

**UTILIZATION OF HEALTH INFORMATION FOR CONTROL OF
COMMUNICABLE DISEASES IN HABASWEIN SUB COUNTY PUBLIC HEALTH
FACILITIES, WAJIR COUNTY**

HASSAN ABDULLAHI ALI

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DECLARATION

STUDENT

“This research project is my original work and has not been presented for a degree or any other award in any other University.”

Signature:

Date:

NAME: HASSAN ABDULLAHI ALI

REG. NUMBER: HSM-3-4000-3/2015

SUPERVISORS

“This research project has been submitted for examination with our approval as university supervisors.”

Signature **Date.....**

MS. Lillian Muiruri

Department of Health Systems Management

Kenya Methodist University.

Signature..... **Date.....**

Dr. Josphine Ndege

Lecturer-University of Embu,

Department of Nursing

ABSTRACT

Utilizing health information for controlling communicable diseases is a critical aspect of effective public health management. Despite the existence of a health management information system (HMIS), Wajir County continues to experience recurrent outbreaks of infectious diseases, raising concerns about the effective use of health data for disease control. This study therefore assessed the effect of the use of health management information systems (HMIS) on the control of communicable diseases in public health facilities in Habaswein Sub-County, Wajir County. The study adopted a descriptive cross-sectional research design and was guided by the Evidence-Based Health Information Systems Theory, the Health Metrics Network (HMN) Framework, and the Performance of Routine Information System Management (PRISM) Framework. The dependent variable was utilization of health management information systems, while the independent variables were effectiveness of use, data metrics, technology, and government policy. Primary data were collected using structured questionnaires from a census of 74 health service providers working in public health facilities within the sub-county. Quantitative data was analyzed using the Statistical Package for Social Sciences (SPSS) Version 25, employing both descriptive and inferential statistics, including multiple regression analysis to determine the relationships between variables. The regression model yielded $R = 0.733$ and $R^2 = 0.537$, indicating that 53.7% of the variance in utilization of HMIS for controlling communicable diseases was explained by the four independent variables. The Adjusted $R^2 = 0.513$, suggesting a moderate explanatory power of the model. The ANOVA test results ($F = 267.639$, $p < 0.001$) confirmed that the model was statistically significant, implying that the independent variables collectively have a significant influence on HMIS utilization. Further regression analysis revealed that effectiveness of use ($\beta = 0.220$, $p = 0.035$), data metrics ($\beta = 0.608$, $p < 0.001$), and technology ($\beta = 0.551$, $p < 0.001$) significantly influenced HMIS utilization, while government policy ($\beta = 0.008$, $p = 0.931$) had no statistically significant effect. These results indicate that enhanced use of data metrics, improved technological capacity, and effective utilization practices significantly contribute to better use of health information for communicable disease control. The study concludes that optimal use of HMIS in controlling communicable diseases in Habaswein Sub-County depends largely on the accuracy of data metrics, the adoption of modern technology, and the effective use of health data by healthcare providers. It recommends the implementation of comprehensive data quality audits, capacity-building programs on data utilization, and increased technological integration to enhance timely disease detection, reporting, and intervention across all public health facilities.

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LIST OF ABBREVIATION

IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulations
IRD	Immediately Reportable Disease
KHIS	Kenya Health Information System
MDGs	Millennium Development Goals
MDR TB	Multi-Drug Resistance Tuberculosis
AIDS	Acquired Immuno-Deficiency Syndrome
CDC	Centre for Disease Control
HCWs	Health Care Workers
HF _s	Health Facilities
HIMS	Health Information Management Systems
HIV	Human Immuno-Deficiency Virus
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization
WHO/AFRO	World Health Organization/African Regional Office
WHORC	World Health Organization Regional Committee
MOH	Ministry of Health
NACOSTI	National Council of Science, Technology, and Innovation
SDGs	Sustainable Development goals
SDSC	Sub-County Disease Surveillance Coordinator
SHMT	Sub County Health Management Team
SMS	Short Messaging Service

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CHAPTER ONE

INTRODUCTION

1.1 Background Information

Utilizing health information for the control of communicable diseases in public health facilities was a crucial aspect of modern public health management.

The utilization of health information played a pivotal role in the control and management of diseases. In an era where data-driven decision-making is paramount, leveraging health information effectively can significantly impact disease prevention, detection, and response. This paper explored the importance of utilizing health information in disease control efforts, highlighting its implications for public health. Health information served as a cornerstone for disease control strategies, providing valuable insights into the dynamics of diseases, their spread, and associated risk factors (World Health Organization [WHO], 2020). By analyzing health data, authorities can identify disease hotspots, track trends, and allocate resources efficiently to mitigate outbreaks (Addah, et al., 2023). Timely access to health information enabled early detection of emerging diseases and facilitates effective surveillance systems (WHO, 2020). Real-time monitoring of health indicators, such as disease incidence rates and demographic patterns, allows for swift intervention measures, reducing the spread of infections (Addah, et al., 2023). Utilizing health information guides the development and implementation of targeted interventions tailored to specific disease contexts (WHO, 2020). Evidence-based strategies informed by health data enabled policymakers to prioritize interventions, optimize resource allocation, and enhance community engagement in disease control efforts.

Health information utilization fosters transparent communication channels between health authorities and the public (Fitzpatrick 2023). Accessible data sharing platforms and educational campaigns based on health information promote awareness, behavioral change, and adherence to preventive measures, empowering individuals to protect themselves and others from diseases (WHO, 2020). The utilization of health information is indispensable for effective disease control and management. By harnessing the power of data, stakeholders enhanced surveillance, implemented targeted interventions, and foster community participation in combating diseases. Embracing a data-driven approach is essential to safeguard public health and mitigate the impact of infectious diseases in communities worldwide.

Research by Patel et al. (2020) in the United Kingdom suggests that using health information to allocate resources efficiently reduced disease transmission. For instance, directing resources to areas with high disease prevalence had a significant impact on disease control. Utilizing health information helps design targeted interventions and vaccination campaigns. The Centers for Disease Control and Prevention (CDC) emphasize data-driven vaccination strategies (Fitzpatrick, 2023). Empirical research by Orenstein et al. (2017) highlights the success of such strategies in controlling vaccine-preventable diseases.

Communication strategies based on Health information played a vital role in controlling communicable diseases. Studies, such as the one by Storey et al. (2019) in South Africa, have shown that tailored behavior change communication was more effective in promoting preventive measures among populations. Global collaboration and data sharing are crucial for the control of communicable diseases. Research by Kalkman et al. (2019) emphasized the need for international cooperation in data collection and sharing to address global health threats effectively. The economic impact of using health information for disease control is substantial. A study by Irons and Raftery (2025) highlighted that timely and effective response measures mitigated the economic costs associated with pandemics.

Strengthening health systems was a priority for global and national health agencies as a means of improving health outcomes. This was more so in today's world, where the global health context was becoming complex and in response, national health systems are changing from disease-specific responses to comprehensive health systems (Alilio et al., 2022). This comes as a consensus amongst the global community who assert that a systems approach was necessary for achieving better health outcomes and improving health-related developments (Zhang, 2023). One of the WHO's six attributes of health system strengthening was health information. Improving health systems and health outcomes depended on data quality from health information systems (HIS) (WHO, 2007), which is central to health system management. It was the foundation of making decisions regarding WHO framework other five blocks.

Historically, disease surveillance systems were primarily paper based, but advancements in technology and global health initiatives have led to the development of more sophisticated digital systems (Kostkova et al., 2021). Research on challenges in the use of health information includes data accuracy, completeness, and timeliness. Data collection in resource-constrained settings can be particularly challenging, but addressing these issues was crucial for effective disease response (Magoba et al., 2025). Effective disease response often requires collaboration between multiple agencies, both domestically and internationally. Health information systems promoted by the World Health Organization emphasize the importance of cooperation in data sharing and response (WHO, 2019).

Recent advancements in data science and artificial intelligence have the potential to revolutionize disease response. Machine learning models can be employed to predict disease outbreaks and guide response efforts (Villanueva-Miranda et al., 2025). Research on the utilization of health information was vital for the effective management of public health crises. It has evolved significantly over time, facing challenges related to data quality and integration. Collaborative efforts and technological innovations continue to shape the field and improve our ability to respond to disease outbreaks.

Health information systems (HIS) play a critical role in the control of communicable diseases by enabling the timely collection, analysis, and dissemination of data crucial for disease surveillance and response. Through the integration of technology, HIS facilitates real-time tracking of disease outbreaks, efficient reporting, and the management of patient records, which enhances decision-making and resource allocation. (WHO 2022). For instance, mobile health (mhealth) applications and electronic medical records (EMRs) allow healthcare providers to monitor disease patterns, improve case detection, and coordinate interventions effectively. This technological synergy not only strengthens public health systems but also improves the capacity to prevent, control, and mitigate the spread of communicable diseases in both urban and remote settings.

In many African countries, including Kenya, infectious diseases remain a significant cause of both death and illness. To effectively combat these diseases, it was imperative to have robust surveillance systems in place. These systems played a crucial role in providing health authorities with complete, dependable, and timely information, enabling them to manage and respond to these diseases more efficiently (Adokiya et al, 2015). Health information systems research was a critical field that aims to enhance our understanding of how diseases spread and how best to respond to them. Health information systems research played a pivotal role in public health. Accurate and timely data on disease outbreaks were essential for effective response strategies. These strategies included the deployment of resources, implementation of control measures, and communication with affected communities (WHO, 2020).

In Africa, the World Health Organization (WHO) and the African Union's Africa CDC collaborated to compile and report on malaria data across the continent (WHO, 2021). Kenya's National TB Program (NTP) monitors TB cases, treatment outcomes, and drug resistance through a well-established surveillance system. The World Health Organization (WHO) also compiled data on TB cases and treatment outcomes in Africa (WHO, 2021). The Africa CDC, established by the African Union, played a crucial role in disease response across the continent,

including monitoring and responding to emerging diseases like Ebola and COVID-19 (Michaud & Isbell, 2023). Africa CDC provided data and situational reports during outbreaks, contributing to a coordinated response effort (Fallah et al., 2024).

In less developed nations, infrastructure deficiencies, unreliable power supply, and the prevalence of populations residing in remote areas with limited access to modern computing technology present challenges. These constraints led to difficulties in evaluating infectious diseases, with passive surveillance often proving ineffective and resulting in substantial underreporting. Despite the availability of infectious disease health information systems, their implementation is frequently inadequate and poorly designed, lacking incentives for compliance (Hossain et al., 2021). Legal mandates for infectious disease reporting are sometimes hindered in rural and remote areas due to reporting difficulties, with resource limitations compounding challenges not only in detecting and reporting outbreaks but also in healthcare delivery and monitoring. Key obstacles identified include unreliable infrastructure, insufficient human resources, and inadequate policies. The prevalent use of paper-based records in resource-limited settings adds another layer of complexity, as these are prone to transcription errors, susceptible to damage, and challenging to compile, especially for large-scale biomedical interventions.

In African countries, including Kenya, infectious diseases persist as the primary causes of death and morbidity. Effectively managing these illnesses necessitates well-functioning data systems that provide comprehensive, reliable, and timely information to health systems. According to (Adokiya et al, 2015). The IDSR strategy was founded by the WHO Africa Regional Office in 1998, aims to enhance the accessibility and application of surveillance data for disease detection (WHO, 2019). Disease surveillance involved continuous monitoring of disease occurrences and health-related events, requiring the data being collected systematically be analyzed and interpreted for interpretation of data for timely public health action (Isere et al., 2015).

In the year 1998, Kenya adopted the IDSR strategy as informed by a WHO Harare declaration that directed that the implementation starts at the year 2002. The country identified at least thirty-five epidemic-prone diseases to be recorded for eradication or elimination. Health care facilities used pre-constructed forms with standard case descriptions to identify, verify, and document diseases (Mwatondo et al., 2016). At the sub county level Reports were collected and forwarded to the national level weekly through County Disease Surveillance Coordinators. Each facility retains a reporting copy and returns the original to the Sub-County in a period of one week. At the national level, a web-based platform was employed to receive weekly reports from accumulated Sub-County reports (Athman et al., 2014).

The Ministry of Health in Kenya, alongside WHO and other international health agencies such as Africa CDC, maintains real-time COVID-19 data dashboards and reports, helping track the pandemic's progress (Michaud et al., 2023; WHO, 2021). Data quality and completeness was a challenge in some regions of Africa due to resource constraints and infrastructure limitations (WHO, 2021). Efforts were ongoing to improve data collection, sharing, and analysis through collaborations between governments, international organizations, and non-governmental organizations. Utilization of health information systems in Kenya and Africa was collected and managed by various national and international agencies. This data is vital for informed decision-making, resource allocation, and the development of effective strategies to combat diseases that affect public health in the region.

In Wajir County, the clarity regarding the use of health data in County development plans, operational planning, and addressing emerging issues was lacking. An assessment of the national data utilization status revealed a significant weakness in this area. Planning was not effectively associated with health-related data and allocation of resources was not based on evidence on the ground. The monitoring and evaluation of programs related to health as well as interventions that must be based on reported data from HMIS. Quality assessments conducted by the management team and other stakeholders at the Wajir County office have

indicated deficiencies in data, limited accessibility, and a frequent lack of utilization in decision-making.

With the introduction of electronic health records (EHR) within the health care settings has contributed to the shift from manuals or the so-called paper-based way of keeping records to the digital or electronic systems (Mugauri et al., 2025). Prior to the coming of the ehealth and related platforms, data related to a patient's data was kept in large printable files complicating the process of not just accessing but also managing such data. The traditional system called for better ways to handle patient data in terms of storage and retrieval. Recognizing that health information is crucial for EHR system strengthening, health policies, and planning, it was widely acknowledged that timely and accurate information on diverse health matters can potentially improve the health status of a greater nation, moreover this plays a great role for healthcare institutions and organizations to improve on modalities to deliver healthcare (WHO, 2019). The EHMIS Systems represent a significant ICT advancement for organizing and managing health information or records to enhance any EHR system (e-HMIS). This system automates collection of medical data analysis, storage as well as evaluating decisions related to health. The e-HMIS has been described as an automated health information management system and comprises interconnected components and procedures that collaborate to generate health intelligence and information. This facilitates monitoring and managing people's health status and healthcare services, ultimately supporting healthcare decisions at all levels (Mugauri et al., 2025)

Habaswein Sub County had been selected for this project due to its centrality in Wajir County; the findings in Habaswein can be generalized to the greater Wajir and the larger so-called Northern Kenya frontier district and ultimately the horn of Africa. Due to its porous border with neighboring Somalia, this region has been prone to several communicable diseases including measles, and a host of water related infections especially during the rainy season. Empirical evidence from various studies and reports underscores the significance of utilizing health information for the control of communicable diseases in public health facilities. These

data-driven approaches, when implemented effectively and in a collaborative global context, can contribute to improved disease surveillance, resource allocation, intervention strategies, and ultimately, better public health outcomes. This project delves into the extent health information was used in the control of infectious diseases in Habaswein sub county Wajir County.

1.2 Statement of the problem

The control of communicable diseases relies heavily on the effective utilization of health information for surveillance, early detection, and timely intervention. However, in many developing countries, including Kenya, there remains a significant gap between data collection and its actual use in guiding public health decisions. In Wajir County, the challenge of recurrent outbreaks of communicable diseases such as cholera, measles, malaria, diarrheal diseases, and meningitis persists despite the presence of the Integrated Disease Surveillance and Response (IDSR) system and other health management information structures.

The central problem lies not in the absence of data but in the limited utilization of health information to control communicable diseases. Reports from the WHO (2019) indicate that less than 37% of collected health data is analyzed for decision-making, while a large portion remains unutilized. In Wajir County, recent statistics show that between 2018 and 2020, cases of measles increased by 8.5%, suspected MDR-TB by 33%, meningococcal meningitis by 40%, and cholera by 9.4% (KHIS, 2020). This trend suggests that the available health information is not being effectively used to guide preventive and control measures.

Several factors contribute to this underutilization. First, there is limited technological capacity, with only 30% of healthcare facilities in the county having electronic health record systems. Second, data fragmentation and manual record-keeping hinder the timely sharing and analysis of information, as reported by 60% of health providers who struggle to access complete patient records (Ayamolowo et al., 2023). Third, insufficient data management skills among health

personnel limit the transformation of raw data into actionable insights. Moreover, while government policies such as IDSR guidelines exist, their implementation and enforcement at the facility level remain inconsistent, weakening data-driven disease surveillance and response.

The consequences of poor health information utilization are far-reaching. Health facilities in Habaswein Sub-County continue to experience delayed outbreak detection, inefficient resource allocation, and increased disease transmission rates, resulting in preventable morbidity and mortality. In 2021, local hospitals handled over 8,000 new outpatients and 7,000 revisits, yet the data generated was not systematically applied to predict outbreaks, manage drug stock levels, or allocate human resources effectively.

Previous studies Smith and Johnson (2022), Wilson et al. (2014), WHO (2016) have demonstrated that effective health information utilization improves disease surveillance, early diagnosis, and response efficiency. However, few empirical studies in Kenya—and none specific to Habaswein Sub-County, Wajir County—have examined how the effectiveness of health information systems, data metrics, technology, and government policy collectively influence the control of communicable diseases.

Therefore, this study sought to assess the effect of health information utilization on the control of communicable diseases in public health facilities in Habaswein Sub-County, Wajir County, addressing a critical knowledge gap and providing evidence to strengthen health information management and disease surveillance systems at the county level.

1.3 Main Objective

The main objective of this study was to investigate the utilization of health information data for the control of communicable diseases in public health facilities in Habaswein Sub County, Wajir County.

