Influence of Routine Health Information on Decision-Making in Public District Hospitals in Kilimanjaro Region, Tanzania

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Abstract

The study sought to assess the implication of regularly collected health information in public hospitals in Kilimanjaro region, Tanzania. The effect of information accuracy, completeness of reports, information reliability, and information timeliness on decision-making in public district hospitals was examined. Descriptive cross-sectional design was adopted for this study conducted in the Kilimanjaro region of Tanzania. A target population of 60 individuals comprising hospital administrators, procurement officers, pharmacists, doctors, and nurses from six public district hospitals was identified. The sample size was determined using convenient sampling techniques. Primary quantitative data was collected through structured survey questionnaires. Data was analysed using the Statistical Packages for Social Sciences (SPSS Version 26). The study underscores the importance of accurate and timely health information in guiding decision-making processes and improving healthcare delivery. It identifies challenges such as lack of standardized information procedures and inadequate electronic health information systems, and highlights the importance of streamlining data presentation and visualization as crucial in enhancing better comprehension among healthcare professionals, reducing delays, and improving efficiency in health information management. The study recommends implementation of standardized procedures and electronic health information systems, capacity building for health information analysis, and establishing accessible common health management information system to all hospitals. Further, the study advocates for policy suggestions, such as prioritization and adoption of standardized procedures and electronic systems, training healthcare professionals, and appointing health management information system focal persons within hospitals to facilitate information sharing and communication in bid to enhance accountability, and transparency, and ultimately improve health outcomes for the population served by public district hospitals

Keywords: *Routine Health Information, Decision Making, Information Accuracy, Completeness of Reports, Information Reliability, Information Timeliness*

1.0 Introduction

A health information system is described as a comprehensive system that combines data gathering, processing, reporting, and utilization to enhance efficacy and efficiency of health services through improved management across all healthcare levels. These systems help to improve care coordination, information organization, timeliness, accuracy, and completeness; reduce medical errors, lower costs, maintain continuity of care; facilitate information exchange, and quick and simple access to providers at various locations and times; and enhance communication between patients and health professionals (Torab-Miandoab et al., 2023).

In this digital age, decision-making in public health facilities has gotten increasingly complex, and the utilization of health information has become critical in developing and developed countries. For healthcare systems to succeed, they must be built on a foundation of some key pillars. A health information system (HIS) collects, processes, uses, and disseminates health-related data to enhance patient outcomes. Interventions for regular health information systems are encouraging in the European region, according to Saigí-Rubió et al. (2021). To connect platforms among European nations, it is necessary to build new global strategies, tools, and processes. Koumamba et al. (2021) suggest a systematic strategy that considers stakeholders' demands globally at all decision-making levels. Shiferaw et al. (2017) notes that in Tanzania in the 1960s, data was collected using an information system called “Kalamazoo” dealing only with morbidity and mortality information. In the 1980s, a new information management system was launched that modified the HMIS to contain more information than before. However, the number of health information demands increased (Mahundi et al., 2011; Mboera et al., 2021). As a result of this, in 1993, the first edition of the new semi-computerized information system branded *Mfumo wa Taarifa za Uendeshaji wa Huduma za Afya* (MTUHA) which was only available in English was introduced. All this enhanced the processing and dissemination of health information to facilitate patient care.

Lack of a regular good health information system may result in poor service quality, insufficient infection prevention and control measures, a shortage of competent health professionals where they are required, and shaky medicine and equipment supply chains. These could also result from failure to use the available information. These factors play a role in people's bad health outcomes. Wilms et al. (2014) acknowledged that health information systems show poor performance in many developing countries. Tanzania's health information system, like that of any other developing country, has challenges that demand improvement in the use and administration of health data.

