and between expectations of the customer for good services and perceptions of the service provider. Quality satisfaction can also be viewed as the intensity of various emotions linked to specific requirements during

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a given period (17). Definition of healthcare quality, from the client perspective, includes high-value healthcare that achieves good outcomes at reasonable prices and at the right time with dignity.

Quality shortfalls exist in "areas as diverse as patient safety, the evidence basis for care, care coordination, access to care, and health service disparities" (17,19). Several factors determine the quality of services; for instance, Mosadeghrad reported these factors as Patient-related factors, Patient socio-demographic variables, Provider related factors, and Environmental factors[16]. In another study, quality was found to be affected by income, education, and frequency of visits in public health centers, and patient satisfaction is affected by income).

The HIS is also a useful tool in the disease classification exercise. The history of the systematic statistical classification of diseases dates back to the nineteenth century. Early medical statisticians, William Farr (1807–83) and Jacques Bertillon (1851–1922), for example, did a great job to initiate the system. The aim of the International Classification of Diseases (ICD) is to categorize diseases, health-related conditions, and external causes of disease and injury to be able to compile useful statistics in mortality and morbidity. Its categories are also useful for decision support systems and reimbursement systems, and as a common denominator to be used in language-independent documentation of medical information.

Clinical documentation practice in Ethiopia is so poor that it doesn't enhance clinical coding. For this reason, the availability of reliable information for the production of quality data to enhance the quality of patient care is not ensured. To overcome these problems, one of the studies reported in this special issue tried to provide a solution by assessing the utilization and challenges of the National Classification of Disease (NCoD) and its mapping to the ICD10 in capturing and coding more clinical details, and in the end, tried to make it eHealth ready for use in electronic environments.

According to WHO, eHealth is defined as the use of information and communication technologies (ICT) for health. More specifically it refers to the recording, quality check, use and dissemination of patient's record electronically. E-health involves a large group of activities that use electronic means to deliver health-related information, services, and resources.

Combining technology and the genomic revolution, digital health is helping health care providers and patients to acquire, track, manage and use it to improve health and the health care system leading to improved health outcomes. The use of these technologies and digital services is not only changing the way we communicate, they also offer more innovative ways for monitoring the health of individuals and the community, offering greater access to patient data, and even to personal data for self-management. Common problems facing the health sector regarding HIS are that of multiple and different information sources and repositories, including databases, object stores, knowledge bases, file systems, digital libraries, information retrieval systems, and electronic mail systems [20]. Recognizing the fact that a few functionalities may be in use in most systems, it is therefore important to investigate the level of use of DHIS2 system functionalities and how the use of more functionalities of DHIS2 can be enhanced. Thus, attempt has been made to determine knowledge and extent of use of major and sub functionalities of DHIS2 as a case system in one of the papers included in this volume. The findings also support a need for an immediate intervention to enhance use of the system.

The health system these days is focusing more on responding to the pandemic by advocating for social/physical distancing (21). Many patients were unable to obtain healthcare as a result of these limitations. Many outpatients and inpatient facilities were also halted as healthcare staff and other personnel were diverted to taking care of COVID-19 patients. Furthermore, patients stopped seeking medical help out of fear of catching the virus in a medical environment (22, 23), resulting in delaying necessary healthcare such as surgery, dialysis, and cancer treatment. Therefore, it is necessary to assess selected essential services utilization (ANC1, ANC4, SBA, Penta3, Emergency, In-patient, Out-patient, Pneumonia, VCT, LQAS, and PMT) and Data quality and information use review at selected health centers before and after COVID_19 pandemics reported at selected public health facilities in Addis Ababa, Ethiopia.

The pandemic might generate disruptive action to the ongoing healthcare services through diverting available healthcare resources to the fight against the pandemics in the country. On the one hand, the outbreak compromised the functioning of the health system, due to the deaths of many health care workers and the closure of health facilities, while at the same time communities had little trust in the capacity of providers to secure safe health care in Ethiopia. Evidence from different settings indicates that covid-19 may persist for a long time, particularly in developing countries. As the result, healthcare service is deteriorating to provide essential health services to the public. The health system should look for an alternative strategy to ensure resilience. Disruption to vertical programs, activities, and essential systems has been highlighted in another study reported in this issue (24,25).

HIS collects data from the health sector and other relevant sectors; analyses the data and ensures their overall quality, relevance, and timeliness; and converts data into information for health-related decision-making. This was applied in the COVID-19 outbreak response to generate information for the public and the decision-makers. There was different health information related and mathematical modeling researches to show the distribution, magnitude, severity and trend. In Ethiopia, different studies related to COVD-19 were conducted to show the magnitude, severity, trend, trajectory, and prediction of the disease. An effort is necessary to synthesis information from different studies as a systematic review which showed the

situation of hospitalization, recovery, death, incubation period, and severity of COVID-19.

Health information has played a significant role in combating the COVID-19 outbreak to create effective and efficient communication among the healthcare providers and the community as well as the way the healthcare services are delivered. Health information showed advancement in the era of COVID-19 that applied information technology from simple information communication to sophisticated artificial intelligence and robotics systems.

Some of the challenges in the application of information technologies like modeling are a dependency of the modeling result on the size of the data used (the lower the size of the data the weaker the prediction accuracy) and the quality of data used; and sometimes the result from the modeling could not be in line with the reality.

Looking at the issue of HIS from a different angle, the capacity building of health professionals is the way to improve data quality, data management, data analysis, and information use. The capacity-building initiatives run by the FMoH, regional health bureaus, or projects often follow the usual ways of pick-a-sellable titles, organize training sections, invite resource persons, and conduct training in the traditional way. Often pieces of training are organized and offered with little or no practical exercise mainly because things are done without proper planning and in a hurry. Practical application/implementation of the training is left to the discretion of the trainees without proper follow-up or augmenting such training with other complementary strategies. This special issue thus attempts to provide a strategic approach, which was tested by the CBMP, to the human capacity development program in health information management and use. It can be adopted by FMoH or other stakeholders for future human resources development plans.

Therefore, it is evident that data quality, data use, e-health, quality of care, and occurrence of a pandemic are in a sense intermingled, co-existing, and supplement each other regarding the data generated by the health system. In addition, unless the capacity of providers is improved from time to time, it is hard to maintain coherence across the components. Also excelling by one of these components alone will not take us anywhere. Thus, researchers, policymakers, and implementers need to carry out these activities in parallel, keeping balance, so that for example, e-health is used to generate reliable data, this quality data is then used for planning and policy.

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