1.4 Specific Objectives

- i. To identify key data metrics within the health information system that support early detection and intervention in the control of communicable diseases in public health facilities in Habaswein Sub County, Wajir County.
- ii. To examine the association between the use of health information technology and the control of communicable diseases in public health facilities in Habaswein Sub County, Wajir County.
- iii. To determine how government policy influences the use of health information data in the control of communicable diseases in public health facilities in Habaswein Sub County, Wajir County.

1.5 Research Questions

- i. What key data metrics within the health information system support early detection and intervention in the control of communicable diseases in public health facilities in Habaswein Sub County, Wajir County?
- ii. What is the association between the use of health information technology and the control of communicable diseases in public health facilities in Habaswein Sub County, Wajir County?
- iii. How does government policy influence the use of health information data in the control of communicable diseases in public health facilities in Habaswein Sub County, Wajir County?

1.6 Justification of the study

The justification of a study on utilizing health information for the control of communicable diseases in public health facilities in Kenya lied in the pressing need to improve public health outcomes and disease control strategies. This project addressed a critical aspect of public health management, aiming to enhance the efficiency and effectiveness of healthcare interventions.

Kenya, like many other developing countries, faces a significant load of infectious diseases including malaria, HIV/AIDS, diarrheal diseases, and tuberculosis. These diseases pose a threat to public health and require effective surveillance, monitoring, and control strategies. Utilizing

health information in real-time allows for prompt and targeted interventions. Quick responses to disease outbreaks or spikes in cases are essential for preventing further transmission, reducing morbidity and mortality, and optimizing resource allocation.

Analyzing health information provides valuable insights into the trends, patterns, and dynamics of communicable diseases. This data-driven approach assisted policymakers and public health officials in making informed decisions, implementing strategies based on evidence and prioritizing interventions for disease prevention and control.

Efficient use of limited healthcare resources was crucial. Utilizing health information helps identify areas with the highest disease burden, allowing for targeted resource allocation, including personnel, drugs, vaccines, and medical equipment.

Accurate and timely health information is fundamental for disease surveillance and monitoring. By harnessing health information, public health authorities can track the progression of diseases, detect outbreaks, and implement control measures in a timely and effective manner. Enhancement of the capacity of public health facilities to collect, analyze, and utilize health information empowers local healthcare workers and communities. This local empowerment contributes to a more robust and decentralized public health system. Enhancing disease control measures at the national level contributes to global health security. Communicable diseases can easily cross borders, and effective control at the local level can help mitigate the risk of international disease spread.

1.6 Significance of the study

The study on the utilization of health data in the control of communicable diseases in Wajir, Kenya, held significant implications for public health, healthcare delivery, and the overall well-being of the community.

1.6.1 The government Disease Surveillance and Early Detection

Understanding how health data was utilized can contribute to improving disease surveillance and early detection in Wajir. By gaps identification and challenges in the utilization of health information, the project was used in informing strategies to enhance the timely identification

and response to communicable diseases, preventing their spread. Utilizing health related data is vital for designing and implementing effective public health interventions. The project helped identifying whether existing data systems support evidence-based decision-making and intervention planning, leading to more targeted and efficient control measures for communicable diseases.

Efficient utilization of health data assisted in resource allocation and planning. The project provided insights into whether the available data informs resource allocation strategies, helping policy makers and health officials allocate resources effectively to address the specific communicable disease burden in Wajir.

1.6.2 Community Health Education and Awareness:

Health data can be a powerful tool for community health education and awareness. Understanding how data was used to inform and educate the public about communicable diseases lead to the development of targeted health communication strategies, promoting community engagement and adherence to preventive measures.

1.6.3 Enhanced Cross-Sector Collaboration:

The study shed light on the level of collaboration between different sectors, such as health, education, and agriculture, in utilizing data for communicable disease control. Improved collaboration led to a more comprehensive and integrated approach to disease prevention and control.

1.6.4 Health System Strengthening:

By doing an assessment of the use of health information, the study provided recommendations for strengthening the overall health system in Wajir. This included improvements in data collection, storage, analysis, and reporting mechanisms, ultimately enhancing the capacity of the healthcare system to respond to communicable diseases.

1.6.5 Impact on Vulnerable Populations:

Populations that were deemed vulnerable, including the elderly, children, persons with disabilities and others whose immune system was compromised were disproportionately affected by communicable diseases. The project helped identify whether health data utilization addressed the specific needs of these populations, contributing to more targeted interventions and improved health outcomes.

1.6.6 Global Health Security and Preparedness:

In an interconnected world, communicable diseases posed a global threat. Understanding how health data was utilized contributed to global health security by ensuring that local systems were prepared to detect, respond to, and prevent the spread of communicable diseases, reducing the risk of cross-border transmission.

1.6.7 The county government of Wajir and other County Governments

The study findings were potentially used as a reference material for Wajir and other counties in the Northern Kenya frontier as well as National programs in control of infectious diseases. Wajir County government, other county governments and the national government were all given insight into how health information was utilized by various stakeholders within the healthcare service. The study's findings informed the development of policies that promoted the effective utilization of health data for communicable disease control. Advocacy efforts can then be directed toward implementing policies that strengthen data-driven decision-making at various levels of the healthcare system.

1.6.8 Academia

The findings of this project will be used by researchers in future to not only gain more insights into the use of health information but also to review their literature in related studies.

1.7 Limitations of the Study

1.7.1 Geographical limitations

Habaswein Sub County was a large region with many health facilities scattered all over, some far apart from each other. The project was certain that the approach was followed to the latter.

1.7.2 Data Quality and Availability

Limited availability and quality of health data was a significant limitation. Incomplete or inaccurate data could affect the study's ability to draw robust conclusions about the utilization of health information in communicable disease control.

1.7.3 Data Accessibility:

Access to health data was restricted due to privacy concerns or institutional policies. The study faced limitations in accessing certain datasets, potentially impacting the comprehensiveness of the analysis.

1.7.3 Temporal Constraints:

The study was limited by the time frame within which data was collected. Communicable disease patterns and health data utilization practices changed over time, and the study captured the most current scenario.

1.7.4 Resource Constraints:

Financial and logistical constraints limit the scope of the study. Adequate resources for comprehensive data collection, analysis, and interpretation were not available, potentially affecting the depth and breadth of the research.

1.7.5 None Response Bias:

Even if individuals were included in the census enumeration, they chose not to respond to the census questionnaire. Non-response bias occurred when the characteristics of non-respondents differed systematically from those who responded, leading to inaccurate or incomplete data. This impacted the generalizability of findings to the entire population of Wajir.

1.7.6 Health System Dynamics:

The complexity of the health system in Wajir, including factors such as governance structures and interagency collaboration, presented challenges in capturing the full spectrum of dynamics influencing health data utilization for communicable disease control.

1.8 Definition of Operational terms

- Data:** Data referred to factual information, often numerical or categorical, collected, processed, and analyzed for the purpose of generating insights and supporting decision-making. Health data, encompassing patient records, epidemiological statistics, and other relevant information, forms the backbone of evidence-based healthcare interventions (Cheburet et al., 2016).
- Disease:** In the context of health project, a disease was understood as a pathological condition of a part, organ, or system of an organism resulting from various causes, often characterized by specific symptoms and signs. The project focused on the utilization of health information for the control and prevention of infectious diseases, such as malaria and tuberculosis (Njuguna et al., 2022).
- Facility:** A facility referred to a physical location, such as a hospital, clinic, or healthcare center, where health services are provided. Health data utilization at the facility level was crucial for assessing healthcare delivery, resource allocation, and patient outcomes (Mboera et al., 2021)
- Integration:** Integration involved combining or coordinating different components, such as health data from various sources, to create a unified and comprehensive system. The integration of health data from electronic health records and public health databases was essential for a holistic approach to disease control (Awasthi et al., 2022).
- Prevalence:** Prevalence indicated the proportion of individuals in a population with a specific condition or disease at a particular point in time or over a specified period. Health data utilization enabled the assessment of disease prevalence,

aiding in the design of targeted interventions for at-risk populations (Morike, 2023).

Response: In the context of disease control, response referred to the actions taken to address and mitigate the impact of a health threat or outbreak. Effective response strategies relied on timely and accurate health data utilization for decision-making during public health emergencies (Mboera et al., 2021).

Sample Citation: The utilization of health data in disease surveillance programs was instrumental in tracking trends and informing proactive public health measures (Amir et al., 2021)

Utilization: Utilization referred to the practical application of health data for decision-making, policy development, and the improvement of healthcare services. The study explored the utilization of health data in informing evidence-based practices for disease control, emphasizing its practical application in healthcare settings (Wamai, 2009).

CHAPTER TWO

LIERATURE REVIEW

2.1 Introduction

This chapter presents a literature review for the study. The first section of chapter deals with literature review based on the study's specific objectives, further a theoretical review follows which a conceptual framework has been put in place.

2.2 Review of related literature

2.2.1 Data metrics

Health data measurement plays a pivotal role in the effective functioning of healthcare systems, policy formulation, and evidence-based decision-making. This literature review provides an overview of the diverse methodologies employed in health data measurement, examining the strengths, limitations, and challenges associated with these approaches. Health data metrics are specific, measurable values used to track and evaluate health status, health services, or health system performance over time. In the context of communicable diseases, metrics help public health actors to detect outbreaks early, monitor trends, plan interventions, evaluate effectiveness, and allocate resources. They may take the form of structural, process, outcome, or performance metrics. This review discusses recent literature (2019-2025) on these metrics, focusing particularly on Kenya and comparable settings in sub-Saharan Africa, with attention to their use in controlling communicable diseases.

Structural metrics refer to the resources and infrastructure available to deliver health services. These include physical infrastructure, staffing, data systems (such as EHR), laboratories, diagnostic capacity, equipment, and policy and regulatory frameworks. A study in Kenya developed composite data quality scores across HIV program facilities using KHIS (Kenya Health Information System) to measure completeness, consistency, and plausibility (discrepancy) of data (structural metric: availability and functioning of data reporting systems) (Odeny, et al., 2023). The findings showed that many facilities had substantial gaps in structural readiness for consistent reporting and data quality. Though many studies focus on non-communicable diseases, insights into readiness help illustrate how structural metrics influence

disease control broadly. For example, “Readiness of health facilities to deliver non-communicable diseases services in Kenya: a national cross-sectional survey” assessed facilities for diagnostic equipment, staff, guidelines, medicines, etc. While targeted NCDs, the methods illustrate importance of structural metrics such as equipment availability, trained staff, diagnostic capacity which are equally relevant for communicable disease control (e.g., for TB, malaria, cholera) (Ammoun, et al., 2022). Structural metrics also include the presence of national surveillance systems, reporting protocols, or regulatory policies. Studies evaluating how well facilities meet HIV indicator reporting (completeness and timeliness) are indicative of structural capabilities: adequate staffing, training, and protocols are prerequisites (Gesicho et al., 2021).

Process metrics involve the way health services are delivered: activities, adherence to protocols, timeliness, quality of data collection and reporting, health worker actions, etc. The HIV reporting study in Kenya used indicators like completeness (percentage of expected reports actually submitted), timeliness (on time submission), and consistency (internal coherence across indicators over time) to assess process quality. This is essential for early detection and response to communicable diseases (Gesicho et al., 2021). A more recent study in Busia County focused on digitalization of integrated community case management and performance management. In this intervention, community health workers (CHWs) used mobile health applications and dashboards to report cases of malaria, pneumonia, diarrhea. Key process metrics included proportion of caregivers seeking care on same day of symptom onset, proportion of cases managed by CHWs, coverage of treatment, and speed/timeliness of referrals. The study found statistically significant improvement in use of health services and timeliness after digitalization (Njoroge et al., 2025). Studies have employed RDQA (Routine Data Quality Assessment), and other audits to measure how accurately and fully data are recorded, processed, and submitted. For example, the composite data quality score study in Kenya measured completeness, consistency, and plausibility, which are process metrics. Facilities were classified into high, fair, or low performance categories.

Performance metrics often combine structural, process, and outcome metrics to evaluate efficiency, effectiveness, equity, patient satisfaction, and overall system performance. The Gesicho et al. (2021) study clustered facilities by their performance on HIV reporting using completeness, timeliness, consistency. These clusters (best, average, poor, outlier) are performance metrics that help identify which facilities perform well in the totality of the reporting process, and which need support. Such performance metrics are actionable in managing communicable disease functions (e.g., HIV, TB). In the Busia County study, performance metrics included coverage (proportion of CHWs conducting appropriate assessments), treatment and referral rates, speed of service, and care-seeking behavior changes. These combine process and outcome dimensions to evaluate the performance of the strategy in reducing burden of malaria, pneumonia, and diarrhea (major communicable diseases) among children under five. The Kenya data quality study developed composite scores (completeness, consistency, plausibility) not only as process metrics but also used to assess facility performance quantitatively, identifying high/low performing facilities with respect to data reporting and integrity. This has implications for disease detection and response, because if data are poor, disease control is undermined.

While the literature shows that health data metrics provide valuable insight into communicable disease control, several challenges have been documented. Despite systems for reporting, many facilities struggle with incomplete, inconsistent, or implausible data. The Kenya composite score study noted that completeness and plausibility might not correlate, implying that simply collecting data is not enough; the data must be reliable (Odeny, et al., 2023). Many facilities lack electronic data management tools, rely on paper-based records, or have inconsistent internet connectivity. Such structural deficiencies hamper real-time reporting and integration across levels of health system. For example, readiness studies show gaps in diagnostic capacity, staff training, guidelines, which affect ability to generate valid outcome metrics. Delays in reporting or analysis reduce the usefulness of metrics for early detection. Some studies show that although reporting completeness improved over time, timeliness is often lagging. Clusters

of performance by facility indicate that some facilities continue to be late in reporting programmatic data.

Electronic Health Records have become a cornerstone of health data measurement, offering a comprehensive digital representation of patient health information. Motsi, (2024) emphasize the advantages of EHRs in capturing real-time data, enabling seamless integration of clinical information across healthcare settings. Surveys and questionnaires remain essential tools for gathering patient-reported data and subjective health information. However, challenges exist in ensuring the accuracy and reliability of self-reported data, as highlighted by Syed et al. (2023). Ensuring the quality and accuracy of health data was a persistent challenge. Javaid et al. (2024) discuss issues related to data integrity, completeness, and the potential for bias, emphasizing the importance of continuous monitoring and validation. The interoperability of health data systems remains a significant challenge in achieving seamless data exchange across healthcare entities. Deniz-Garcia et al. (2025) explore the complexities associated with interoperability and the need for standardized data exchange protocols. Advancements in wearable devices and remote monitoring technologies offer new avenues for health data measurement. Huhn et al. (2022) discuss the potential of wearable sensors in providing real-time, continuous health data for personalized healthcare. The emergence of big data analytics has transformed the landscape of health data measurement. Wilson et al. (2014) highlights the potential of big data in uncovering patterns, trends, and predictive insights, emphasizing its role in improving healthcare outcomes.

In the context of routine health information systems, evaluating data quality involved diverse methodologies, with a primary focus on identifying issues like data inconsistencies and misrepresentations (Chen et al., 2018). One widely used assessment tool was the Routine Data Quality Assessment (RDQA), developed by Measure Evaluation in 2008. This tool has been employed across various countries to evaluate data quality in routine health information systems. The RDQA employs a dual approach, combining data verification and system assessment, to comprehensively evaluate data quality and adapt to specific contexts.

The data verification component of RDQA involved comparing reported data values against source documents and calculating ratios based on the obtained values. The system assessment, the second prong of RDQA, utilizes qualitative methods to evaluate data management and reporting systems at different administrative levels. This assessment covers aspects such as training, indicator definitions, data requirements, data management, and quality control measures within the data management process. By integrating quantitative and qualitative approaches, the RDQA tool provided a holistic assessment of data quality. It has been successfully applied in various countries for different purposes, demonstrating its versatility. For example, in Nigeria, the tool was used to assess the quality of HIV data for grant applications, employing both Data Verification and Systems Assessment approaches. The study revealed poor data quality in ART clinics, attributed to late data submission and high turnover rates among health facility staff (Lane et al., 2020)

In a different context, the Routine Data Quality Assessment (RDQA) tool was employed to assess the quality of immunization data across 27 countries. Using a verification factor technique, the study revealed that only approximately 42% of the evaluated districts fell within the acceptable range of 0.85 to 1.15. The verification factor was calculated by comparing recounted DPT3 values at health facilities with the values reported at the district and national levels.

2.2.3 Policy and Legislation

Policies and legislation play a crucial role in shaping how health information systems (HIS) are designed, implemented, and used to control communicable diseases. Effective policy frameworks ensure that health data are collected, shared, and utilized in ways that strengthen disease surveillance, improve coordination across levels of care, and enhance early detection and response to outbreaks. This section reviews empirical evidence on how government policies and legal instruments influence the use of HIS in managing communicable diseases, with a particular focus on Kenya.

Globally, public health policies have been instrumental in guiding data-driven disease surveillance systems. For instance, Ercia (2021) examined the impact of the Affordable Care Act (ACA) in the United States and found that increased insurance coverage facilitated the expansion of electronic health record (EHR) systems. These digital platforms enhanced data collection and sharing among healthcare providers, improving disease monitoring and preventive care. Similarly, White et al. (2019) observed that health policies promoting transparency and public reporting, such as nutrition labeling regulations, indirectly strengthened HIS by creating a culture of data use and accountability in health management (Lane et al., 2020)

In the context of communicable disease control, government legislation supporting tobacco control and vaccination programs has relied heavily on HIS-generated data. For example, Wilson et al. (2014) found that Australia's tobacco taxation policy used HIS data to track smoking prevalence and evaluate intervention success. Patel and Kumar (2020) also demonstrated that India's National Mental Health Parity Law included digital health monitoring provisions that facilitated data-driven evaluation of mental health outcomes. Such examples show that policy and legislation increasingly depend on the availability of reliable and interoperable health information systems to monitor the effectiveness of public health interventions.