There is no clear information on the use of quality routine health information collected in the district hospitals in the Kilimanjaro region (Todd et al., 2017). A review of studies indicates limited evidence of how collected HMIS enhances district-level decision-making. Hameed et al. (2017) inferred that information collection and submission to the district level is more emphasized than data analysis and use for

decision-making. However, there are no guidelines or established systems for decision-making, rather data analysis, and use have more to do with leadership than the information system (Hameed et al., 2017). It is unknown, how RHI is used to improve health-related decision-making. In this study, therefore, the researcher is interested in assessing the usefulness of RHI, which leads to good decision-making, from selected district hospitals in the Kilimanjaro region. The purpose of the study was to assess the influence of routine health information on decision-making processes within public district hospitals in the region.

2.0 Materials and Methods

This study adopted a descriptive cross-sectional survey research design. The study conducted in the Kilimanjaro region sought to assess the influence of routine health information on decision-making processes within public district hospitals. The target population comprised 60 members of CHMT, including hospital administrators, procurement officers, pharmacists, doctors, and nurses from the six public hospitals in Northern Tanzania. All members of the Committee of Health Management Team (CHMT) were considered for inclusion**.** Convenient sampling was employed to obtain the sample size. This method was chosen due to practical considerations and the accessibility of participants. Co-opted CHMT members were excluded from the study as they did not possess comprehensive information about the health information system. Primary data was collected using self-administered questionnaires distributed to health staff in each participating hospital. The questionnaires were designed to capture information related to routine decision-making, information accuracy, completeness of reports, and reliability and timeliness of information**.**

"The study recommends regular training on data entry and effective use of communication channels among staff so as to enhance healthcare information management

The dependent variable was routine decision-making, while the independent variables included information accuracy, completeness of reports, reliability, and timeliness of information. Data entry was performed using Statistical Packages for Social Sciences (SPSS Version 26). Descriptive analysis techniques including frequency and percentages were utilized to summarize the data.

3.0 Results and Discussion

Results

The demographic information considered includes respondents' gender, age, highest level of education, and duration of service as healthcare worker (HCWs**).** See Table 1.

Table 1
Demographic Information

Characteristics	*Frequency*	*Percent*
Sex		
Female	31	56
Male	24	44
Total	55	100
Age bracket		
< 25 years	6	11
26 to35 years	18	33
36 to 45 years	22	40
> 45 years	9	16
Total	55	100
Education Level		
Certificate level	22	40
Diploma level	28	51
Graduate/Degree	4	7
Postgraduate	1	2
Total	55	100
HCW Duration of service		
< 1 year	9	16
1 to 5 years	16	28
6 to 10 years	13	24
> 10 years	17	31
Total	55	100

Out of the 60 questionnaires issued, 55 respondents completed the questionnaires, translating to 91.7% response rate. The majority of respondents were female 31 (56%), 22 (40%) were aged between 36 to 45 years, 28(51%) were diploma holders; while 16 (28%) had served as health care workers (HCW) for a duration of between 1 to 5 years.

Decision-Making in Public District Hospitals

The study explored the aspect of decision-making in public district hospitals by examining planning, gaps identification and priority areas; monitoring and evaluation, resources mobilization, medical supply and drugs management, and use of appropriate resources. See Table 2.

Table 2

Decision-Making in Public District Hospitals

	NO	YES
	n (%)	n (%)
Planning is enhanced	9(17)	46(83)
Identification of gaps and priority areas is enhanced	10(18)	45(82)
Monitoring and evaluation of various programs are enhanced	12(21)	43(79)
Mobilization/Shifting of resources based on comparison by services	12(21)	43(79)
There is improved medical supply and drug management	13(23)	42(77)
Ensures efficient and effective use of limited resource	13(23)	42(77)

Results shows that 46 (83%) and 45 (82%) respondents agreed that planning and identification of gaps and priority areas respectively were enhanced. Of the study participants, 43(79%) agreed that monitoring and evaluation of various programs was enhanced and mobilization of resources based on comparison by services was promoted. Further, 42 (77%) of the respondents agreed that there was improved medical supply and drug management, ensuring efficient and effective use of limited resources.

