

Data management in Nepalese medical sector: An empirical study

Priya Singh*

Abstract

This study attempted to examine the influence of data management in the Nepalese medical sector and the impact of big data in health care. Many nations have strict policies and guidelines of data management of medical services. Countries with good ranking in health sector are the instances of this. Contemporary medical literatures have answered many issues, but the level of intensity or impact of unmanaged data in the medical sector and mechanisms to utilize EDI in the data management of the Nepalese medical sector are yet to be answered which is the quest of this article.

Keywords: data management, traditional data, modern data, unmanaged data, and electronic data interchange

Introduction

Focused on some pertinent but unanswered issues of medical services from the perspective of data management system and its relevancy in Nepal. The learning question is how the big data plays immense role in transforming incompetent medical services into competent ones in today's complex array of operations and activities. Modern day world runs on data, and its significance is immensely high in any field or any sort of research. We generally conclude when we have enough data, and it is expressive enough to bring out clarity in a situation. Data are of two types: traditional and modern data (big data). Traditional data is managed in a structured format to run businesses and carry out several day-to-day activities. SQL (Structured Query Language) is one example of managing the data traditionally. There is a fixed structure that is followed, where data is placed and organized. In today's world, where data is the major part that runs many complex operations and activities, big data is utilized such that not only a fixed structure is followed in managing the data, but also semi-structured and unstructured data are utilized in deriving conclusions and operating tasks. Sensor data, images, videos, audio clips, social media, etc. are some examples of big data.

When it comes to the medical sector, following traditional data in their management process can lead to incompetent service. In terms of data, the world has advanced a lot, and its management requires big data, such that data is collected from many advanced sources and doesn't have a fixed structure for managing it. Based on the research and analysis of data management in the medical sector, there are a few aspects that are not addressed, along with the gaps that have been identified and are not possibly found in the literature.

1. The level of intensity or impact that unmanaged data can have in the medical sector.

2. Mechanisms to utilize EDI (Electronic Data Interchange) in the data management of the Nepalese medical sector.

The conceptual framework of this research includes relationships between dependent and independent variables to determine the significance of data management in the Nepalese medical sector.

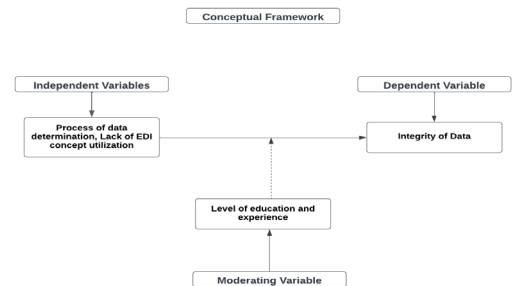


Figure 1: Conceptual Framework

The research hypothesis for this research is mentioned below:

Hypothesis:

Based on all the given hypotheses, we can summarize the independent and moderating variables as aspects of data management and assume the data integrity as the major essence of the Nepalese medical sector.

Null Hypothesis:

$H_{0,\mu}$ = Data Management has no impact on the Nepalese Medical Sector.

Alternative Hypothesis:

$H_{1,\mu}$ > Data Management has a greater impact on the Nepalese Medical Sector.

$H_{2,\mu}$ < Data Management has a lower impact in the Nepalese Medical Sector.

Methods and Materials

Understanding the importance of data management and its influence in the excellence of medical services, the study well investigated using both parametric and non-parametric test design. Hypothesis were devised and tested using reliable tools. The number of health facilities registered in Nepal as per the Department of Health Services is

The efficiency of medical and health sectors depends upon proper management of data in two ways: traditional SQL and NoSQL

How is data management important in the excellence of medical services?

* Ms. Singh, an MBA Graduate and a practising manager at CEDAR GATE, Kathmandu
Email: preeyah.singh123@gmail.com

14,313 health facilities, that are registered with the DoHS reporting system. This study was conducted from July 2023 to December 2023.

Both quantitative and qualitative research methods are used in this study. The present investigation utilizes both parametric and non-parametric test designs to examine the importance of data management and assess its influence on the medical field in Nepal. This test has been carried out using information gathered from a variety of sources.