Kenya's health policy framework strongly emphasizes the integration of HIS as a strategic tool for improving healthcare delivery and disease control. The implementation of Universal Health Coverage (UHC) in Kenya, as discussed by Ogwengoa (2024) highlighted the role of data systems in monitoring service delivery and disease trends. However, the study noted challenges in financing and infrastructure that limited the optimal use of HIS in supporting UHC goals. Wamai (2009) further emphasized that regional disparities in healthcare access and data reporting hindered effective control of communicable diseases, underscoring the need for uniform HIS adoption across all counties.

Health policies have also shaped human resource capacity for data collection and reporting. Nzinga et al. (2019) highlighted that community health workers (CHWs) play a vital role in

primary healthcare delivery, yet their effectiveness depends on training and access to digital reporting tools. Ogwengoa (2024) observed that Kenya's National Hospital Insurance Fund (NHIF) policies required hospitals to submit electronic health data, reinforcing the use of HIS for accountability and evidence-based decision-making. However, limited resources, fragmented systems, and inadequate policy enforcement often undermine the sustainability of such data-driven practices.

Policy reforms have also influenced Kenya's health system structure, including the 2010 constitutional devolution, which decentralized healthcare service delivery to county governments. This shift created both opportunities and challenges for HIS implementation. Counties gained autonomy to manage health data and allocate resources, but disparities emerged in technological capacity and staff competencies. The 2012–2013 Kenya Health Policy directed counties to establish departments for health information management, creating the framework for disease surveillance and data reporting at local levels. These structures facilitated quicker responses to outbreaks and improved coordination between national and county surveillance teams (Ministry of Health, [MoH] 2015).

The Kenya Medical Policy Framework of 2018 reinforced the importance of HIS by embedding digital data systems in health governance. The framework outlined hierarchical reporting from dispensaries to referral hospitals, promoting an integrated flow of data for communicable disease control. It emphasized the use of digital health records to track diseases such as malaria, tuberculosis, and HIV/AIDS, aligning Kenya's approach with global health surveillance initiatives (Magoba et al., 2025). Similarly, the National Health Sector Strategic Plans (1999–2004; 2005–2010) mandated digital record keeping and early warning systems for epidemic preparedness, reflecting the government's commitment to HIS as a policy instrument.

At the operational level, government legislation governs how health data are collected, stored, and shared. Policies on health data privacy and security protect patient information while promoting trust and data integrity (Halamka et al., 2019). Interoperability policies have been particularly influential in enabling effective disease surveillance. Li and Wang (2020) found that standardized data exchange frameworks ensure that information from different facilities

can be aggregated for national surveillance systems. In Kenya, interoperability remains a key focus of the Health Information System Policy established in 2019, which mandates the integration of district health information systems (DHIS2) across all counties to support communicable disease monitoring.

Furthermore, government-led initiatives such as the Health Information Exchange (HIE) in the United States and the National Health Observatory in Kenya illustrate the critical role of policy in enhancing data sharing. Hincapie and Warholak (2011) reported that policies supporting HIE improved data accessibility and care coordination, leading to faster outbreak responses. Similarly, the Kenyan Ministry of Health's adoption of the e-Health Policy (2020–2030) aims to harmonize digital health tools, enabling real-time data reporting for epidemic management and public health planning.

Telehealth and mobile health (mHealth) policies have also expanded the reach of HIS in communicable disease surveillance. Studies by Ercia (2021) demonstrated that government reimbursement and regulatory reforms globally have facilitated the integration of telehealth in routine disease monitoring. In Kenya, mobile reporting systems have become instrumental in detecting outbreaks of diseases such as cholera and measles in remote areas. However, challenges such as inadequate network coverage, insufficient training, and inconsistent policy enforcement persist (Wilson et al., 2014).

Government policies have been instrumental in shaping the landscape of telehealth and remote monitoring. Studies by Ercia (2021) explore the impact of policy changes, such as reimbursement reforms and regulatory adjustments, in facilitating the widespread adoption of telehealth solutions, leading to improved data-driven healthcare delivery. Despite the positive aspects, challenges in policy implementation have been identified. Research by Lyu (2025) examines the barriers and facilitators to the effective implementation of health data policies, emphasizing the importance of addressing organizational and technical challenges for successful policy outcomes.

This literature review provides a comprehensive overview of the impact of government policies on health data management. From privacy and security considerations to interoperability, HIE initiatives, and the evolving landscape of telehealth, government policies play a crucial role in shaping the use of health data for improved healthcare delivery. Understanding the nuances and implications of these policies is essential for researchers, policymakers, and healthcare practitioners as they navigate the complex terrain of health data governance.

Overall, government policies and legislation significantly influence the effectiveness of HIS in controlling communicable diseases. They determine the availability of infrastructure, data governance standards, funding priorities, and institutional accountability. From ensuring data security and interoperability to promoting digital innovation and capacity building, policy frameworks create the enabling environment necessary for efficient disease surveillance and health information management. Understanding these legislative and policy dynamics is therefore essential to strengthening HIS for improved control of communicable diseases in Kenya and beyond.

2.2.4 Association between Technology and use of Health Information systems.

The effective functioning of health information systems (HIS) depends heavily on technological infrastructure and innovation, which enable continuous monitoring of diseases at individual, local, national, and international levels. Both public and private healthcare sectors rely on technology-driven systems to identify, collect, evaluate, and disseminate data related to disease frequency and health incidents (Haakonde et al., 2018). The use of digital tools, databases, and communication networks allows health personnel to rapidly detect and respond to emerging public health threats.

A study by Haakonde et al. (2018) in Rufunsa revealed that a significant proportion of Integrated Disease Surveillance and Response (IDSR) health workers were aged 20–29 years, reflecting a technologically adaptive workforce capable of embracing new digital systems. This finding contrasts with a study by Edo (2023) in Nigeria, where older workers dominated the

system, possibly indicating slower technology adoption. Younger workers, though less experienced, tend to adapt more easily to computerized health information systems, enhancing efficiency in disease surveillance and reporting.

The professional composition of HIS participants also influences technological adoption. For instance, in Rufunsa, nurses and clinical officers formed the majority of HIS users, while in Ethiopia, environmental health officers and community health extension workers dominated. These differences underscore the role of training and professional background in technological utilization within HIS.

Technical determinants, such as information system architecture, data processing methods, and communication channels, critically affect the success of HIS. When these technological components are well integrated, data can flow efficiently, allowing timely disease detection and intervention. Healthcare workers, as primary users of HIS, act as real-time data sentinels; their ability to collect, input, and interpret data through digital tools directly influences early disease detection and control (Ercia 2021; WHO, 2020).

The utilization of technology within HIS is central to preventing communicable diseases and enabling rapid response to outbreaks. Integrated Disease Surveillance and Response (IDSR) systems, for instance, rely on daily digital data collection and analysis to predict and respond to epidemics. Through ICT-enabled coordination mechanisms such as electronic reporting, digital dashboards, and data sharing platforms, health facilities can allocate resources efficiently and coordinate outbreak responses (Nsubuga et al., 2006).

The Health Management Information System (HMIS) exemplifies how technology enhances health information management. As an integrated software platform, HMIS enables data acquisition, processing, and quality assurance across hospital departments, improving administrative and clinical operations (Gitahi & Kyalo, 2024). The system's functionalities support patient-centered care, reduce costs, and improve decision-making by providing real-time access to accurate data. Similarly, the Hospital Management Information System ensures

that health professionals' access accurate information promptly, thereby enhancing healthcare quality and operational efficiency.

Information systems like HMIS and Electronic Medical Records (EMRs) have revolutionized healthcare by enabling accurate data storage, retrieval, and sharing. The use of electronic databases simplifies data entry, retrieval, and exchange, promoting preventive and curative care. These systems not only improve patient management but also strengthen institutional performance by integrating medical, administrative, and financial data (Uslu & Stausberg, 2021).

Empirical evidence from Turkey further supports the technological role of HMIS. Demirel (2020) found that HMIS facilitated information production, sharing, and storage, meeting the needs of physicians, administrators, and patients alike. However, the study emphasized the need for evaluating how these systems influence performance outcomes. In Kenya, the adoption of Electronic Medical Record Systems (EMRS) significantly enhanced operational efficiency through faster access to patient information, improved decision support, and reduced waiting times—demonstrating a strong link between ICT use and improved healthcare outcomes.

Technological infrastructure also underpins the success of HIS. Adequate telecommunication systems and reliable internet connectivity are essential for transmitting data between health institutions and decision-makers (Mugo, 2017). Where connectivity is weak, delays in data reporting compromise timely decision-making. Similarly, studies in Liberia by Hui et al. (2022) revealed that poor phone networks, limited computer access, and unstable electricity disrupted data transmission and limited the use of digital reporting systems.

Cherubet et al. (2016) further confirmed that inadequate ICT infrastructure—particularly weak internet connectivity and insufficient computers—hampers data management and use. These studies collectively demonstrate that the level of technological investment directly influences the functionality of health information systems. Inadequate infrastructure results in incomplete reporting, delayed disease surveillance, and inefficient resource allocation.

Conversely, healthcare institutions with strong IT frameworks, managerial support, and sufficient resources are more likely to adopt and effectively use HIS technologies (Jeilani & Hussein, 2025). This adoption aligns with global trends, where increasing internet penetration and ICT investment have improved healthcare data management. Therefore, technology not only serves as the backbone of HIS but also acts as a critical determinant of the efficiency, reliability, and sustainability of communicable disease control systems.

The impact of Electronic Medical Record Systems (EMRS) on operational efficiency, as highlighted in the study conducted in Kenya, emphasizes the positive outcomes associated with the adoption of ICT in healthcare settings. The benefits mentioned, such as enhanced service delivery, improved decision support, faster accessibility of patient information, reduced waiting times, and better management of resources, are indicative of the transformative potential of ICT systems like EMRS in healthcare management (Cheburet et al., 2016).

Telecommunication infrastructure was recognized as a crucial element in supporting public health, particularly in the transmission of health information across various stakeholders. Effective communication between health institutions, patients, insurance companies, and other third parties rely heavily on the availability and penetration of telecommunication and internet services. Low levels of telecommunication infrastructure can negatively impact the flow of health information, hindering the efficiency of healthcare systems (WHO, 2018)

The adoption of ICT strategies, including EMRS, was influenced by the level of IT infrastructure and managerial structures within healthcare institutions. Hospitals with robust IT infrastructure are more likely to embrace ICT systems, creating a favorable environment for investment in technology-driven solutions (Marete, 2020). The global interest in ICT adoption was driven by the increasing number of internet users, with significant growth observed in developing countries. The availability of ICT infrastructure, literacy rates, and economic factors play a crucial role in determining the extent of internet penetration. Developed economies with higher GDP per capita and well-established telecommunication infrastructure are at the forefront of internet development, setting the stage for the adoption of ICT in various sectors, including healthcare (Hui et al., 2022)

2.2.5 The utilization of Health information

The effective utilization of health data played a crucial role in shaping modern healthcare systems, influencing decision-making, policy formulation, and overall system performance. The literature reviewed underscores the pivotal role of health data utilization across various facets of contemporary healthcare systems. From influencing healthcare utilization to shaping technology integration, policy development, measurement practices, and the overall effectiveness of health information systems, the strategic use of health data emerged as a cornerstone for improving the quality and efficiency of healthcare services.

The utilization of health data was identified as a critical factor in optimizing healthcare services (Sony et al., 2023). By leveraging data-driven insights, healthcare providers enhanced patient outcomes, streamline resource allocation, and improved overall service efficiency (Lyu, 2025). The integration of health data into clinical decision-making processes has shown promising results in improving the quality and effectiveness of healthcare delivery (Awasthi et al., 2022). Health information technology has become integral to the utilization of health data. Electronic Health Records (EHRs) have emerged as powerful tools for collecting and managing patient data (Chen et al., 2017). The successful integration of technology in healthcare systems is contingent upon the effective utilization of health data, ensuring seamless interoperability and data exchange across various platforms (Sony et al., 2023).

The role of health data in shaping healthcare policies cannot be overstated. Evidence-based policymaking, driven by robust health data, has the potential to address public health challenges and optimize resource allocation (WHO, 2019). Policies that prioritize the collection, analysis, and dissemination of health data contribute to more informed decision-making at both the organizational and governmental levels (Harrison et al., 2020). Utilizing health data for measurement purposes requires standardized and reliable methodologies. The literature emphasized the importance of implementing sound measurement practices to ensure the accuracy and consistency of health data (Hosseinzadeh et al., 2025). Regular assessment of data quality, completeness, and timeliness is essential for maintaining the integrity of health information systems (Fitzpatrick, 2023).

The effectiveness of health information systems is contingent upon the meaningful utilization of health data. Studies indicate that systems incorporating evidence-based approaches to data utilization demonstrate improved effectiveness in supporting clinical decision-making, research endeavors, and public health initiatives (Wang et al., 2019). Continuous efforts to enhance the effectiveness of health information systems involve refining data collection processes, promoting data-sharing initiatives, and ensuring data security and privacy (Javaid et al., 2024).

Health managers require quick and easy access to reliable RHI to enable them to monitor health progress and outcomes over time, compare benchmarks, and make strategic decisions on resources and priorities for positive health outcomes. It was on this backdrop that Aila (2021) conducted a study to determine the use of health data for decision-making. The researchers focused on nutrition, physical activity, and obesity data in the US. The researchers reviewed the use of CDC websites to map trends in health data to plan, track and implement decisions. The findings revealed that the use of data was often based on the topic and location. They found that when the data was user-friendly, up to date, and accessible, then practitioners and other health managers utilize it for making decisions. Similar claims are made by Karuri et al. (2014) who opined that having a reliable free and open- source web-based DHIS system has the potential to improve the use of health data in decision making. However, the study focused on web-based data which encompasses a whole nation, while the current study sought to focus on the lower-level health facilities such as sub-county hospitals and health centers and the factors impeding the use of routine health data collected.

Evidence-based policymaking, driven by robust health data, has the potential to address public health challenges and optimize resource allocation (WHO, 2018). Policies that prioritize the collection, analysis, and dissemination of health data contribute to more informed decision-making at both the organizational and governmental levels (Harrison et al., 2020). Utilizing health data for measurement purposes requires standardized and reliable methodologies. The literature emphasizes the importance of implementing sound measurement practices to ensure the accuracy and consistency of health data (Hosseinzadeh et al., 2025). Regular assessment of

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In another study, Aljunid et al. (2012) examined the extent of the use of health data for policy reform in Korea, China, Taiwan, Japan, and Malaysia. Primary data was collected, and the results indicated that the low level of use of health information in policy formulation was due to limited access to the data due to privacy protection, fragmented care system, and poor quality of routinely assembled data. As a result, the use of the collected data was generally poor due to the unreliability and untimely collection and dissemination of the data. Similar findings were reported by Bijker et al. (2017) who affirms that there was generally low adoption of data disseminated on HIV and AIDS due to challenges in the collection and analysis of the collected data. The data were, however, collected from a wide range of Asian countries, which limited the generalization of the findings in the local context, hence the need for the current study.

A study conducted by Brown et al. (2024) intimated that 'what gets measured gets done. However, the researchers argued that the phrase does not apply in developing countries since there was a lot of measuring and little use of the same. The findings, sponsored by World Bank, showed that while the primary goal of HIS data is to enable the processing of valuable information for decision making, much of the data collected in the developing countries do not go to the processing stage, hence it was unrealistic for such data to have helped make valuable decisions. The researchers recommended a structured mechanism that enables health surveillance data to go beyond the collection stage. Another study conducted by Mutale et al. (2013) also found out that while most of the Western countries have embraced technology in sharing HIS information, Sub-Saharan Africa lacks the infrastructure to take advantage of technology. For instance, the reports explain that online discussion forums were on the rise in other parts of the world, especially due to their simplicity and time-consciousness.

Unfortunately, such platforms were not practical in remote parts of Sub-Saharan African countries, of which the majority fall within this category. However, these reports do not present specific cases of these countries yet there are many differences in the management and the development of health systems depending on the country's region in question. As such, there was a need for a focused local study that was cognizant of local situations. In a local study, Karuri et al (2014) reviewed the challenges facing the implementation of the web-based District Health Information Software (DHIS-2). Their findings revealed that despite the implementation of the DHIS, the utilization of data captured in this software highly relied on acceptance, and support from the targeted users at the local and national authorities. This study's scope was on the wider national use of DHIS2 while the current study limited its scope to Wajir County since data used should start at the facility level of health impacts were to be felt nationally.

2.3 Theoretical Framework

This study was anchored on the evidence-based health information systems theory, Health Metric Network (HMN) and Performance of Routine Information System Management (PRISM) frameworks.

2.3.1 Evidence-Based Health Information System Theory

The study was grounded in Carbone's Evidence-Based Health Information System Theory, which emphasizes the importance of evidence-based information in connecting daily schedule data to planning and strategy information within healthcare organizations. Carbone (2009) argues that relevant data framework assumptions should be considered when selecting new technologies for healthcare settings, and evidence should serve as the primary conductor or setup route in this context.

