

## Preliminary considerations for electronic medical record (EMR) in the public hospitals of Gandaki province in Nepal

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### ABSTRACT

Electronic Medical Record (EMR) is the digital tool to keep records of valuable information on computer or computer-like equipment, regarding health systems, including patient's records and stock management which can provide real time evidence for better patient record, clinical care and health policy making. As Nepal does not have a national EMR system, and it is a challenge to get real time data, information and evidence required for effective health policy making. With an effective national EMR system in Nepal, the health system can be improved with reliable information of patients for the continuity of clinical care.

There are existing scientific evidence of EMR on the lessons of implementation in Nepal, opportunities for the use of EMR in Malaysia, perspectives of health care workers on EMR after its implementation in Canada, on the development of success measuring tools and the use of questionnaires for the EMR implementation in Canada, best practices, impact of EMR on physician practice, and barriers for EMR implementation.

EMR can improve the quality, effectiveness, transparency and efficiency of healthcare services and its management. Gandaki province is one of seven provinces in Nepal and is exploring ways to implement EMR in all the hospitals operated under the province government. There can be step wise approach to have EMR in all of these hospitals. This can give more strategies for the national EMR system.

**Keywords:** Electronic medical record, health system, health policy

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## INTRODUCTION

Information management and effective communication have potential to strengthen and upgrade the health care system. Keeping paper records is the current practice of managing information related to patients in Nepal. A paper based record system needs space and human resources to manage effectively and efficiently. It is difficult to search paper-based medical records even after a short interval of time. These records might have significant public health relevance. Electronic Medical Record (EMR) is the digital tool to keep records of valuable information on computer or computer-like equipment, regarding health systems, including patient's records and stock management which can provide real time evidence for better patient record, clinical care and health policy making. People often use Electronic Health Record (EHR) in place of EMR and the nomenclature is similar for the purpose of this article. In this article, we will use EMR and will have the same meaning as EHR.

EMR ensures easier and faster availability of valuable information. This will be instrumental in Nepal to compare the clinical records of patients with the use of EMR. We can get an accurate number of new cases of Tuberculosis (TB) as for example in Nepal and we can target to lower down the number of new cases with specific interventions with the easy availability of national data. Therefore, in the context of Nepal, EMR system can provide evidence to guide clinical care, to reduce burden of diseases and in long-term it may help in health policy making.

It is valuable for a country to have a national health system which allows exchange of information between the healthcare institutions for care coordination. Pryor R et al (2020) highlights the importance of EMR enhancements for the infection control measures in an emergency situation.<sup>1</sup> With hospital-based EMR, Wang Z et al (2020) have critically analyzed the COVID – 19 patients and their valuable information to learn prognostic factors for improved clinical outcomes.<sup>2</sup>

EMR has been implemented in the majority of the developed nations and in some developing countries. Low-and-middle income countries (LMICs) have multiple challenges to implement EMR systems.<sup>3</sup> Nepal does not have a national uniform EMR system. Therefore, it is a challenge to get real time data, information and evidence required for effective policy making without a EMR system in Nepal. With an effective national EMR

system in Nepal, the health system can be improved with reliable information of patients for the continuity of clinical care. It is valuable for Nepal to learn from the successes, lessons and challenges of EMR implementation from other countries around the globe.

## Brief Review of Literature

The scientific evidence regarding EMR systems in Nepal is scarce. A single study was done by Raut et al (2018) in the context of a rural hospital in the Far west province of Nepal to learn the EMR's implementation.<sup>3</sup> The authors described an experience of implementation after the design of EMR at a hospital in rural Nepal and replication of the same system in another district-level hospital in the country. The authors believe that it is feasible to implement an integrated EMR system at a hospital in Nepal. This can be a lesson to learn and will be helpful to integrate the data of different hospitals. Further study on the impact of the ongoing EMR system in those hospitals will give valuable evidence to Nepal.

Noraziani, et al. (2013) described local and global lessons from the implementation of EMR and the opportunities for use of EMR in Malaysia.<sup>4</sup> Their lessons are equally valuable for Nepal and will be vital to plan for a national EMR implementation.

EMR needs to be user-friendly and should foster a patient centered mechanism in order to get the highest level of advantage. Terry et al (2012) conducted a descriptive qualitative study on the perspectives of health care workers on EMR after its implementation for two years in South-western Ontario, Canada.<sup>5</sup> They found improved patient care as one of the motivating factors and ongoing need to learn computers and EMR as the hindering factors along with variability of EMR use. The motivating factor can be used to provide ongoing training for the physicians and health care workers in Nepal.