The study revealed that decision-making in public district hospitals was positively influenced by effective planning and the identification of gaps and priority areas, aligning with previous research findings. For instance, Katurura and Cilliers (2018) demonstrated in the South African public health sector that the implementation of electronic health records (EHRs) significantly impacted decision-making processes. Similarly, Nutley and Reynolds (2013) highlighted the role of health information systems in strengthening health systems, thereby influencing decision-making. Moreover, Tulu et al. (2021) found that routine health information system data played a crucial role in informing program management decisions in Ethiopia. Additionally, Asangansi et al. (2013) observed that the Health Management Information System (HMIS) influenced decision-making within the Nigerian communal health sector. These studies collectively suggest that the adoption of computerized health systems across various nations facilitates more organized data and streamlined applications, ultimately enhancing decision-making processes in healthcare settings.

Information Accuracy

Information accuracy and completeness of reports facilitate decision-making in public district hospitals. The study findings below indicate the respondents' responses regarding data accuracy and completeness of reports. See Table 3.

Table 3

Information Accuracy and Completeness of Reports

Statements	NO N (%)	YES N (%)
Information Accuracy		
The data captured is always accurate	10(19)	45(81)
The use of the data gives instant positive change	16(29)	39(71)
The data is always complete	19(35)	36(65)
The data is relevant to the basic operations of the hospital	23(42)	32(58)
The data is credible to guide decision-making	26(48)	29(52)
The data captured is always precise	34(62)	21(38)
Completeness of Reports		
Data collection sheets are self-explanatory	17(31)	38(69)
The data is available in a simplified form	19(34)	36(66)
Reporting intervals are regular	20(36)	35(64)
Data from two intervals can never mix	25(45)	30(55)
There is an integration of data from different HMIS within the departments	29(53)	26(47)

The findings in Table 3 reveal that 45 (81%) of the participants agreed that the data captured was always accurate, and 39 (71%) reported that the use of the data gave instant positive change. 36 (65%) of the participants reported that the data was always complete, while 32 (58%) stated that the data was relevant to the basic operations of the hospital. Additionally, 29 (52%) of the respondents agreed that the data was credible to guide decision-making. However, 34 (62%) of the study participants disagreed that the data captured is always precise.

According to the study, the information gathered was consistently accurate, comprehensive, and relevant, leading to immediate improvements upon its application. These findings agree with previous research conducted by AbouZahr et al. (2002) which emphasized the importance of data accuracy, consistency, and quality in facilitating effective decision-making processes. Additionally, the study's findings align with the observations made by Aslinda et al. (2020) who noted that challenges in collecting credible ambulatory safety data in medical systems lack smoothly connected health records and patient data. This highlights the critical role of reliable health information in informing decision-making and improving healthcare outcomes. The parallels observed between the study's findings and existing literature suggest the presence of effective mechanisms for obtaining and utilizing reliable health information, which is essential for enhancing decision-making processes in healthcare settings.

The results of the study suggest that information accuracy, completeness, reliability, and timeliness play significant roles in influencing decision-making processes in public district hospitals in the Kilimanjaro region in Tanzania. These findings are consistent with prior research

conducted in similar contexts. For instance, Sadeghi et al. (2023) found that information accuracy significantly influenced decision-making in public district hospitals in Iran, highlighting the importance of reliable data in informing healthcare decisions. Similarly, Todd et al. (2017) observed that completeness of reports significantly affected the accuracy of routine data from district health information systems in the region, emphasizing the necessity of comprehensive data for informed decision-making. Furthermore, Simba and Mwangu (2005) emphasized the importance of reliability in regular health management information for decision-making processes. Additionally, Murai et al. (2022) identified the timeliness of reporting and associated factors as significant contributors to decision-making in the Kilimanjaro region, aligning with the present study's findings on information timeliness. These consistent findings underscore the critical role of accurate, complete, reliable, and timely information in facilitating effective decision-making processes within healthcare settings.

Completeness of Reports

The results in Table 3 indicate that 38 (69%) of the respondents agreed that data collection sheets were self-explanatory. Additionally, 36 (66%) reported that the data was available in a simplified form, 35 (64%) stated that reporting intervals were regular, while 30 (55%) reported that data from two intervals were never mixed. Moreover, 29 (53%) of the respondents moderately disagreed that there was integration of data from different HMIS within the departments. See Table 3.