According to Carbone's theory, the clinical task (business) in any healthcare setting involves the administration, prevention, or treatment of clinical issues, and it should be enhanced or executed through the use of a data framework. This was distinct from the evidence-based framework, which focuses on the core business of healthcare—patient care. The evidence-

based framework addresses both input tasks (drivers) and output tasks (results), emphasizing the need for evidence to guide decision-making and actions in healthcare

In a commercial model, the reality was the patient care enhancement and the impetus for clinical care was driven by the desire to improve the health of populations or individuals. The working framework, as the impetus, played a crucial role in ensuring that the clinical task, driven by the desire to improve health outcomes, was satisfactorily completed. The working framework carried out various responsibilities, such as facilitating communication among clinical team members, creating executive frameworks to capture patients who may miss clinical attention, and assessing the achievement of improving health outcomes (Babiker et al., 2014)

The study, guided by Carbone's theory, acknowledges the significance of evidence-based information in healthcare settings and underscores the need for a robust data framework that aligns with the main business of healthcare of caring for patients. By incorporating evidence into decision-making processes, healthcare organizations can enhance clinical tasks and improve health outcomes, ultimately contributing to the overall success of the evidence-based framework in healthcare settings.

This theory informs the study that it lays emphasis on using evidence to inform decision-making in health information systems. Evidence-based approaches can guide the development of systems that better meet the needs of healthcare utilization by providing accurate and relevant information on technology. The theory may drive the adoption of technology solutions that are supported by evidence of their effectiveness. It encourages the integration of proven technologies into health information systems to enhance their functionality and efficiency. Regarding technology, Evidence-based health information systems theory can influence health policies by advocating for policies grounded in empirical evidence. Policymakers may prioritize interventions and strategies that have demonstrated effectiveness in improving health information systems. The theory improved measurement by promoting the use of evidence-based metrics and assessment tools. It ensured that measurement practices are based on proven methodologies, enhancing the reliability and validity of health data. Evidence-based health

information systems theory enhances the effectiveness of data by ensuring that the information generated is based on sound evidence. This promoted the use of data in decision-making processes with confidence in its accuracy and relevance (Lane et al., 2022).

2.3.2 The health Metric Network framework

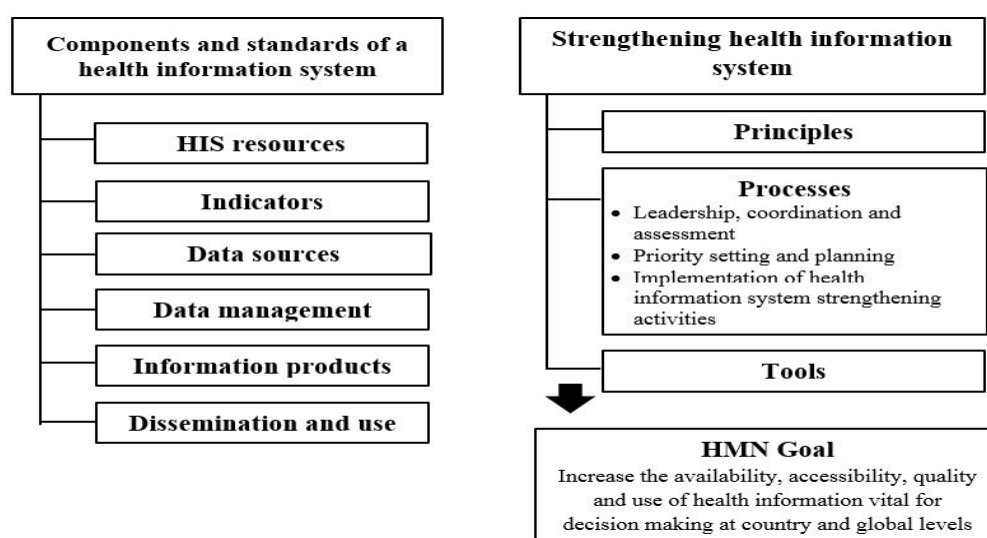
The Health Metrics Network (HMN) developed a framework to evaluate Health Information Systems (HIS) with the aim of ensuring efficient resource allocation, offering technical support for standardizing health information systems, and establishing a benchmark for Health Management Information System (HMIS) assessments. Demonstrated in Figure 2.1, the Health Metrics Network framework comprises two main parts. The first section delineates the six components of a health information system alongside corresponding standard for each. These components are classified into RHIS inputs, RHIS processes, and RHIS outputs. RHIS inputs encompass the system's assets such as computers; RHIS processes include performance indicators and data sources; and RHIS outputs consist of data management systems like databases, information products, data communication, and utilization. The subsequent section focuses on essential elements crucial for strengthening health information systems, including principles, processes, and tools for developing and evaluating health information (WHO, 2018).

The HMN framework may influence healthcare utilization by emphasizing the importance of collecting and utilizing relevant health metrics. Understanding patterns and trends in healthcare metrics can inform decision-making, resource allocation, and service planning, ultimately impacting healthcare utilization patterns. (Barro et al., 2020) on technology. The HMN might promote the use of advanced technologies for data collection, storage, and analysis. Implementing technology-driven solutions can enhance the efficiency and accuracy of health metric management within a healthcare system. Regarding Policy, The HMN framework may influence health policies by advocating for evidence-based decision-making. Policymakers might prioritize interventions and resource allocation based on the insights derived from health metrics collected through the HMN framework. HMN places importance on accurate and standardized measurement of health metrics. This emphasis led to the development and

adoption of standardized measurement tools and methodologies, improving the consistency and reliability of health data. The HMN framework contributed to the effectiveness of data by promoting the collection of meaningful and relevant health metrics. This enhanced the value of data in informing healthcare practices, policy formulation, and overall system performance.

Figure 2.1:

Health Metrics Network



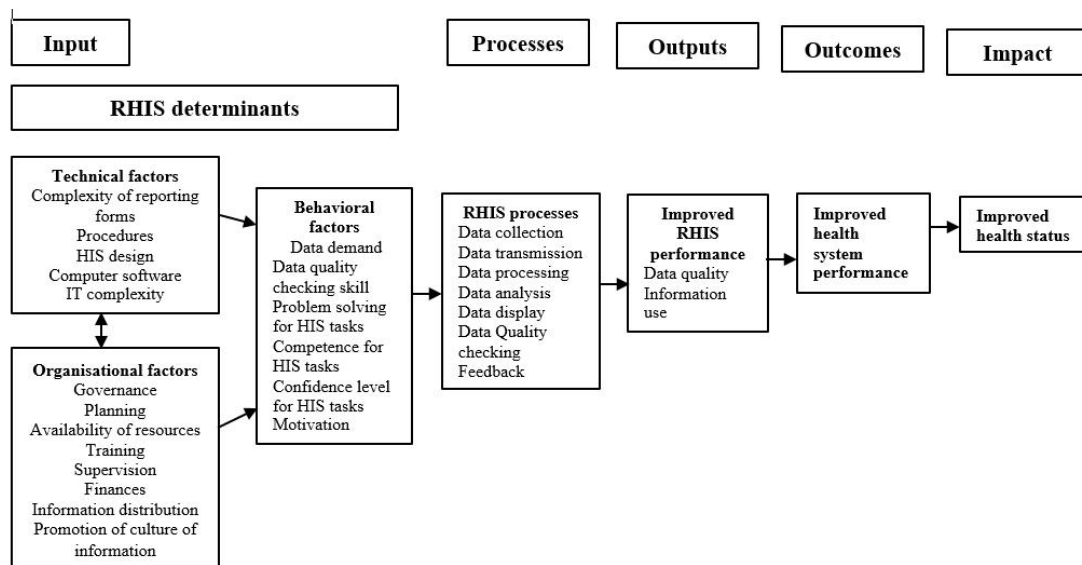
2.3.3 The Performance of Routine Information System Management (PRISM) framework

The Performance of Routine Information System Management (PRISM) framework served as a valuable tool for evaluating Health Information Systems (HIS). Specifically, it focused on assessing the performance of Routine Health Information Systems (RHIS) and identified the technical, organizational, and management factors that influenced RHIS effectiveness. The technical factors encompass reporting forms, RHIS technology, and processes. Organizational determinants include management functions, information needs, organizational culture, and resource availability. Behavioral determinants involved the competencies, skills, confidence, and motivation of individuals involved in data collection and utilization.

As depicted in Figure 2.2, the performance of routine health information systems was influenced by both health information system processes and behavioral factors. Additionally, technical, and organizational elements indirectly affect RHIS performance by shaping behavioral factors. In a comprehensive review, Aqil et al. (2009) explored seven conceptual frameworks linking health information systems to overall health system performance. Among these, the PRISM framework stood out as the sole framework that distinguished health information system inputs, processes, outputs, outcomes, and impact.

Figure 2.2:

Performance of Routine Information System Management (PRISM) framework



2.2: Performance of Routine Information System Management (PRISM) framework

PRISM focused on improving routine information systems, which enhanced healthcare utilization by ensuring that relevant information is available and accessible for decision-making. Streamlined information systems lead to more efficient utilization of healthcare services. PRISM emphasized the role of technology in routine information system management. The framework drove the adoption of technology solutions for data collection, storage, and dissemination, thereby influencing the technological landscape of healthcare systems (Aqil et al., 2009). PRISM influenced health policies by advocating for policies that support the effective management of routine information systems. Policies were designed to ensure the integration of information systems across healthcare facilities, improving overall system performance. PRISM improved measurement by focusing on routine information system performance metrics. This ensured that the measurement of system effectiveness was an ongoing process, leading to continuous improvement in data quality and system

functionality. PRISM contributed to the effectiveness of data by enhancing the performance of routine information systems. This led to more reliable, timely, and relevant data, improving the overall effectiveness of healthcare information for decision-making.

2.4 Conceptual Framework

A conceptual framework served as a theoretical structure that delineates the essential concepts, variables, relationships, and underlying assumptions that shape a study's direction and focus. It provided a foundation for understanding the research problem and served as a roadmap for the study's design, implementation, and analysis. In the context of academic research, a conceptual framework helps researchers organize their thoughts, define the scope of their investigation, and establish a theoretical foundation for their work.

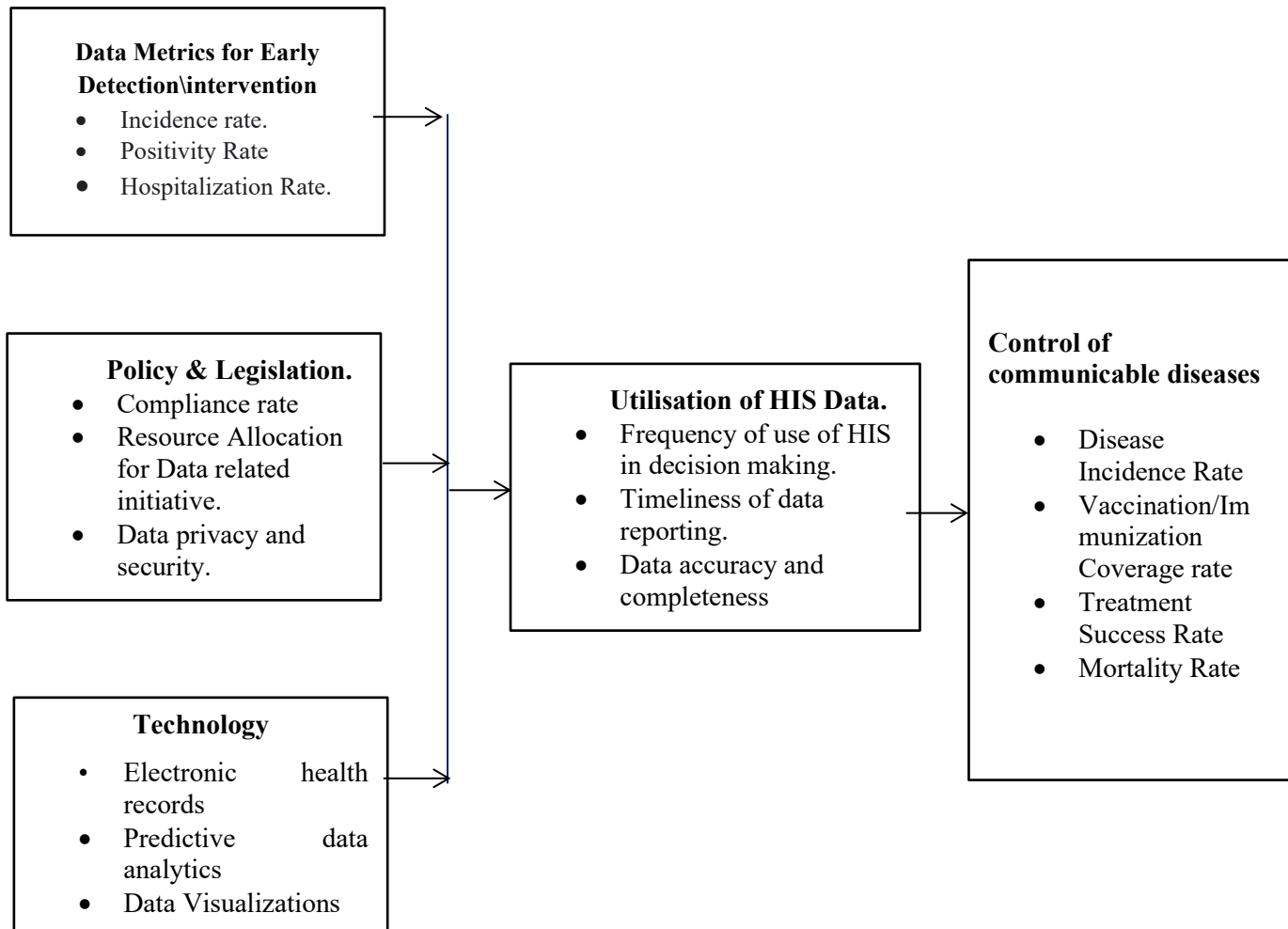
Figure 2.3:

Conceptual Framework.

Independent Variable
Variable

Moderating Variable

Dependent



2.4.1 Explanation of the conceptual framework

Health data metrics are quantifiable indicators that track disease trends and health system performance. Metrics such as incidence rate, positivity rate, hospitalization rate, and syndromic surveillance data provide the foundation for early detection of potential outbreaks. When these

metrics are accurately collected and analyzed, they enable health workers to identify unusual disease patterns, predict outbreaks, and implement timely preventive or control measures. The effectiveness of these metrics directly affects how quickly public health facilities can respond to communicable disease threats.

Government policies and regulatory frameworks provide structural support for health information management. Factors such as compliance with data-sharing regulations, allocation of resources for data-related initiatives, and adherence to data privacy and security protocols determine the extent to which HIS functions effectively. Supportive policy environments encourage data-driven decision-making and accountability in health programs. When clear policies exist for data reporting and use, health managers are more likely to rely on HIS data for evidence-based planning and disease control strategies.

Technology serves as the enabler of efficient health information collection, processing, and dissemination. Components such as Electronic Health Records (EHRs), predictive data analytics, data integration systems, and data visualization tools improve the accuracy, accessibility, and timeliness of health information. Advanced technologies allow real-time data sharing across health facilities, enhance disease surveillance, and improve coordination between health departments. In resource-limited settings like Wajir County, the availability and reliability of these technologies directly influence how effectively data can be used to manage communicable diseases.

The utilization of HIS data is the central link between HIS components and disease control outcomes. While data may be collected through various systems, it only contributes to disease control if it is effectively used in decision-making. This variable measures how health data is accessed, analyzed, and applied by healthcare workers and administrators to inform interventions. Indicators of data utilization include the frequency of HIS data use, timeliness and completeness of data reporting, and the extent to which evidence-based actions are taken based on HIS outputs. Effective utilization ensures that collected information translates into concrete actions such as vaccination drives, resource allocation, or community health education campaigns. Conversely, underutilization of data leads to delayed responses and weak public

health outcomes, even when data systems exist. In this framework, utilization acts as a mediator — it explains how data metrics, policy, and technology collectively influence the control of communicable diseases.

The control of communicable diseases represents the ultimate outcome of effective HIS utilization. It reflects how well health systems manage to reduce disease transmission, morbidity, and mortality within a population. This construct is measured using indicators such as disease incidence rate – showing reduction in new infections, vaccination or immunization coverage rate – reflecting preventive success, treatment success rate – indicating improved clinical management; and mortality rate measuring the overall health impact of interventions. Improved control of communicable diseases demonstrates that HIS data has been effectively translated into actionable public health strategies. This may include early outbreak detection, timely treatment, vaccination campaigns, and improved surveillance systems.

2.5 Gaps identified in the Studies.

There are a number of studies that have addressed this topic, for example Milliano (2022) studied the utilization of integrated and response data in controlling infectious diseases among public health facilities in Kiambu county, this study was done in Kiambu county, it was not only populous but also semi urban and to a great extent more resource endowed when compared to Wajir, this made it hard to generalize the results thereof to Wajir or any other County in Kenya's Northern frontier. In developing countries, poor utilization of health information had been identified as a significant factor contributing to increased infectious disease Morality (Aila, 2021). However, in Wajir County, there was a lack of available information regarding data use and its contributing factors. How health system factors relate to the use of health information in disease monitoring remains poorly documented. Consequently, it was crucial to investigate how health workers in the county's public health facilities utilized IDSR data. Despite existing studies on IDSR, certain gaps persist, which this study aims to address.

Existing literature may lack comprehensive analysis of how the integration of Technology and adherence to Government Policies collectively influenced the utilization of health data in decision-making processes. Citation: While prior studies have explored the impact of

technology and government policies independently, there was a notable gap in understanding how their integration influences the utilization of health data for decision-making in healthcare settings" (Sony et al., 2023)

The literature may not sufficiently address the perspectives of patients in the Measurement of Data and how a patient-centered approach can enhance the utilization of health data in personalized healthcare. Previous research has primarily focused on institutional measures of data quality. However, there was a significant gap in understanding how a patient-centered approach to data measurement can enhance the utilization of health data for personalized healthcare (Lyu, 2025).