Keshavjee, et al. (2001) developed success measuring tools and studied the use of questionnaires for the EMR implementation in Canada.<sup>6</sup> The authors found that the clinical administrative work decreased within six months as one of the significant findings. From the very beginning of the national EMR implementation, it should be planned to measure the success and the evidence gathered by Keshavjee et al (2001) will be helpful for Nepal. Keshavjee et al (2006) conducted a systematic review to learn best practices in EMR implementation.<sup>7</sup> They found that a detailed plan for pre-implementation,

implementation and post-implementation may help get success. They also urge that EMR implementation may fail and has failed. The best practices can be incorporated for the EMR in Nepal.

Williams F & Boren SA (2008) had done systematic review on EMR's role in the health care delivery development in developing countries.<sup>8</sup> They state *"Some benefits of an EMR system include accurate medication lists, legible notes and prescriptions and immediately available charts."* These are meaningful findings and must be emphasized to the EMR users and service users, and patients in the case of EMR.

Lau et al (2012) conducted a systematic review to learn the impact of EMR on physician practice in office settings.<sup>9</sup> They found limited positive impact and recommended lessons from previous studies. In spite of all the advantages and success, EMR does have barriers. Sima Ajami S & Arab-Chadegani R (2013) conducted a non-systematic review study and found that resistance to change as one of the barriers for EMR implementation.<sup>10</sup> Tonnesen AS, LeMaistre A, & Tucker D (1999) found multiple barriers which include administrative shifts, software, hardware, resource, training, incomplete data repository, support and feedback system and security.<sup>11</sup> These barriers can be encountered for the EMR implementation in Nepal and strategies can be developed to mitigate these barriers.

Digitalization of the health information roadmap of Nepal also gives high priority to EMR. The Ministry of Health and Population has developed a protocol for initiation of EMR in different levels of hospitals. Moreover, selected hospitals have already started using EMR independently which has no connection with the central data system.

#### **EMR in Nepal and Gandaki Province**

Reviewing existing scientific literatures, it is clear about the roles and importance of EMR systems to improve the quality, effectiveness, transparency and efficiency of healthcare services and its management. Therefore, EMR systems need comprehensive design, development, deployment and implementation plans with a focus to gather more evidence to make them better. In the context of Nepal, EMR needs to be designed as per the needs of the country with its clear objectives and goals. As there is a lack of a national EMR system in Nepal, we can document findings like lessons learnt, best practices, advantages and perspectives of both service providers and service

users from the existing evidence from other countries. Nepal has a potential to design a national EMR system and implement an effective health information system which enables high quality healthcare services. The existing evidence suggests planning, designing, implementing and studying. In the federal structure and budgetary constraints of the country, Nepal can plan to implement EMR at the province level hospitals and then connect with federal level hospitals and primary hospitals operated under the local governments.

EMR and its functions can be specified for Nepal. Baseline study to learn current hospitals using EMR and strategies to connect them can be formulated. It is important to find more existing evidence and their in-depth discussion to design strategies to deploy an effective national EMR system for Nepal. The government of Nepal can collaborate with all the provincial governments and form a technical committee with a request for the submission of a report which can outline the steps to be taken for the design, development and implementation of the national EMR system.

On 3rd and 4th June of 2022, the Health Directorate of Gandaki province organized a workshop inviting all the hospitals under the provincial government. Medical superintendents, medical recorders, hospital managers and directors of different divisions participated and discussed the need for a single integrated EMR system with the Central Data Repository System (CDRS) to be located in Gandaki Province. The workshop was attended by the federal ministry of health and population (MOHP).

Gandaki is one of seven provinces in Nepal and makes health as its top priority to improve the system with its provincial health policy endorsed in 2022. The Gandaki province government has a health directorate, twelve hospitals, a tuberculosis treatment center, province public health laboratory, province health logistics management center, health training center and eleven health offices to manage and implement a uniform system within these hospitals and start gathering valuable information from its citizens. The first recommendation is to have a baseline study on the status of the digital record keeping system within the government hospitals of the province. The second one to have an EMR system which can gather all the information related to patients. Then, after thorough selection and uniform implementation of an EMR system, smooth collaboration between the provincial hospitals,

there is a need for ongoing rigorous study to learn whether the objectives of the EMR are achieved or not.

The next phase of the implementation is to get connected with the federal hospitals and primary hospitals and community-based health facilities in collaboration with the federal and local governments.

With all the information, it is suggested for the formation of a technical committee to specify all the steps necessary to take to implement provincial EMR in Gandaki province. There is a need for experienced researchers who can design a robust study from the very beginning. The EMR system needs regular support with a team of mentors and on-site trainers to regularly improve and strengthen the EMR system. It is better to specify early to consider policy changes with the help of the EMR system. And, finally, the database system gathered via the EMR would be of no use if there is no data review process within the system. Therefore, it is strongly recommended to have an institutionalized data review system linked with monitoring and evaluation.

For smooth implementation of EMR system there is a need for a nation owned software with suitable data repository system with strong better security system of collected data. In order to roll into this system, there should be high priority at different levels of government.

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