These findings reveal that reporting intervals were regular, data from different intervals were never combined, and data collection forms were both self-explanatory and available in a simplified form. The findings align with the observations made by Lee et al. (2021) who highlighted the exacerbation of stock-outs due to financial constraints and insufficient logistical capabilities. Moreover, the study's findings are consistent with the limited utilization of routine information in decision-making processes within healthcare facilities, emphasizing the significant impact of concentrated and accessible information on decision-making within health institutions. Further, the findings agree with Shiferaw et al. (2017) who observed that health practitioners relied on regular health information to make informed decisions on time.

Information Reliability

Information reliability and information timelines can be close to improved health services. The study looked into information reliability and timeliness in decision-making. The findings are shown in the table below: see Table 4.

Table 4

Information Reliability and Information Timeliness

	NO	YES
	n(%)	n(%)
Information Reliability		
Data presentation is improved and visualized	23(41)	32(59)
The consistency of data produced within similar intervals promotes the reliability of the data	24(43)	31(57)
Data analysis is simplified	25(45)	30(55)
Valid data is reliable in foretelling the aspects covered in the data	25(45)	30(55)
The computer software for capturing data is secure from malware and viruses to prevent loss of information	26(47)	29(53)
Information Timeliness		
Delays are greatly reduced as a result of reduced time wastage in searching for procurement files	9(16)	46(84)
The waiting time for information is greatly reduced	10(18)	45(82)
Referencing products from the previous order and supply is fast	15(28)	40(72)
The system allows for speedy access to any information required	20(36)	35(64)
The data mining and scrutiny process is made easier than during the previous systems of keeping records	23(42)	32(58)
Bureaucracies in the scheduling procedures are greatly decreased	30(54)	25(46)

From this study, 32 (59%) of the respondents agreed that data presentation was improved and visualized, while 31 (57%) reported that consistency of data produced within similar intervals promoted the reliability of the data. Additionally, 30 (55%) of the respondents agreed that data analysis was simplified, and valid data was reliable in foretelling the aspects covered in the data. Furthermore, 29 (53%) of the respondents agreed that the computer software for capturing data was secure from malware and viruses to prevent loss of information. See Table 4.

The study demonstrated that the analysis of health data was simplified, and enhancements in data presentation and visualization were achieved. Additionally, maintaining data consistency across comparable intervals contributed to increased data reliability, while ensuring that computer software used to capture data was protected against viruses and malware helped prevent data loss. These findings on information reliability align with the observations made by Bhattacharya et al. (2019) who emphasized the importance of good information quality in promoting completeness and accuracy of information.

Further, the findings are consistent with the findings of Kayode et al. (2014) who highlighted the significance of validity of routine information in decision-making processes, which involves recognizing problems and assessing alternatives. The study's results suggest that the use of self-explanatory and efficient data-collection forms facilitated healthcare professionals' comprehension and completion of necessary data, contributing to improved information reliability.

Information Timeliness

Results show that the majority of respondents agreed that delays were greatly reduced due to reduced time wastage in the search for procurement files (46 respondents, 84%), and waiting time for information was also greatly reduced (45 respondents, 82%). Additionally, a significant proportion of respondents (40 respondents, 72%) agreed that referencing products from previous orders and supplies was fast, while 35 respondents (64%) reported that the systems allowed for speedy access to any required information. Further, the majority (32 respondents, 58%) pointed out that the data mining and scrutiny process was made easier compared to previous record-keeping systems. 25 individuals (46%) reported a significant decrease in bureaucracies in scheduling procedures. These results indicate that respondents were aware of the importance of information timeliness in enhancing decision-making in public district hospitals in the Kilimanjaro region in Tanzania (see Table 4).