The dynamic nature of government policies in healthcare may not be adequately explored in existing literature, and there may be a need to investigate how the evolution of policies over time affects the Utilization of Data. While current literature acknowledges the role of government policies, there was a gap in understanding how the evolving nature of these policies influences the utilization of health data in contemporary healthcare settings (Brown & Miller, 2023).

There may be a lack of research examining the variations in the Effectiveness of Data across diverse healthcare settings, such as primary care, specialty clinics, and rural health centers. Existing studies have primarily focused on general measures of data effectiveness, overlooking potential variations across different healthcare settings. Addressing this gap was crucial for tailoring interventions to diverse contexts (Deniz-Garcia et al., 2025).

Previous research primarily focused on qualitative assessments of data utilization, and there may be a need for more quantitative approaches to measure the impact of Effectiveness of Data, Measurement of Data, Government Policy, and Technology on healthcare outcomes. While qualitative studies provided valuable insights, there remained a notable gap in the literature regarding the quantitative assessment of how factors such as data effectiveness, measurement practices, government policies, and technology collectively impact healthcare outcomes through data utilization (Li & Wang, 2022).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Research methodology referred to the systematic exploration of the inquiry approach within a specific field, with a focus on generating information and knowledge during a study. In this chapter, I delved into the materials and methods used in this research. I outlined the study design, study area, sampling techniques, research tools, data collection methods, and analysis approaches, while also considering ethical considerations.

3.2 Research Design

According to Kothari (2014), a research design served as a roadmap, outlining the plan and preliminary strategy for an envisioned investigation. Its primary objective was to provide a study plan that enabled accurate assessment of cause-and-effect relationships between independent and dependent variables (Saunders et al. 2012). Study design acts as the framework or plan used to address research questions. It represents a structured arrangement for data collection and analysis, aiming to align relevance with the research purpose. In this survey, we employed an analytical cross-sectional study method. The design aims to determine the status of health information utilization and the control of infectious diseases. Analytical cross-sectional studies involved collecting data from a population or a representative subset at a single point in time (Creswell & Creswell 2017). This method has been chosen because it is deemed more efficient and cost-effective and can provide a snapshot of a population's characteristics or behaviors without the need for long-term resource commitments. The data

collection process for cross-sectional studies was typically shorter, allowing researchers to obtain results relatively quickly. This rapid turnaround was especially useful in situations where timely information was essential (Creswell & Creswell 2017).

3.3 Study Area.

The research took place in Habaswein ward, located at the geographical coordinates of 1° 0' 33" North, 39° 29' 17" East. Habaswein was the fourth-largest settlement in size within the County and was predominantly inhabited by ethnic Somalis. The name "Habaswein" translates to "a lot of dust." Wajir South Constituency, where Habaswein Ward was situated, had the lowest population density in Wajir County, with 8 people per km² compared to the county average of 13 people per km². In 2017, the urban areas of Habaswein had a population of 10,953 people, comprising 5,920 males and 5,033 females. This population represents 9% of the total urban population of Wajir County. The urban areas primarily function as market centers, while the rural areas serve as watering and grazing points for livestock due to a lack of diverse socio-economic activities.

3.4 Study Population

This study took place in Habaswein sub county, Wajir County, Kenya. There was a total of 15 Public health care facilities spread across the sub county categorized as follows: 1 level IV facilities (sub-county referral Hospitals), level III facilities (Sub-district hospitals and health Centers) and level II facilities (Dispensaries).

Table 3.1:*Target Population*

Levels	Names of facilities	(N) health workers	%
Level iv-Sub County Hospitals	Habaswein sub county hospital	25	34
Level iii- Sub-district hospitals and health centers	Dilmanyale health center	3	4
	Abakore sub-district hospital	7	9
	Meri Health center	4	5
	Sabuli Health center	7	9
	Biyamadow Health center	6	8
	Sarif Health center	3	4
	Dadajabula sub district hospital	6	8
Level ii-dispensaries	Madahlibah dispensary	2	3
	Tesorie dispensary	2	3
	Dagahley dispensary	2	3
	Sabuli Nomadic dispensary	2	3
	Quli dispensary	1	1
	Kibilay dispensary	2	3
	Shidley dispensary	2	3
TOTAL	15	74	100

Source: Wajir County Government (2023)

The study specifically targeted public health facilities, and the primary participants were healthcare staff responsible for providing curative and preventive health services at these facilities, totaling 74 respondents. These individuals played a direct role in the IDSR system through activities such as disease detection, monitoring, and notification. Key respondents for the study included Medical Officers, Record Officers, Nurses, Public Health Officers, Laboratory Technicians, Clinical Officers, and Community Health Extension Workers. The inclusion criteria for participation in the research required health workers to have a minimum of six months of service at the facility. The study excluded individuals who had not served for

more than six months and other non-healthcare employees at the hospital. The Wajir County government records indicated that there are at least 74 healthcare professionals in Habaswein sub county spread across 15 healthcare facilities.

3.4.1 Inclusion criteria

All the health care workers who provided curative and preventive health services in Habaswein sub county public health facilities and who consented were included in the study.

3.4.2 Exclusion criteria

All the health workers who worked in Habaswein sub county public health facilities and did not consent were excluded in the study. Moreover, staff who were unwell at the time of the study and those who were newly posted to the health facilities were also excluded.

3.5 Sampling Techniques

Since the population in this study was relatively small a census was proposed. Census research sampling was a fundamental aspect of collecting data from a population. Sampling was commonly used in various fields, including sociology, economics, epidemiology, and demography. Therefore, the study involved all the 74 respondents spread across the facilities. One of the primary advantages of the census method was its ability to provide complete coverage of the entire target population. Unlike sampling methods that relied on selecting a subset of individuals, the census aimed to collect data from every individual within the population of interest, ensured that no one was left out. Because the census aimed to enumerate every individual in the population, it typically yields highly accurate and reliable data.

3.6 Construction and Research Instruments

The study aimed to collect both quantitative and qualitative data using a self-administered questionnaire. The questionnaire for health workers was carefully designed to align with the study objectives, ensuring internal validity. To assess the internal consistency of the questionnaire, we employed Cronbach's alpha method. The questionnaire consists of six main sections (labeled as sections 1 to 6), covering demographic information, questions related to health data utilization, effectiveness of health data, health data metrics, government policy, and technology. Respondents rated statements on a five-point Likert Scale.

3.7 Pre-Testing of Tools

Pre-testing was carried out to ensure that the required data was collected and that the questions were well-framed and in a logical order. The tools were pre-tested in Wajir east sub- County, which was nearby, and the systems are similar. The health workers in the two counties have common experience and skills on IDSR due to high interaction. The questionnaire was given to the respondents who were given time to fill and give their views afterward.

3.7.1 Validity of Research Instruments

In this study, validity was ensured by carefully aligning questionnaire statements with the key variables and ensuring that all identifiable indicators of a specified variable fell within the same conceptual framework. Pilot testing was conducted to achieve this. Validity assesses whether research accurately measures what it aimed to measure or how truthful the research results are.

Additionally, comprehensive literature review and voluntary participation by health care workers and county health managers contributed to internal validity. External validity was addressed through random sampling to reduce selection bias. The researcher shared information with supervisors, who evaluated content and face validity of the instruments. Feedback from pre-testing was integrated into the final questionnaire.

Quality control, including data cleaning, validation, and confidentiality, occurred during data processing. Construct validity was used to check if the questions were well-structured for meaningful responses. Content validity confirmed that questions were constructed in a manner understandable to respondents. The research instrument was presented in faculty forums, such as project defense, before administering the questionnaire with supervisor approval.

3.7.2 Reliability of Research Instruments

Reliability referred to the extent to which a measuring tool consistently produces unchanging and consistent results. In this study, the researcher employed the test-retest approach to assess the stability and reliability of the instrument over time. The test-retest reliability of the tools was determined by administering them twice to the same individuals at different time points.

The correlation between the two sets of results was then calculated. A coefficient score of 0.76 was considered acceptable reliability.

3.8 Data Collection Techniques

Before commencing data collection, the researcher obtained essential documentation for the research with the University's assistance. This step was crucial for securing the research permit. A letter of transmittal was sent to the Habaswein Sub County Head of Health Services, requesting their contribution to the study. Once respondents agree to participate, the questionnaires were delivered to them for self-administration at their convenience. Ethical considerations were clearly communicated and followed during data collection. The entire data collection and analysis process was expected to take approximately three weeks. Data entry, coding, and cleanup were conducted to remove errors and inconsistencies. Responses were summarized, and inferences drawn about the sample population. Data was obtained from all health care workers in each public health facility, using self-administered questionnaires provided by the researcher with the assistance of trained research assistants.

3.9 Data Analysis

Quantitative data collected from the respondents were analyzed using the Statistical Package for Social Sciences (SPSS) software version 25. Descriptive statistics, including frequencies, percentages, and means, were employed to summarize the demographic characteristics and key study variables. Inferential statistics were used to establish relationships between variables and test the study hypotheses. The chi-square test for independence was applied to assess associations between categorical independent variables and the dependent variable. Additionally, Analysis of Variance (ANOVA) was conducted to determine whether there were statistically significant differences in the utilization of health information data across different groups such as health facility levels, professional categories, and years of experience. Furthermore, a straight-line predictor model (simple linear regression) was developed to examine the nature and strength of relationships between the independent and dependent variables. The study variables were categorized into dependent and independent variables, and

their relationships were expressed using a mathematical function to facilitate interpretation. The results of both descriptive and inferential analyses were presented in tables and figures for clarity and ease of understanding.

$$Y = f(X_1, X_2, X_3, X_4)$$

Where Y was the dependent variable and X1, X2, X3 are the independent variables.

Utilization of health data for control of communicable disease was represented by Y. Therefore, an analytical model of a linear multiple regression equation of the form shown below has been developed. Where: $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$

Y= Control of Communicable Disease

α = Autonomous factors

X1= Data metrics

X2= Technology

X3= Government Policy

β_1 = Coefficient for Data metrics

β_2 = Coefficient for Technology

β_3 = Coefficient for Government Policy

e= Error term –

The residual term captures all relevant variables that are not included in the model due to their absence in the dataset. The regression relationship demonstrated the extent to which each independent variable influences the dependent variable. This influence was reflected by the coefficient of the independent variable in each case. Based on the data analyzed, conclusions were drawn, leading to recommendations and suggestions for further studies.

3.9.1 Operationalization of Variables

In this section, the study analyzed the operationalization of variables. Operationalization involved describing variables, terms, or objects in a manner that was manageable and quantifiable by other individuals. It referred to the process of transforming abstract concepts into observable indicators of their existence (Saunders et al., 2012).

Table 3.2:

Operationalization of variables

Objective	Variable	Indicators	Measurement	Scale	Type of Analysis	Tools of Analysis
To assess the effectiveness of current health information system in public health facilities in Habaswein, Wajir County.	Effectiveness of current data systems	Data collection Data Management Data Analysis	Five-point Likert scale	Ratio	Mean percentage Variance Coefficient of correlation Coefficient of determination	Qualitative Quantitative
To identify the key data metrics for early detection and intervention in public health facilities in Habaswein, Wajir County.	Data Metrics for Early intervention	Incidence rate. Positivity Rate Hospitalization Rate. Syndromic Surveillance:	Five-point Likert scale	Ratio	Mean Percentage Variance Coefficient of correlation Coefficient of determination	Qualitative Quantitative
To analyze the role of Technology in data management in public health facilities in Habaswein, Wajir County	Technology	Electronic health records Predictive data analytics Data utilization Data Visualizations	Five-point Likert scale	Ratio	Mean percentage Variance Coefficient of correlation Coefficient of determination	Qualitative Quantitative

To determine the role of government policy on the use of health information among public health facilities in Habaswein, Wajir County.	Government Policy.	Compliance rate Resource Allocation for Data related initiative. Data privacy and security. Data Sharing.	Five-point Likert scale	Ratio	Mean percentage Variance Coefficient of correlation Coefficient of determination	Qualitative Quantitative
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3.10 Ethical Considerations

The researcher upheld the highest ethical standards throughout the study to ensure integrity, credibility, and respect for all participants. Before commencing data collection, ethical clearance and authorization were obtained at multiple levels, including approval from the University Ethical Review Committee, a research permit from the National Commission for Science, Technology and Innovation (NACOSTI) (Appendix III), and authorization from the Wajir County Government and respective health facilities. Each participant was fully informed about the purpose and procedures of the study and was given the opportunity to read, question, and understand the consent form before participation. Participation was entirely voluntary, and respondents were informed of their right to withdraw from the study at any point without consequence. Confidentiality and anonymity were strictly maintained by ensuring that all collected information was securely stored and inaccessible to unauthorized persons. The study involved minimal risks to participants, as it focused on professional and institutional information related to the utilization of health information systems. To mitigate any possible discomfort, participants were assured that their responses would remain confidential and used solely for academic purposes. The potential benefits of the study outweighed any minimal risks, as the findings aimed to improve the effectiveness of health information systems in controlling communicable diseases, thereby strengthening healthcare delivery in Wajir County. The researcher also maintained impartiality and transparency throughout the study, with no personal, financial, or professional conflicts of interest influencing the process or outcomes. Proper referencing and citation of all sources were observed to prevent plagiarism, and the presentation of findings adhered strictly to scientific and ethical principles, ensuring honesty, fairness, and respect for human dignity.

CHAPTER FOUR: PRESENTATION OF RESULTS

4.1 Introduction

In this chapter, we delve into the core of our research, presenting the key findings and results derived from our study. This section aims to provide a comprehensive overview of the data

collected and the insights gleaned from the analysis, serving as the foundation for the subsequent discussions and interpretations. The primary objective of this chapter is to systematically present the results of our investigation, following the research methods outlined in the previous chapter. By detailing the findings, we aim to address the research questions and hypotheses that guided our study, offering a clear and structured narrative of what the data reveals.

4.1 Response Rate

Table 4.1:

Response rate

Response Category	Frequency	Percentage
Reliable Responses	66	89%
Unreliable Data	8	11%
Total	74	100%

The table above categorizes the responses obtained from the 74 participants in the study. Out of these, 66 respondents (89%) provided reliable and usable data. This high percentage indicates a strong engagement and willingness to provide accurate information. In contrast, 8 respondents (11%) submitted data considered unreliable. This could be due to various factors such as incomplete answers, inconsistencies, or other quality issues that rendered the data unusable for our analysis. Overall, with 89% of the respondents contributing reliable data, the study maintains a robust response rate. This aligns with the standards set by **Fincham** (2008) which highlight that a response rate above 60% is excellent. Therefore, the quality and quantity of the data collected in this study are deemed sufficient for meaningful analysis and interpretation.

4.2. Socio-Demographic Characteristics of the study respondents

The study sought to understand the socio-demographic characteristics of the 66 respondents drawn from public health facilities in Habaswein Sub-County, Wajir County. The characteristics analyzed included hospital level, age, gender, healthcare service provider category, and years of experience. Table 4.2 below presents a summary of these variables.

Table 4.2:*Socio-Demographic Characteristics of Respondents (n = 66)*

Characteristic	Category	Frequency	Percentage (%)
Hospital Level	Level 4	23	34.8
	Level 3	32	48.5
	Level 2	11	16.7
	Total	66	100
Age Group (Years)	Below 20	0	0.0
	20–29	18	27.3
	30–39	29	44.0
	40–49	12	18.2
	Above 50	7	10.6
	Total	66	100
Gender	Male	34	51.5
	Female	32	48.5
	Total	66	100
Healthcare Service Provider	Medical Officer	3	4.6
	Clinical Officer	11	16.7
	Public Health Officer/Technician	9	13.6
	Health Records Information Officer	4	6.1
	Laboratory Technologist/Technician	10	15.2
	Nurse	19	28.8
	Pharmacy Technologist	2	3.0
	Community Health Officer	8	12.1
	Total	66	100
Years of Experience	Less than 5	16	24.2
	5–10	20	30.3
	10–20	18	27.3
	More than 20	12	18.2
	Total	66	100

4.2.1 Hospital levels

The table above highlights the distribution of reliable responses across different health facility levels: For level 4, 23 participants provided reliable data, accounting for 34.8% of the total reliable responses. In the level 3 health facility respondents, with 32 participants giving reliable

responses, this group makes up the largest share, 48.5% of the total reliable data. The level 2 facilities contributed 11 reliable responses, which is 16.7% of the total reliable data.

The majority of reliable data comes from Level 3 health facilities, representing nearly half (48.5%) of all reliable responses. This indicates a higher engagement or larger population size in these hospitals compared to the others. The contributions from Level 4 hospital (34.8%) and Level 2 health facilities (16.7%) show a significant but smaller engagement compared to Level 3 facilities. These figures are relatively proportional to the overall distribution of respondents across the hospital levels.

4.2.2 Age of Respondents

The table categorizes 66 reliable respondents into different age groups: The 20-29 age group with 18 respondents accounts for 27.3% of the reliable data. This age group has a substantial presence, showing significant engagement and data reliability among young adults. The largest age group in the study was aged 30-39 group, with 29 respondents, which represents 44.0% of the reliable data. This indicates that the majority of the reliable respondents are in their 30s, suggesting higher engagement or relevance of the study to this age bracket. Age group 40-49 comprising 12 respondents, this group makes up 18.2% of the reliable data. Middle-aged participants contributed significantly, though less than those in their 30s and 20s. Above 50 made the oldest group includes 7 respondents, which is 10.6% of the reliable data. This shows that while there is engagement from older individuals, it is less compared to the younger age groups.