An interview was conducted to gather information about medical service conditions and the way of managing data in Nepal. The interview was conducted at Grande Hospital. Dr Abhi Kumar Singh, MD, attended the interview and helped gather several pieces of information on how data management is done in the Nepalese medical sector. Also, a close-ended questionnaire was performed, and for these too, Grande Hospital was taken into consideration, and several questions were answered.

For this study, around 10–12 pieces of literature were reviewed to get meaningful insights into data management in the medical sector. Various articles, studies, and EDI aspects of data management were determined through websites. Many Nepalese newspapers and journals have depicted the negligence of the medical sector in data management, leading to unacceptable medical services.

To analyze the collected data, a distinct data analysis process was performed. All the WH questions were run through the process of collecting data. The tool that was used in this research for data analysis is Microsoft Excel. With the help of these tools, different tests were performed on the data. For the parametric test, based on the sample data collected, a T-test has been performed. And, for the non-parametric test, the chi-square test has been performed.

Results

Data management in the medical sector includes the practice of relational database management, where the process involves receiving data, sampling, and reporting the records, with verification at a certain turn around time. Integration of this data with digital imaging and communication in medicine so that the appointment of the patient can be done by this. After the appointment, various additional data regarding medicines, and follow-up checkups are stored in a database on which the WHO surgical safety checklist is considered, inpatient and outpatient modules, bed occupancy if needed, and discharge summary. Along with patient records, databases also include the storage and management of medical equipment records, such as medicine, surgical items, pharmacy

dispensing label demand, transfers, and purchase return forms. The integration of all these data is stored in a relational database and managed for the day-to-day activities of the hospital.

Relational database management is a reckoned and standardized system practiced in rendering the medical services which integrates the data for effective and efficacious day to day activities of the hospital. This study through hypothesis testing made it clear that data management has a greater impact in medical field of Nepal.

Table 1: Hypothesis Testing

Null Hypothesis:
$H_0: \mu =$ Data Management has no impact on the Nepalese Medical Sector.
Alternative Hypothesis:
$H_1: \mu >$ Data Management has a greater impact on the Nepalese Medical Sector.
$H_2: \mu <$ Data Management has a lower impact on the Nepalese Medical Sector.

T- Test:

A t-test is a statistical test that is often used in hypothesis testing to determine whether a process or treatment influences the population of interest or whether two groups are different from one another. Based on the test:

$$T_{cal} = 1.93$$

The level of significance for the right tail hypothesis at 0.05% is 1.86.

$$T_{cal} > T_{tab}$$

Reject the null hypothesis.

Hence, Data Management has a greater impact on the Nepalese Medical Sector.

Table 2: T-test Result

T-TEST Result
$T_{cal} > T_{tab}$
The null hypothesis is rejected, and the right-tail hypothesis is accepted.

Chi-Square Test:

A statistical test called a chi-square test is used to compare actual outcomes with predictions. This test aims to determine whether a discrepancy between observed and expected data is the result of random variation or a relationship between the variables being examined.

$$X^2 = 31.23$$

X^2 tabulated for 7 (degree of freedom is 7) at 5% level of significance is 14.06.

$$X^2_{cal} > X^2_{tab}; \text{ Reject the null hypothesis}$$

Hence, Data Management has a greater impact on the Nepalese Medical Sector.

Table 3: Chi-Square Test Result

Chi-Square Test Result
$X^2_{cal} > X^2_{tab}$
The null hypothesis is rejected, and the right-tail hypothesis is accepted.

The method adopted for the research includes: interview and questionnaire for obtaining information from selected sample hospitals, the author used parametric test and non-parametric test to test hypothesis

For the purpose of testing hypothesis, the author used t-test as parametric and Chi-Square Test as non-parametric. Both tests showed data management has greater impact on Nepal Medical Sector performance

Discussions

The Nepalese medical sector lacked central database forcing the data integrity to compromise. Other shortfalls are structured and rigid software and absence of protected Healthcare Information (PHI). Limitations have upsurged the medical malpractice and increase in litigations. Study findings showed the urgency to implement the concept of EDI to make Nepalese medical sector standardized in terms of medical facilities and service accuracy.