The study revealed significant reductions in delays, attributed to less time wastage while searching for procurement files. Most participants reported experiencing significantly shorter wait times for information. These findings on information timeliness are consistent with the observations made by Braa et al. (2012) who highlighted the importance of prompt administration of adequate care in reducing mortality and morbidity for chronic diseases. Additionally, the study's findings align with the findings of Kihuba et al. (2014) emphasizing that the speed of access to information is a critical factor in utilizing routine health information for decision-making processes. Moreover, the results agree with the study conducted by Wagenaar et al. (2016) which emphasized that routine health information systems are most useful when they are timely and aim to meet the specific needs of society. Furthermore, the findings are supported by observations made by Simba and Mwangu (2005) who highlighted the influence of timeliness of scheduling procedures of routine information collection on health decisions. The technological advancements have facilitated the easy gathering, analysis, and processing of data; thereby promoting the use of timely routine health information in decision-making processes.

The results from this study align with the findings of Turnpenny and Beadle-Brown (2015) who suggested that low-quality information within primary healthcare settings can have detrimental effects. Our findings indicate that poor information quality may indeed lead to substandard treatment of patients, compromise the legitimacy and repeatability of research findings, and limit the utility of public health surveillance information. Also, the findings are in line with Mpimbi and Mughwira (2021) who highlighted the partial use of routine health information

(RHI) in health-related decision-making processes. We observed a similar pattern, wherein the interaction of technological, organizational, and behavioural factors influenced the utilization of health information among healthcare workers in our study setting.

The study revealed that information accuracy, completeness of reports, reliability, and timeliness were all significant factors influencing decision-making in public district hospitals. These findings are consistent with prior research Findings by Maïga et al. (2019) and Sako et al. (2022) who found out that the quality of interval information was crucial in decision-making processes. Their findings align with the observation of this study on the importance of information accuracy. Similarly, the findings regarding the significance of completeness of reports resonates with Hotchkiss et al. (2010) who demonstrated a correlation between consistency over time of reports and decision-making in public hospitals in Kampala, Uganda. Further, this study identifies information reliability as a significant factor, and mirrors the findings of Bhattacharya et al. (2019) who observed that health information significantly influenced decision-making within public hospitals in Melbourne, Australia. Lastly, our results concerning the importance of information timeliness are supported by Braa et al. (2012) and Kihuba et al. (2014) who emphasized the role of speedy access to information in promoting effective decision-making and the utilization of routine health information. Thus, our study contributes to the existing body of literature by confirming the significance of these information quality factors in healthcare decision-making processes.

4.0 Conclusions

In conclusion, our study highlights several key findings regarding the quality and utilization of health information in public district hospitals. Firstly, we found that the data captured was consistently accurate, and its utilization led to instant positive changes in healthcare practices. This underscores the importance of reliable information in driving effective decision-making within healthcare settings. Further, our observations on regular reporting intervals and the non-mixing of data from different intervals indicate a structured and organized approach to data management, thereby enhancing the reliability and consistency of information. Additionally, the integration of data from various Health Management Information Systems (HMIS) within departments suggests progress toward a more cohesive and comprehensive information infrastructure. Overall, the advancement of technology has played a crucial role in facilitating the collection, analysis, and processing of data, ultimately improving the accessibility and timeliness of routine health information. These findings emphasize the significance of investing in robust information systems and technology to support informed decision-making and enhance healthcare delivery in public district hospitals.

5.0 Recommendations

The study recommends several crucial interventions to enhance healthcare information management and decision-making in public district hospitals. Firstly, hospital administration should prioritize training healthcare staff in data entry techniques and electronic health records to

ensure accurate data capture. Effective communication channels such as meetings and social media platforms should be established to facilitate information sharing and best practice dissemination among healthcare providers. Additionally, comprehensive training programs should be implemented to equip professionals with the skills needed to analyze and interpret health information systems effectively. Standardizing health management systems across all health centers can modernize data processes and improve coordination. Regular audits are essential to identify and rectify inaccuracies in data, ensuring its reliability. Finally, the utilization of quality Routine Health Information is recommended to promote accountability and transparency in healthcare delivery, fostering a culture that values the importance of health information among healthcare providers.

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