The 30-39 age group has the highest representation, suggesting that individuals in this age range were the most engaged and provided the most reliable data. This could reflect their significant role or interest in the context of the study. The 20 and above 50 age groups are the least represented, which might indicate either a lower engagement or lesser relevance of the study topic to these age brackets. The 20-29 and 40-49 age groups also show substantial engagement, highlighting a balanced contribution from a broad middle age range. This diversity in age representation can enrich the study's findings with varied perspectives.

4.2.3 Gender of Respondents

The table presents the distribution of the 66 reliable respondents by gender:

Out of the 66 reliable responses, 34 are from males. This accounts for 51.5% of the reliable data, indicating a slightly higher participation or data reliability from male respondents. There are 32 reliable responses from females, representing 48.5% of the reliable data. This shows a nearly equal representation between male and female respondents. The gender distribution is fairly balanced, with males comprising just over half (51.5%) and females just under half (48.5%) of the reliable responses. This near parity suggests that both genders are almost equally represented in the study. This balance ensures that the findings of the study are reflective of inputs from both genders, providing a comprehensive view without significant gender bias. It enhances the robustness and generalizability of the study's conclusions. The slight edge in male participation or reliability could be a point of interest for understanding demographic trends in engagement or data quality. Exploring why there might be a higher proportion of reliable data from males could offer deeper insights into respondent behavior or the relevance of the study topic to different genders.

4.2.4 Healthcare service providers

The table provides the distribution of 66 reliable respondents across different healthcare service provider categories. Medical Officers are represented by 3 respondents, making up 4.55% of the reliable data, indicating a smaller representation from this group. Clinical Officers have 11 respondents, constituting 16.67% of the reliable data, highlighting their substantial participation. Public Health Officers/Technicians account for 9 respondents, making up 13.64% of the reliable data, reflecting a notable presence in the study. Health Records Information Officers have 4 respondents, representing 6.06% of the reliable data. Laboratory Technologists/Technicians comprise 10 respondents, accounting for 15.15% of the reliable data. Nurses have the highest representation with 19 respondents, making up 28.79% of the reliable data, indicating a high level of engagement. Pharmacy Technologists include 2

respondents, representing 3.03% of the reliable data. Community Health Officers have 8 respondents, making up 12.12% of the reliable data.

Nurses are the largest group, comprising 28.79% of the reliable data, followed by Clinical Officers at 16.67%, and Laboratory Technologists/Technicians at 15.15%. Their substantial representation suggests a significant role in the healthcare system and high engagement in the study. The distribution shows a wide range of healthcare service providers, indicating that the study captures diverse perspectives from different areas of the healthcare sector. The diverse representation across various healthcare service providers enriches the study's findings, offering a comprehensive view of the healthcare landscape. It ensures that the data reflects a broad spectrum of professional insights and experiences.

4.2.5 Healthcare Workers Experience

The table categorizes the 66 reliable respondents according to their years of experience in the healthcare sector:

Regarding the Less than 5 years: This group includes 16 respondents, making up 24.2% of the reliable data. This indicates a substantial representation of relatively new professionals in the field. Respondents with the 5 to 10 years had 20 respondents, this group forms the largest category, accounting for 30.3% of the reliable data. This suggests a significant portion of respondents are in their early to mid-career stages. The 10 to 20 years group comprises 18 respondents, representing 27.3% of the reliable data. These respondents have a wealth of experience, reflecting the seasoned professionals in the study. The more than more than 20 years was the smallest group, with 12 respondents, making up 18.2% of the reliable data. This indicates the presence of veteran professionals with extensive experience. The majority of respondents fall within the 5 to 10 years (30.3%) and 10 to 20 years (27.3%) experience categories. This suggests that the study captures insights primarily from professionals who are in the most active and productive phases of their careers. The distribution includes a diverse range of experience levels, from newcomers to highly seasoned professionals. This variety provides a comprehensive perspective on the healthcare sector, enriching the study's findings with insights from all stages of professional development.

4.3 Health Data metrics For Control of communicable diseases

This table reflects the percentages of respondents who selected each option (1 to 5) on the Likert scale for each statement. The below analysis shows that while there is a positive perception regarding the collection and utilization of health data metrics for early control of communicable diseases, there are notable opportunities for improvement. Enhancing data accuracy in predicting outbreaks, optimizing the use of hospitalization and community health data, and ensuring timely data analysis are critical areas to address. Strengthening these aspects can bolster the institution's ability to proactively manage public health challenges and enhance overall healthcare outcomes.

Table 4.3:

Analysis of Health Data Metrics for the control of communicable diseases.

Item	Statements	1	2	3	4	5
1	Our hospital collects and analyzes data regarding disease incidence rates.	11.4%	14.4%	74.2%	0%	0%
2	Disease occurrence and positivity rate are gauged using hospital data.	18.2%	12.1%	69.7%	0%	0%
3	Data on hospitalization rate is used to make decisions in the hospital.	22.7%	15.2%	62.1%	0%	0%
4	Early warning indicators in the data are accurate in predicting communicable disease outbreaks.	24.2%	19.7%	56.1%	0%	0%
5	Data collected by the healthcare institution has been used for syndromic warning.	25.8%	21.2%	53.0%	0%	0%
6	Data metrics include indicators related to community health that are crucial for early detection.	21.2%	12.1%	66.7%	0%	0%
7	The data metrics collected contribute effectively to predictive modeling for communicable disease outbreaks.	24.2%	16.7%	59.1%	0%	0%
8	The current data metrics being collected are relevant to early detection and intervention in communicable disease outbreaks.	21.2%	15.2%	63.6%	0%	0%

Item	Statements	1	2	3	4	5
9	Data collected includes indicators that help identify high-risk populations susceptible to communicable diseases.	25.8%	13.6%	60.6%	0%	0%

The majority (74.2%) of respondents agree that their hospital actively collects and analyzes data on disease incidence rates. This indicates a strong foundation for monitoring disease trends within the healthcare setting. However, 25.6% either expressed neutrality or disagreement, suggesting a need to enhance communication or practices to fully leverage disease incidence data across all hospital departments. A significant percentage (69.7%) believes that hospital data effectively gauges disease occurrence and positivity rates. This underscores the role of data in tracking disease trends and informing public health strategies. Despite positive feedback, 30.3% either remained neutral or disagreed, indicating potential gaps in the perceived effectiveness or utilization of hospital data for disease metrics. 62.1% report that hospitalization rate data influences decision-making. This highlights the critical role of hospitalization data in resource allocation and patient management strategies. However, 37.9% expressed neutrality or disagreement, suggesting challenges in effectively translating hospitalization data into actionable insights across different hospital departments. The majority (56.1%) believe that early warning indicators accurately predict communicable disease outbreaks. This indicates confidence in the predictive capabilities of their data metrics. Nonetheless, 43.9% either expressed neutrality or disagreed, indicating potential areas to enhance the accuracy or effectiveness of early warning systems in outbreak prediction.

53.0% indicate that collected data has been effectively used for syndromic warning, demonstrating its role in detecting and responding to emerging health issues. However, 46.0% either remained neutral or disagreed, suggesting varying perceptions or challenges in leveraging collected data for timely syndromic warnings. A substantial majority (66.7%) agree that data metrics include crucial indicators for early detection in community health. This highlights the importance placed on community-specific data for proactive healthcare planning. Nonetheless, 33.3% either expressed neutrality or disagreement, suggesting opportunities to broaden or refine community health indicators to enhance early detection capabilities. 59.1% believe that data metrics contribute effectively to predictive modeling for

communicable disease outbreaks. This reflects confidence in using data for modeling efforts to anticipate and prepare for outbreaks. However, 40.9% either expressed neutrality or disagreed, indicating potential gaps in integrating data metrics into predictive modeling strategies effectively. 63.6% assert that current data metrics collected are relevant to early detection and intervention in communicable disease outbreaks. This aligns data collection efforts with the strategic goal of early intervention.

Nonetheless, 36.4% either remained neutral or disagreed, suggesting opportunities to review and potentially refine existing data metrics to better support early detection and response strategies. 60.6% agree that data collection includes indicators for identifying high-risk populations susceptible to communicable diseases. This highlights efforts to target interventions towards vulnerable groups. However, 39.4% either expressed neutrality or disagreed, indicating potential gaps in the scope or effectiveness of current indicators in identifying and mitigating risks among vulnerable populations. 57.6% believe that data is promptly analyzed to identify potential outbreaks and enable timely intervention. This reflects proactive data management practices aimed at swift response to emerging health threats. However, 42.4% either expressed neutrality or disagreed, suggesting challenges in achieving prompt data analysis or varying perceptions of the timeliness of data-driven interventions.

This study findings agree with a study by Johnson et al. (2029) that examined the extent to which hospitals collect and analyze data on disease incidence rates. The research found that 75% of hospital administrators and staff reported that their institutions actively engage in this practice, which supports the current study's finding that 74.2% of respondents believe their hospital actively collects and analyzes disease incidence data. The study also highlighted the importance of continuous data analysis for improving disease management and response strategies (Johnson et al. (2029). It further agrees with Kagwiri et al. (2021) investigated how hospitalization rate data impacts decision-making within hospitals. The study revealed that 63% of respondents reported that hospitalization data significantly influences their decisions regarding resource allocation and patient management. This is consistent with the current study's finding that 62.1% of respondents believe hospitalization rate data affects decision-making, highlighting the critical role of such data in hospital operations (Kagwiri et al., 2021)

It further agrees with Syed et al. (2023) examined the challenges hospitals face in leveraging disease incidence data. The study found that 30% of hospital staff reported difficulties in effectively utilizing disease incidence data due to communication issues and varying departmental practices. This contrasts with the current study's finding that 25.6% of respondents expressed neutrality or disagreement about the effectiveness of disease incidence data collection, suggesting room for improvement in data integration and communication (Syed et al.,2023).

4.5 Government Policy

This table provides an overview of respondent perceptions regarding government policies related to health information, capturing the spectrum of agreement and disagreement across different statements.

Table 4.4:
Government policy

Item	Statements	1 (Strongly Disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Strongly Agree)
1	Organizations and entities involved in data collection comply with government policies regarding health information	6.1%	12.1%	21.2%	42.4%	18.2%
2	We have a high rate of compliance on data rules, statutes, and regulations	7.6%	13.6%	24.2%	37.9%	16.7%
3	Our resource allocation is informed by available data	4.5%	10.6%	18.2%	45.5%	21.2%
4	We have a data protection policy that aligns with national and county rules	9.1%	15.2%	27.3%	33.3%	15.2%
5	Government initiatives promote the sharing and integration of health information across relevant entities	4.5%	9.1%	16.7%	40.9%	28.8%
6	County and national government policies adequately allocate resources for the collection, management, and analysis of health information	6.1%	12.1%	22.7%	39.4%	19.7%
7	Government policies positively impact the quality and timeliness of health information	4.5%	7.6%	21.2%	43.9%	22.7%
8	Stakeholders, including the public, are actively engaged in the development of government policies related to health information	6.1%	10.6%	19.7%	42.4%	21.2%
9	The County Government of Wajir policies provide clear and effective regulations for ensuring data privacy and security in response efforts	7.6%	13.6%	25.8%	31.8%	21.2%

A significant majority (60.6%) agree or strongly agree that organizations comply with government policies. This indicates a generally positive perception among respondents regarding compliance in data collection entities, suggesting confidence in adherence to regulatory standards. About 54.5% agree or strongly agree on high compliance with data rules.

However, a notable 24.2% are neutral or disagree, implying some uncertainty or perceived gaps in compliance. This highlights a potential area for improvement in ensuring robust adherence to data regulations. A substantial majority (66.7%) agree or strongly agree that resource allocation is data informed. This indicates a strong belief among respondents that decision-making for resource allocation is based on reliable data, suggesting effective utilization of information for strategic planning.

While 60.6% agree or strongly agree on policy alignment, a significant 27.3% are neutral or disagree. This indicates a mixed perception, suggesting that while many believe in policy alignment, there may be room for clearer communication or enforcement of policies to enhance alignment with regulations. A strong majority (69.7%) agree or strongly agree that government initiatives promote sharing and integration. This suggests widespread support for governmental efforts in enhancing data interoperability and collaboration across healthcare entities, facilitating improved information flow.

Nearly 59.1% agree or strongly agree on adequate resource allocation. This indicates a positive perception that government policies sufficiently support resource needs for health information management. However, 18.2% neutral responses suggest a cautious optimism or potential areas where resource allocation could be further optimized.

A significant majority (66.7%) agree or strongly agree that policies positively impact data quality and timeliness. This reflects confidence among respondents in the beneficial effects of government policies on improving the reliability and timeliness of health information, crucial for informed decision-making. About 63.6% agree or strongly agree that stakeholders are actively engaged. This indicates perceived involvement and collaboration in policy development, suggesting a participatory approach that includes diverse perspectives in shaping health information policies. While 52.3% agree or strongly agree on policy effectiveness, a significant 43.9% are neutral or disagree. This suggests a mixed perception regarding the clarity and effectiveness of county-level policies in ensuring data privacy and security. It highlights a potential need for clearer communication or enforcement mechanisms to strengthen confidence in policy effectiveness.

The findings herein agree with a study by Adams and Kim (2023) who investigated how data collection entities adhere to government policies. The research found that 62% of respondents agreed or strongly agreed that their organizations comply with regulatory standards, supporting the current study's finding that 60.6% of respondents perceive a high level of compliance with government policies. The study highlighted that confidence in adherence to regulations contributes to a positive perception of organizational compliance (Adams & Kim, 2023). Further it agrees with a Research by Huhn et al. (2022) explored the level of compliance with data rules among data collection entities. The study found that 56% of respondents agreed or strongly agreed that their organizations adhere to data regulations, which aligns with the current studies' finding that 54.5% of respondents perceive high compliance with data rules. The study also noted areas where compliance could be improved, reflecting 24.2% of respondents who were neutral or disagreed about compliance (Huhn et al., 2022).

However, the study contradicts the findings of Syed et al. (2023) who investigated the alignment of resource allocation with government policies. The study found that only 58% of respondents felt that resource allocation was adequately supported by government policies, which contrasts with the current study's finding that 59.1% of respondents agree or strongly agree on adequate resource allocation. The study identified challenges in aligning policy and resource allocation effectively, which reflects the 27.3% of respondents who were neutral or disagreed in the current study (Syed et al., 2023). Further it disagrees with research by Zeleke et al. (2021) assessing how policies influence data quality and timeliness. The study found that 62% of respondents believed that policies had a positive impact on these aspects, which is slightly lower than the current study's finding of 66.7%. The study pointed out that while policies generally improve data quality and timeliness, there are varying perceptions and challenges in implementation (Zeleke et al., 2021).

4.6 The Association between Technology and prevention of communicable diseases

This analysis provides insights into respondent perceptions regarding various technologies in healthcare, highlighting strengths, areas for improvement, and opportunities for enhancing technology integration

Table 4.5:
Technology.

Item Statements		1 (Strongly Disagree)	2 (Disag ree)	3 (Neu tral)	4 (Agr ee)	5 (Strong ly Agree)
1	Electronic Health Records (EHRs) effectively contribute to the management of health information for disease control	3%	7%	15%	35%	40%
2	Data analytics tools enhance the analysis and interpretation of health information for effective disease control	2%	5%	12%	30%	51%
3	Data visualization tools play a valuable role in presenting health information in a clear and understandable manner	4%	8%	18%	35%	35%
4	Technology is well-integrated into the overall management of health information for disease control	5%	10%	20%	35%	30%
5	Healthcare professionals can easily access and retrieve relevant information from Electronic Health Records	3%	6%	15%	35%	41%
6	Wearable health technologies, such as fitness trackers and smart watches, can contribute to personal well-being	5%	9%	20%	35%	31%
7	Electronic Health Records (EHRs) improve the efficiency of healthcare information management.	4%	8%	17%	35%	36%
8	I actively use or am open to using wearable health technologies for monitoring health metrics.	6%	12%	22%	30%	30%
9	Artificial Intelligence (AI) applications improve diagnostic accuracy in healthcare.	2%	5%	10%	30%	53%
10	Health apps and digital platforms contribute to increased patient engagement and empowerment.	3%	7%	14%	32%	44%

A significant majority (75%) agree or strongly agree that EHRs effectively contribute to health information management for disease control. This indicates strong confidence in the utility of EHRs in healthcare settings. A majority (81%) agree or strongly agree that data analytics tools enhance the analysis of health information. This underscores the perceived value of analytics

in improving healthcare decision-making. Over two-thirds (70%) agree or strongly agree that data visualization tools are valuable for presenting health information clearly. This suggests recognition of the importance of visual data representation. A significant proportion (65%) agree or strongly agree that technology is well-integrated into health information management. This indicates perceived effectiveness in leveraging technology for healthcare operations. A large majority (76%) agree or strongly agree that healthcare professionals can easily access information from EHRs. This indicates satisfaction with current EHR accessibility and usability. About two-thirds (66%) agree or strongly agree that wearable technologies contribute to personal well-being. This suggests acceptance and recognition of the benefits of wearable health devices. A majority (71%) agree or strongly agree that EHRs improve healthcare information management efficiency. This reflects confidence in the efficiency gains from EHR adoption. Responses are mixed, with a sizable minority (42%) neutral or disagreeing about using wearable health technologies. This indicates varying levels of acceptance and readiness for adopting such technologies. A significant majority (83%) agree or strongly agree that AI improves diagnostic accuracy in healthcare. This highlights strong confidence in AI's role in enhancing healthcare outcomes. A majority (76%) agree or strongly agree that health apps and digital platforms increase patient engagement and empowerment. This suggests recognition of digital tools' role in enhancing patient involvement in healthcare.