In the Nepalese medical sector, there seems to be a process of ineffective data management, due to which many unwanted medical cases have taken place. The family of Rihan Neupane, a youngster who experienced severe health difficulties because of the hospital's doctors' incompetence and incorrect treatment, was given compensation by the Patan High Court, amounting to Rs 3.5 million. In another instance, Sushma Thapa's leg had to be amputated owing to medical malpractice while the doctor was performing surgery on it; NPR 9,20,000 in compensation was required.

Considering US healthcare, they have a whole systematic and managed setup for medical services. The big data concept is utilized, and data integrity is highly prioritized. Their medical services have a huge network, and varied people are involved in verifying and approving the medical records. Strict rules and laws are implemented for the proper data management and facilitation of health services. The concept of EDI (Electronic Data Interchange) is highly embedded in medical services, due to which no data is compromised, and effective medical services are facilitated.

To make the Nepalese medical sector a reliable one providing proper service and eradicating any sort of medical negligence, the big data management concept must be utilized. Medical data is very crucial and has a significant impact on the medical service one is willing to provide. Implementation of EDI in the Nepalese medical sector can also lead to standardization of medical facilities and accurate medical service. Manual data management and rigid structure cannot be a great example for medical data management, but if all sources are considered for analyzing data and no rigid structure is set up for storing data, then medical data can be well analyzed, understood, and utilized in facilitating proper medical services.

References

Alan, H. (April 2013). *Limitations of medical research and evidence at the Patient-Clinician Encounter Scale*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3616682/>

- Corporate Lawyer Nepal. (n.d.). *Medical negligence in Nepal*. <https://corporatelawyernepal.com/medical-negligence-in-nepal/>
- Coursera. (2023). *Big Data in health care: What it is, benefits, and jobs*. <https://www.coursera.org/articles/big-data-in-healthcare>
- Dash, S., Shakyawar, S.K., & Sharma, M. (2019). *Big data in healthcare: management, analysis and future prospects*. *J Big Data*. <https://doi.org/10.1186/s40537-019-0217-0>
- Department of Health Services.(2023).*Nepal health facts sheet 2023*. <https://publichealthupdate.com/number-of-health-facilities-in-nepal-2/#:~:text=The%20Nepal%20Health%20Facts%20Sheet,the%20reporting%20mechanism%20of%20DoHS.>
- Karkee, R. (2023). *Management of health information of nepalese labour migrants*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10127173/>
- Mary Ville University. (n.d). *4 benefits of data analytics in healthcare*. <https://online.maryville.edu/blog/data-analytics-in-healthcare/#what-are>
- Neupane, P. (2021). *The Nepalese health care system and challenges during COVID-19*. <https://www.jogh.org/documents/2021/jogh-11-03030.pdf>
- Ngusie, HS., Shiferaw, A.M., Bogale, A.D., & Ahmed, M.H. (2021). *Health data management practice and associated factors among health professionals working at public health facilities in resource limited settings* doi: 10.2147/AMEP.S320769
- Peng,C.(2019).*A literature review of current technologies on health data integration for patient-centered health management*. <https://journals.sagepub.com/doi/full/10.1177/1460458219892387>
- Rawal, N. (September 2020). *Why Nepal needs a national electronic medical record system*. <https://english.onlinenepal.com/why-nepal-needs-a-national-electronic-medical-record-system.html>
- Shrestha, M. (2014). *Present progress of information technology in health care system of Nepal*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4375260/>
- The Kathmandu Post. (2022). *Patan High Court orders Grande Hospital to pay Rs3.5 million compensation to Rihaan's Family*. <https://kathmandupost.com/23/2022/05/24/patan-high-court-orders-grande-hospital-to-pay-rs3-5-million-compensation-to-rihaan-s-family>
- Tiwati, A. (2011). *EDI Standards in the healthcare industry*. <https://blog.deerwalk.com/blog/edi-standards-in-healthcare-industry>
- WHO. (2022). *Advancing health data for SDG measurement in Nepal*. <https://www.who.int/news-room/feature-stories/detail/strengthening-health-data-measure-sdg-progress-nepal>

The discussion suggests medical sectors to apply proper data management system to achieve greater efficiency