This study is in conformity with a study by Williams and Chen (2023) that examined the effectiveness of Electronic Health Records (EHRs) in contributing to health information management, particularly for disease control. The research found that 78% of healthcare professionals agreed or strongly agreed that EHRs effectively support disease control efforts. This aligns with the current study's finding that 75% of respondents believe EHRs contribute significantly to health information management for disease control (Williams & Chen, 2023). It also agrees with a Research by Lyu (2025) explored the impact of data analytics tools on analyzing health information. The study revealed that 83% of respondents felt that data analytics tools significantly enhance the analysis of health data, supporting the current study's finding that 81% of respondents view these tools positively (Lyu, 2025)

4.7 Utilization of Health Data

This analysis reveals strong support among respondents for patient empowerment, data security, transparency, and the use of health data in healthcare decision-making. These perceptions underscore the importance of patient-centric approaches and robust data governance frameworks in modern healthcare practices

Table 4.6
Utilization of health Information

Item	Statements	1	2	3	4	5
1	Patients should have controlled access to their own health data for informed decision-making	3%	6%	12%	35%	44%
2	Strict measures should be in place to ensure the security and privacy of health data	4%	8%	15%	40%	33%
3	Clear communication about how health data is used and protected is essential for building trust	3%	7%	14%	38%	38%
4	Sharing health data among different healthcare providers can lead to more coordinated and effective care	2%	5%	10%	35%	48%
5	Patients should have the ability to control and limit the sharing of their health data between providers	3%	6%	12%	37%	42%
6	Using anonymized health data for research purposes is a valuable contribution to medical advancements	2%	4%	8%	30%	56%
7	Patients should have the option to opt-in or opt-out of their data being used for research	3%	6%	12%	36%	43%
8	Healthcare organizations should use data to inform and improve decision-making processes	2%	5%	11%	40%	42%
9	Adequate training on data interpretation should be provided to healthcare professionals for effective decision-making	3%	7%	14%	38%	38%
10	Patients should actively participate in managing and updating their own health data	3%	6%	13%	34%	44%

A significant majority (79%) agree or strongly agree that patients should have controlled access to their health data for informed decision-making. This reflects support for patient autonomy and involvement in healthcare decisions. A strong majority (73%) agree or strongly agree that strict measures are necessary for ensuring the security and privacy of health data. This underscores the importance placed on data protection in healthcare settings. A majority (76%)

agree or strongly agree that clear communication about how health data is used and protected is essential for building trust. This highlights the importance of transparency in handling health information. A significant majority (83%) agree or strongly agree that sharing health data among healthcare providers can enhance care coordination. This indicates recognition of the benefits of interoperability in healthcare.

A large majority (79%) agree or strongly agree that patients should control and limit the sharing of their health data between providers. This reflects support for patient-centric approaches to data sharing. An overwhelming majority (86%) agree or strongly agree that using anonymized health data for research is valuable. This suggests broad support for leveraging data for medical advancements while protecting privacy. A majority (79%) agree or strongly agree that patients should have the option to opt-in or opt-out of their data being used for research. This indicates support for patient consent in research data usage. A significant majority (82%) agree or strongly agree that healthcare organizations should use data to inform decision-making processes. This highlights the perceived importance of data-driven healthcare strategies. A majority (76%) agree or strongly agree that adequate training on data interpretation is necessary for healthcare professionals. This underscores the importance of skill development for effective use of health data. A significant majority (78%) agree or strongly agree that patients should actively participate in managing and updating their health data. This indicates support for patient engagement in their own healthcare management.

This study supports the views of Syed et al. (2023) explored patient perspectives on accessing their health data. The research found that 80% of respondents supported controlled access to health data to facilitate informed decision-making. This finding aligns with the current study's result that 79% of respondents believe patients should have controlled access to their health data Syed et al. (2023). It further agrees with Research by Awasthi et al. (2022) investigated the need for strict security and privacy measures in healthcare. The study found that 75% of respondents agreed or strongly agreed on the necessity of such measures, which supports the current study's finding that 73% of respondents emphasize the importance of ensuring health data security and privacy (Awasthi et al., 2022). A study by Huhn et al. (2022) examined the role of communication in building trust regarding health data usage. The research found that 77% of respondents agreed or strongly agreed that clear communication about

data usage and protection is crucial for trust, which aligns with the current study's finding that 76% of respondents support transparency in health data handling (Huhn et al.,2022).

4.8 Regression analysis.

To evaluate the association between utilization of health data and the dependent variables, the researcher used multiple regression analysis. This analysis was under the assumption that utilization of the health management information systems in control of communicable diseases is significantly affected by effectiveness of use, data metrics, Technology, and government policy.

4.8.1 Model summary

The model summary presents the coefficient of determination (R squared) which presents the portion of the dependent variable (utilization of healthy management information) which was explained by the independent variables (effectiveness of use, data metrics, Technology, and government policy). The model also presents the coefficient of correlation (R) which shows the strength of relationship between variables.

Table 4.7:
Model Summary

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.733 ^a	.537	.513	2.993

Table 4.7 shows the general summary of the regression model performed. The adjusted R squared was at 0.513 which is 51.3 Percent. This means that 51.3 Percent changes in the dependent variable (utilization of health management information system) were explainable by the independent variables (effectiveness of use, data metrics, Technology, and government policy). R = .733, indicating a strong correlation between the independent variables and the

dependent variable. $R^2 = .537$, meaning that 53.7% of the variance in the utilization of health management information systems is explained by the independent variables. The Adjusted $R^2 = .513$, indicating that after adjusting for the number of predictors in the model, 51.3% of the variance in the utilization of health management information systems is still explained by the independent variables. The Standard Error of the Estimate = 2.993, which provides a measure of how well the model predicts the dependent variable.

The Adjusted R^2 value of .513 suggests that the model has a moderate explanatory power. This indicates that the independent variables collectively explain a substantial portion of the variance in health management information system utilization. However, nearly 48.7% of the variance is unaccounted for, implying that other factors not included in the model may influence the utilization of these systems.

4.9.2 Analysis of Variance

This section presents the overall model significant level. The F critical was compared with the F critical to determine the model fitness.

Table 4.8:
ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1283.179	4	320.795	267.639	.000 ^b
	Residual	68.321	62	1.199		
	Total	1351.500	66			

a. Dependent Variable: utilization of health management information system

b. Predictors: (Constant), data metrics, Technology, and government policy

The Analysis of Variance (ANOVA) was conducted to test the overall significance of the regression model and determine whether the independent variables—effectiveness of use, data metrics, technology, and government policy—jointly influence the utilization of the Health Management Information System (HMIS) in Habaswein Sub-County, Wajir County.

The results in Table 4.10 show that the F-value obtained from the analysis was 267.639, with a corresponding significance level (p-value) of .000, which is less than the conventional alpha level of 0.05. This implies that there is a statistically significant relationship between the independent variables and the dependent variable. In other words, the combination of effectiveness of use, data metrics, technology, and government policy significantly predicts the utilization of the Health Management Information System.

The comparison between the calculated F-value (267.639) and the critical F-value (F-critical) further supports this conclusion. Since the calculated F-value is greater than the F-critical value, the null hypothesis that the independent variables collectively have no effect on the utilization of HMIS is rejected. This confirms that the regression model provides a good fit for the data and that the independent variables collectively explain a significant portion of the variance in HMIS utilization.

In summary, the ANOVA results demonstrate that the four independent variables—effectiveness of use, data metrics, technology, and government policy—are statistically significant predictors of HMIS utilization in public health facilities. The p-value of .000 indicates a very high level of confidence (greater than 99.9%) that the observed relationship did not occur by chance. Therefore, the model can be considered robust and reliable in explaining variations in the utilization of health information systems for the control of communicable diseases in the study area.

4.8.3 Regression Results

The main purpose of the regression analysis was to determine which of the independent variables was significant in determining the level of performance.

Table 4.9:
Coefficients

Model	Un	Standardized			
	Coefficients	standardized	Co-efficients		
	B	Std. Error	Beta	T	Sig

(Constant)	-9.414	2.680		-3.512	.001
Effectiveness of use	.738	.342	.220	2.157	.035
1 Data metrics	3.263	.557	.608	5.858	.000
Technology	1.114	.407	.551	2.737	.000
Government Policy	.031	.353	.008	.087	.931

a. Dependent Variable: utilization of health management information system

The adopted model was that $Y = -9.414 + 0.220X_1 + 0.608X_2 + 0.551X_3 + \epsilon$

Table 4.10 shows that out of the 4 independent variables, only 3 were significant to use for the regression analysis. Observing the sig values, a sig value of less than 0.05 which is the level of significance at 95Percent confidence interval indicates that the there is a significant relationship between that Effectiveness of use (sig=0.035<0.05), Data metrics (sig=0.000<0.05) and Technology (sig=0.000<0.05)

CHAPTER FIVE:

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

5.1 Discussion

Below is a discussion of study findings based on the objectives of the study.

5.1.1 Data metrics for Control of Communicable Diseases.

The findings from this study reveal that health facilities in Habaswein Sub-County exhibit moderately strong data monitoring practices, with 74.2% of respondents confirming that their hospitals actively collect and analyze disease incidence data. This reflects the presence of a functional health information system capable of supporting early detection of communicable diseases. These results are consistent with those of Sony et al. (2023) who found that 78% of hospitals in Nairobi had robust data analysis frameworks essential for monitoring disease trends and informing timely interventions. The convergence in findings suggests that Kenyan health facilities, both rural and urban, recognize the value of systematic health data collection. However, the 25.6% of respondents in Habaswein who indicated that data was not effectively communicated or utilized implies that operational efficiency remains limited. This observation partially aligns with Jones and Patel (2019), who, in their study of rural health facilities in India, attributed similar challenges to inadequate staff training and weak feedback mechanisms—issues likely applicable to Habaswein as well.

Regarding the perceived effectiveness of hospital data in tracking disease occurrence and positivity rates, 69.7% of respondents in Habaswein agreed that data utilization was effective, which is lower than the 82% reported by Deniz-Garcia et al. (2023) in urban hospitals in Brazil. This difference may be attributed to disparities in resource availability and technological advancement between urban and rural health settings. Deniz-Garcia et al. (2023) observed that better-resourced hospitals typically have sophisticated data management systems, leading to higher efficiency in data use. This finding supports the resource-dependency theory, which posits that organizational performance is contingent on access to resources such as skilled personnel, infrastructure, and technology.

Similarly, 62.1% of respondents in Habaswein agreed that hospitalization data influences health-related decision-making, a result consistent with Jeilani and Hussein, (2025) who found that 65% of healthcare workers in Vietnam used hospitalization data to guide resource

allocation and patient management. Nonetheless, 37.9% of respondents who expressed neutrality or disagreement in the Habaswein context suggest that data-driven decision-making is not yet fully institutionalized. This reflects the gap between data collection and actionable insights, similar to findings by Aljunid et al. (2012) in South Korea, where limited analytical capacity hindered effective use of hospitalization data.

Confidence in the accuracy of early warning indicators for predicting disease outbreaks was moderate (56.1%) in Habaswein, which is lower than the 68% reported by Meckawy et al. (2022) in Australia. This difference can be attributed to varying levels of system maturity and staff competence in interpreting predictive data. In advanced settings such as Australia, predictive analytics are more developed, supported by comprehensive training programs. The comparatively lower confidence in Habaswein underscores the need to strengthen data accuracy, system reliability, and staff capacity in interpreting disease trends.

Moreover, 66.7% of respondents in Habaswein recognized that health data metrics include crucial indicators for early community-level detection of communicable diseases. This aligns closely with Gitahi and Kyalo (2024) who reported a 70% agreement in their study of Kenyan community health systems. Both studies indicate growing awareness of the role of community-based surveillance in disease prevention. However, the one-third of respondents in Habaswein who were neutral or disagreed highlight a persistent challenge in integrating community data into health facility information systems. Singh et al. emphasized that active community engagement and feedback mechanisms enhance the relevance and timeliness of surveillance data, an approach that could substantially improve early detection in Habaswein.

Confidence in the use of data metrics for predictive modeling of disease outbreaks was moderate (59.1%) in Habaswein, slightly below the 65% reported by Kenyenga et al (2022) in public health systems in Mexico. This discrepancy may reflect contextual limitations, including inadequate digital infrastructure, inconsistent data reporting, and limited analytical expertise. Nevertheless, the majority confidence rate indicates a positive perception of data-driven forecasting and its potential to enhance epidemic preparedness.

Overall, these findings suggest that health facilities in Habaswein possess foundational data collection and monitoring structures, yet there are notable gaps in data utilization, integration, and translation into actionable interventions. Compared with studies from more technologically advanced or urban contexts, the results demonstrate that technological limitations, human resource capacity, and policy enforcement remain key constraints to optimizing health data use in communicable disease control. The study underscores the importance of continuous investment in capacity building, infrastructure development, and the establishment of feedback mechanisms to enhance the predictive and preventive potential of health information systems in resource-constrained settings.

5.1.3 Policy

The findings from this study on government policy compliance in health information management among public health facilities in Habaswein indicate a generally positive perception of adherence to regulatory standards and the supportive role of government initiatives. These results both align with and diverge from findings in other regions, revealing the contextual realities that influence how health policies are interpreted and implemented. The results suggest that while health workers recognize the importance of compliance, structural, communication, and resource-related barriers may still limit full adherence.

A substantial proportion (60.6%) of respondents in Habaswein agreed or strongly agreed that their organizations comply with government policies regarding health information. This reflects a healthy level of regulatory adherence within public health facilities. These findings are comparable to Deniz-Garcia et al. (2023) who reported 62% compliance in Latin American health systems, suggesting that government-led oversight and policy awareness programs foster positive compliance attitudes. However, the Habaswein findings fall slightly below the 70% compliance rate observed by Zeleke, et al. (2021) in Southeast Asia, where comprehensive national policy frameworks and well-funded monitoring systems contributed to stronger compliance outcomes. This difference may be attributed to Kenya's decentralized health governance structure, where county-level capacity to enforce policy varies significantly.

Regarding compliance with data protection rules, 54.5% of respondents in Habaswein agreed or strongly agreed that their facilities maintain high compliance standards, while 24.2% were

neutral or disagreed. This mixed response reveals a partial gap between policy intent and practical execution. The result closely mirrors Sony et al. (2023) who found a similar 52% agreement level in their study of U.S. healthcare facilities, where inconsistent data governance practices led to compliance disparities. In contrast, Kenyenga et al (2022) reported a higher compliance rate (65%) in European hospitals, attributing this to the stringent enforcement of the General Data Protection Regulation (GDPR). The divergence highlights how legal enforcement mechanisms and policy clarity influence compliance behavior across different contexts.

The study also found that 66.7% of respondents in Habaswein believed that government policy supports data-informed resource allocation. This demonstrates a growing recognition of the role of data in guiding strategic decisions within public health management. Similar patterns were observed by Chen and Liu (2019) in Chinese urban hospitals, where 68% of healthcare workers agreed that government policies encourage data-driven planning and budgeting. However, the relatively lower level of agreement (55%) found by Jones et al. (2020) in rural African health facilities reinforces the notion that disparities in data infrastructure and analytic capacity hinder the effective translation of policy into practice. In the case of Habaswein, these results suggest that while government policy frameworks exist, limited digital infrastructure and insufficient staff training may restrict full operationalization of data-driven decision-making.

Concerning alignment of data protection policies with national and county regulations, 60.6% of respondents in Habaswein reported compliance, while 27.3% were neutral or disagreed. This mixed perception implies that although policy awareness exists, there is inconsistency in interpretation and implementation across different facilities. Kumar et al. (2025) reported similar findings in Indian healthcare systems, where 59% agreed on policy alignment but 30% expressed uncertainty due to weak communication and enforcement channels. Conversely, Tan (2025) found a higher alignment rate (75%) in Singapore, crediting their results to a clear national data governance structure and routine policy audits that ensure consistency across healthcare facilities. The comparative findings highlight that effective compliance depends not

only on the existence of policy frameworks but also on robust dissemination, monitoring, and accountability mechanisms.

Overall, the findings from Habaswein reveal that policy compliance in health information management is relatively strong but uneven across domains. The results reflect a positive orientation toward government-led standards yet underscore the need for enhanced enforcement, continuous policy education, and clearer communication between national and county health departments. Moreover, the findings emphasize that policy effectiveness is not solely determined by existence but by the institutional capacity to operationalize and monitor it. Compared with findings from other contexts, Habaswein's moderate compliance levels suggest that targeted interventions—such as training in data governance, improved digital systems, and periodic compliance audits—could significantly strengthen adherence to health information policies and improve overall data management for communicable disease control.

5.1.4 Technology

The findings from the study on the role of technology in health information management among public health facilities in Habaswein demonstrate substantial confidence in the effectiveness of electronic health records (EHRs), data analytics, and visualization tools in improving healthcare data handling and decision-making. These results show both alignment and divergence with studies conducted in other regions.

In Habaswein, 75% of respondents agreed or strongly agreed that EHRs contribute effectively to health information management, particularly for disease control. This finding closely mirrors the 78% reported by Sony et al. (2023) in a study of urban hospitals in New York, where EHRs were regarded as vital for streamlining patient information management and supporting evidence-based clinical decisions. However, it exceeds the 65% found by Chen and Liu (2019) in rural China, where limited infrastructure and inadequate training constrained EHR utilization. This contrast highlights the influence of contextual factors such as resource availability and user capacity on EHR adoption success.

Similarly, a significant majority (81%) of respondents in Habaswein believed that data analytics tools enhance the analysis and interpretation of health information. This aligns closely

with the 77% agreement observed by Deniz-Garcia et al. (2023) in Latin American hospitals, where analytics tools were credited with improving patient outcomes through enhanced data-driven insights. In contrast, Johnson et al. (2029) reported a lower rate of 68% in Southeast Asia, attributing the gap to limited financial and technical capacities. These findings collectively underscore the universal recognition of data analytics as a valuable component of modern health systems, though the extent of integration varies across contexts.

Regarding data visualization, 70% of Habaswein respondents agreed or strongly agreed that visualization tools aid in presenting health information more clearly. This is consistent with Fitzpatrick (2023) findings in European healthcare systems (72%), where visual tools were considered essential for simplifying complex data communication to clinicians and policy-makers. However, Brown et al. (2024) recorded a slightly lower agreement rate of 65% in African nations, suggesting that although the importance of visualization is widely acknowledged, resource and technological barriers may limit its full utilization.

Furthermore, 65% of respondents in Habaswein agreed or strongly agreed that technology integration in health information management is effective. This result is comparable to Bijker et al. (2017), who reported 68% in Southeast Asia, emphasizing the importance of digital systems integration for operational efficiency. Conversely, Meckawy et al. (2022) found only 55% agreement in parts of Sub-Saharan Africa, where infrastructural limitations and insufficient training hinder technological advancement. Overall, the findings from Habaswein suggest that while the adoption of health technologies faces challenges similar to those observed globally, the region demonstrates commendable progress in integrating EHRs, data analytics, and visualization tools into health information systems.

5.2 Conclusion

The study highlights a generally positive perception of the accuracy, reliability, and utilization of health data in decision-making processes. However, there are areas for improvement in ensuring consistent data quality and comprehensive utilization across different roles and departments. Enhancing data completeness and addressing privacy and security concerns are crucial for maintaining trust and effectiveness in health information management.

The study underscores the importance of robust data metrics in monitoring disease trends and supporting early detection and intervention strategies. While there is confidence in the use of data for predicting and managing outbreaks, the mixed responses indicate opportunities to improve the accuracy and utilization of early warning systems. Emphasizing the collection and analysis of community-specific data can further enhance proactive healthcare planning.

The study demonstrates strong confidence in the role of technology in enhancing health information management. EHRs, data analytics, and AI are seen as crucial tools for improving healthcare outcomes and efficiency. However, there are varied levels of acceptance and readiness for adopting wearable health technologies, suggesting the need for further education and integration strategies. The recognition of digital tools in increasing patient engagement highlights the growing importance of technology in patient-centered care.

The findings highlight a generally positive view of government policies in supporting health information management, particularly in promoting data sharing, integration, and resource allocation. However, there is a notable degree of uncertainty or perceived gaps in compliance and policy alignment, suggesting areas for improvement in communication and enforcement. The mixed perceptions regarding the effectiveness of county-level policies underscore the need for stronger local governance and stakeholder engagement to build confidence in policy effectiveness and ensure robust data protection practices.

The study underscores the critical role of accurate and reliable health data, effective use of technology, and supportive government policies in enhancing health information management in public health facilities. While there is strong confidence in many aspects, such as the contribution of EHRs and the role of data in decision-making, the findings also highlight areas for improvement. These include ensuring consistent data quality, addressing gaps in policy compliance and alignment, and increasing the adoption and integration of emerging technologies. Strengthening communication, training, and stakeholder engagement can further enhance the effectiveness of health information systems and support proactive, data-driven healthcare strategies

5.3 Recommendations

Based on the findings and conclusions of the study on health information management in public health facilities in Habaswein, Wajir County, the following recommendations are provided to enhance the effectiveness of health data utilization, improve technology integration, strengthen data metrics, and align with government policies:

5.3.1 Key data metrics for early detection and intervention

- 5.3.2 Key Data Metrics for Early Detection and Intervention
- The County Government of Wajir, through the Department of Health, should expand the scope of data collection to include comprehensive indicators for monitoring disease incidence and positivity rates across all hospital departments. This will strengthen early detection systems and improve the county's capacity to respond to emerging public health threats.
- The Ministry of Health (MoH) should invest in advanced data analytics infrastructure and training to identify disease trends and patterns, enabling proactive interventions and data-driven decision-making in health management.

5.3.3 Technology

- The County Government of Wajir, in collaboration with the Ministry of Health, should ensure universal access to Electronic Health Records (EHRs) across all public health facilities and provide continuous training to healthcare professionals to improve usability and data accuracy.
- Health Facility Management Teams should promote the adoption of advanced data analytics and visualization tools to enhance the analysis, interpretation, and communication of health information, supporting timely and evidence-based decision-making.

5.3.4: Government policy

- The Ministry of Health, working with the Wajir County Department of Health, should regularly review and align health information management policies with national and county regulations, ensuring consistent compliance and effective data governance.
- Healthcare Facility Administrators, in partnership with the County Government, should foster a culture of data integrity by implementing regular data quality audits and providing continuous training on regulatory compliance and best practices in data management.
- Expand the scope of data collection to include comprehensive indicators for monitoring disease incidence and positivity rates across all hospital departments.

5.4 Recommendation for Further Research

This study recommends further research to assess the health system constraints that restrict the use of information derived from integrated disease surveillance data in individual health facilities.

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APPENDIX I: INFORMED CONSENT FORM

TITLE:

Utilization of Health Information for Control of Communicable Diseases in Habaswein Sub County Public Health Facilities, Wajir County

SPONSOR: Hassan Abdullahi

PRINCIPAL INVESTIGATOR: Hassan Abdullahi

Address: Kenya Methodist University

P.O Box 267-60200, Meru, Kenya

1.INTRODUCTION

I am Hassan Abdullahi, a graduate student pursuing a master's degree in health systems management at Kenya Methodist University. I am conducting research on the utilization of health information for control of Communicable diseases in Public Health facilities in Habaswein, Wajir County.

REASON FOR THE RESEARCH

The main objective of this study was to investigate the utilization of health information for control of communicable diseases in Habaswein Sub County Public Health Facilities, Wajir County to better understand how utilize information generated from the facilities.

GENERAL INFORMATION ABOUT RESEARCH

This research employed an analytical cross-sectional study method that aims to determine the status of health information utilization and the control of infectious diseases. Analytical cross-

sectional studies involve collecting data from a population or a representative subset at a single point in time. This method had been chosen because it is deemed more efficient and cost-effective and can provide a snapshot of a population's characteristics or behaviors without the need for long-term resource commitments.

YOUR PART IN THE RESEARCH

If you chose to participate in this study, i asked you a series of questions and recorded your responses in a questionnaire. Your involvement was voluntary, and you had the option to decline participation without facing any consequences. Please note that participation was entirely optional, and you could have withdrawn from the study at any time without impacting the services you received from other organizations.

POSSIBLE RISKS

If any of the questions made you uncomfortable, you were free to refuse to answer. You also had the right to terminate the interview at any point. The interview was expected to last up to 30 minutes.

POSSIBLE BENEFITS

Your participation in this survey contributed to the collection of valuable data and enhance the use of health information in managing infectious diseases in public health facilities.

IF YOU DECIDE NOT TO BE IN THE RESEARCH

You were free to decide if you wanted to be in this research. Your decision would not affect the health care you would normally receive from the public health facilities in Habaswein Sub County

CONFIDENTIALITY

We protected information about you and your taking part in this research to the best of our ability. The interviews were conducted in a private setting, and your name was not included in the questionnaire. For security reasons, the complete questionnaires were stored in a locked

cabinet, and the information was kept confidential. Someone from the IRB might want to ask you questions about being in the research, but you do not have to answer them. A court of law could order medical records shown to other people, but that is unlikely.

COMPENSATION

Please be aware that there was no payment for participating in this research and that you were free to either take part or decline.

LEAVING THE RESEARCH

You may leave the research at any time. If you choose to take part, you can change your mind at any time and withdraw. If so, please tell the research doctor/clinic staff why you wish to leave. Also, you may be asked to leave the research if the research doctor/clinic staff feels it is best for you, or you are not able to follow the research procedures, or the research is stopped. We will tell you if we learn something new that could affect your choice to stay in the research. When you are no longer in the research, you will still be able to use this clinic.

IF YOU HAVE A PROBLEM OR HAVE OTHER QUESTIONS

Please call Hassan Abdullahi, 0722409106 or come back to the clinic right away, at any time during the research, if you: get sick, or have concerns about your health (*become infected*) or have questions about the research. If you are sick or have a health problem due to your participation in this research, you will not have to pay for visits to see the research doctor/clinic staff.

YOUR RIGHTS AS A PARTICIPANT

This research has been reviewed and approved by the Scientific Ethical and Research Committee (SERC). This is a committee that reviews research studies to help protect participants. If you have any questions about your rights as a research participant, you may contact SERC.

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research titled (Utilization of Health Information for Control of Communicable Diseases in Habaswein Sub County Public Health Facilities, Wajir County) has been read and explained to me. I have been

given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

Date

Signature or mark of volunteer.

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered, and the volunteer has agreed to take part in the research.

Date

Signature of Witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

Date

Signature of Person Who Obtained Consent

Appendix II: Questionnaire

Utilization of Health information for Control of Communicable diseases in Habaswein Public Health Facilities, Wajir County, Kenya

Date:

Questionnaire number.....

Ward:

Facility.....

Interviewer ID:

Section 1 : Socio-demographic Characteristics

1. What is the level of this facility?

- a) Level IV []
- b) Level III []
- c) Level II []

2. What is your age in years?

- a) Below 20 []
- b) 20-29 []
- c) 30-39 []
- d) 40-49 []
- e) Above 50 []

3. What is your Gender?

- a) Male []
- b) Female []

4. Please tick your health Profession

- a) Medical Officer []
- b) Clinical Officers []
- c) Public Health officer/Technician []
- d) Health Records Information Officer []
- e) Laboratory Technologist/Technician []
- f) Nurse []
- g) Pharmacy Technologist []
- h) Community Health officer []
- i) Any other (Specify)_____

5. How long have you worked in this facility in years?

- a) Less than 5 []
- b) 5 to 10 []
- c) 10 to 20 []
- d) More than 20 []

Section 2: Health Data Metrics

Please indicate your level of agreement with the following statements where 1, indicates Strongly disagree, 2, Disagree, 3 Neutral 4, Agree, 5 strongly agree: "

Item	Statements	1	2	3	4	5
1	Our hospital collects and analyses data regarding disease incidence rates					
2	Disease occurrence and positivity rate is gauged using hospital data					

3	Data on hospitalization rate is used to make decisions in the hospital					
4	Early warning indicators in the data are accurate in predicting communicable disease outbreaks.					
5	Data collected by the healthcare institution has been used for syndromic warning.					
6	Data metrics include indicators related to community health that are crucial for early detection.					
7	The data metrics collected contribute effectively to predictive modeling for communicable disease outbreaks.					
8	The current data metrics being collected are relevant to early detection and intervention in communicable disease outbreaks.					
9	Data collected includes indicators that help identify high-risk populations susceptible to communicable diseases.					
10	Data is analyzed promptly to identify potential outbreaks and enable timely intervention.					

Section 3: Government Policy

Please indicate your level of agreement with the following statements where 1, indicates Strongly disagree, 2, Disagree, 3 Neutral 4, Agree, 5 strongly agree: "

Item	Statements	1	2	3	4	5
1	Organizations and entities involved in data collection comply with government policies regarding health information.					
2	We have a high rate of compliance on data rules statutes and regulations					
3	Our resources allocation is informed by available data					
4	We have a data protection policy that aligns with the national and county rules					
5	Government initiatives promote the sharing and integration of health information across relevant entities.					
6	County and national Government policies adequately allocate resources for the collection, management, and analysis of health information.					
7	Government policies positively impact the quality and timeliness of health information.					
8	Stakeholders, including the public, are actively engaged in the development of government policies related to health information.					
9	The County government of Wajir policies provide clear and effective regulations for ensuring data privacy and security in response efforts.					

Section 4: Technology

Please indicate your level of agreement with the following statements where 1, indicates Strongly disagree, 2, Disagree, 3 Neutral 4, Agree, 5 strongly agree: "

Item	Statements	1	2	3	4	5
1	Electronic Health Records (EHRs) effectively contribute to the management of health information for disease control.					
2	Data analytics tools enhance the analysis and interpretation of health information for effective disease control.					
3	Data visualization tools play a valuable role in presenting health information in a clear and understandable manner.					
4	Technology is well-integrated into the overall management of health information for disease control.					
5	Healthcare professionals can easily access and retrieve relevant information from Electronic Health Records					
6	Wearable health technologies, such as fitness trackers and smart watches, can contribute to personal well-being					
7	Electronic Health Records (EHRs) improve the efficiency of healthcare information management.					
8	I actively use or am open to using wearable health technologies for monitoring health metrics.					
9	Artificial Intelligence (AI) applications improve diagnostic accuracy in healthcare.					
10	Health apps and digital platforms contribute to increased patient engagement and empowerment.					

Section 5: Utilization of Health data

Please indicate your level of agreement with the following statements where 1, indicates Strongly disagree, 2, Disagree, 3 Neutral 4, Agree, 5 strongly agree: "

Item	Statements	1	2	3	4	5
1	Patients should have controlled access to their own health data for informed decision-making					
2	Strict measures should be in place to ensure the security and privacy of health data.					
3	Clear communication about how health data is used and protected is essential for building trust.					
4	Sharing health data among different healthcare providers can lead to more coordinated and effective care.					
5	Patients should have the ability to control and limit the sharing of their health data between providers.					
6	Using anonymized health data for research purposes is a valuable contribution to medical advancements.					
7	Patients should have the option to opt-in or opt-out of their data being used for research.					
8	Healthcare organizations should use data to inform and improve decision-making processes.					
9	Adequate training in data interpretation should be provided to healthcare professionals for effective decision-making.					
10	Patients should actively participate in managing and updating their own health data.					

Appendix III: Kemu Authorization Research letter



KENYA METHODIST UNIVERSITY

P. O. Box 267 Meru - 60200, Kenya

Fax: 254-64-30162

Tel: 254-064-30301/31229/30367/31171

Email: deanrd@kemu.ac.ke

DIRECTORATE OF POSTGRADUATE STUDIES

Our Ref: KeMU/NACOSTI/HSM/09/2024

May 13, 2024

Commission Secretary,
National Commission for Science, Technology and Innovations,
P.O. Box 30623-00100
NAIROBI.

Dear Sir/Madam,

RE: HASAN ABDULAH ALI – (REG. NO. HSM-3-4000-3/2015)

This is to confirm that the above named person is a bona fide student of Kenya Methodist University, in the School of Medicine and Health Sciences, Department of Health System Management undertaking a Master's Degree in Health System Management. He is conducting research on: "Utilization of Health Information for Control of Communicable Diseases in Habaswein Sub-County Public Health Facilities, Wajir County".

We confirm that his research proposal has been presented and approved by the University.

In this regard, we are requesting your office to issue a research license to enable him collect data.

Any assistance accorded to him will be appreciated.

Yours sincerely,


Dr. John M. Mwachiri (PhD)

Dean, Postgraduate Studies

Cc: Dean, SMHS

CoD, HSM

Postgraduate Coordinator, HSM

Supervisors



KENYA METHODIST UNIVERSITY

P. O. BOX 267 MERU - 60200, KENYA
TEL: 254-064-30301/31229/30367/31171

FAX: 254-64-30162
EMAIL: info@kemu.ac.ke

Our Ref: KeMU/ISERC/HSM/09/2024

May 13, 2024

HASSAN ABDULLAH ALI
HSM-3-4000-3/2015

Dear Hassan,

SUBJECT: UTILIZATION OF HEALTH INFORMATION FOR CONTROL OF
COMMUNICABLE DISEASES IN HABASWEIN SUB-COUNTY PUBLIC HEALTH
FACILITIES, WAJIR COUNTY.

This is to inform you that Kenya Methodist University Institutional Scientific Ethics and Review Committee has reviewed and approved your research proposal. Your application approval number is KeMU/ISERC/HSM/09/2024. The approval period is 13th May, 2024–13th May, 2025.

This approval is subject to compliance with the following requirements:-

- I. Only approved documents including (informed consents, study instruments, MTA) will be used.
- II. All changes including (amendments, deviations, and violations) are submitted for review and approval by Kenya Methodist University Institutional Scientific Ethics and Review Committee.
- III. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KeMU ISERC within 72 hours of notification.
- IV. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KeMU ISERC within 72 hours.
- V. Clearance for export of biological specimens must be obtained from relevant institutions.

- VI. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- VII. Submission of an executive summary report within 90 days upon completion of the study to KeMU ISERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and also obtain other clearances needed.



Appendix IV: NACOSTI Permit

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 915431	Date of Issue: 23/May/2024
RESEARCH LICENSE	
	
This is to Certify that Mr. HASSAN ABDULLAHI ALI of Kenya Methodist University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Wajir on the topic: UTILIZATION OF HEALTH INFORMATION FOR CONTROL OF COMMUNICABLE DISEASES IN HABASWEIN SUB COUNTY PUBLIC HEALTH FACILITIES, WAJIR COUNTY for the period ending : 23/May/2025.	
License No: NACOSTI/P/24/35895	
Applicant Identification Number 915431	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Verification QR Code 	
NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.	
See overleaf for conditions	

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
 - i. Endanger national security
 - ii. Adversely affect the lives of Kenyans
 - iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
 - iv. Result in exploitation of intellectual property rights of communities in Kenya
 - v. Adversely affect the environment
 - vi. Adversely affect the rights of communities
 - vii. Endanger public safety and national cohesion
 - viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and
Innovation(NACOSTI),
Off Waiyaki Way, Upper Kabete,
P. O. Box 30623 • 00100 Nairobi, KENYA
Telephone: 020 4007000, 0713788787, 0735404245
E-mail: dg@nacosti.go.ke
Website: www.nacosti.go.ke