# Data Utilisation and Factors Influencing the Performance of the Health Management Information System in Tanzania

**Leonard Mboera** ( lmboera@gmail.com )

SACIDS-Foundation for One Health, Sokoine University of Agriculture, P.O. Box 3297, Chuo Kikuu, Morogoro

**Susan Rumisha**

National Institute for Medical Research, Dar es Salaam

**Doris Mbata**

National Institute for Medical Research, Dar es Salaam

**Irene Mremi**

National Institute for Medical Research, Dar es Salaam

**Emanuel Lyimo**

National Institute for Medical Research, Dar es Salaam

**Catherine Joachim**

Ministry of Health, Community Development, Gender, Elderly and Children, Dodoma

---

**Research Article**

**Keywords:** Health Management Information System, data, utilisation, performance, factors, Tanzania

**Posted Date:** January 22nd, 2021

**DOI:** https://doi.org/10.21203/rs.3.rs-150624/v1



---

# Abstract

**Background:** Health Management Information System (HMIS) is a set of data regularly collected at health care facilities, aimed to meet the needs of statistics on health services. This study aimed to determine the utilisation of HMIS data and factors influencing the performance of health system at the district and primary health care facility levels in Tanzania.

Methods: This cross-sectional study was carried out in 11 districts and involved 115 health care facilities in Tanzania. Data were collected using a standard questionnaire and an observational checklist. The collected data was cleaned, summarized into proportions and graphical presentation using STATA version 13 software.

**Results:** This study involved 115 health facilities in 11 districts. A total of 93 health facility workers and 13 district officials were interviewed. About two-thirds (60%) of the facility respondents reported to use the HMIS data they collect. Data were mainly used for comparing performance in terms of services coverage (53%), monitoring of disease trends over time (50%), and providing evidence for community health education and promotion programme (55%). The majority (41.4%) of the facility's personnel had not received any training on data management related to HMIS in the past 12 months. Only five out of 13 district respondents reported to routinely analyse HMIS data. Patient load was described to frequently affect staff performance on data collection and management. Less than half (42%) of the health facilities (HFs) had received supervisory visits from the district office. Nine district respondents reported to systematically receive feedback on the quality of their reports on monthly and quarterly bases from higher authorities. More than half (n=7) of district respondents reported that those responsible for HMIS activities are also responsible for other equally important activities.

**Conclusion:** Poor data utilisation was common in most of the districts and health facilities in Tanzania. Inadequate human and financial resources, inadequate training, lack of supervision, and lack of standard operating procedures were the major challenges affecting the HMIS performance in Tanzania.


# Background

Data analysis and the use of information are essential components of a well-functioning health delivery system for planning and monitoring the progress of disease intervention programmes. In many low- and middle-income countries, the Health Management Information Systems (HMIS) have been established to enhance routine health facility-based data management [1]. The HMIS is expected to measure the magnitude of disease morbidity and mortality in populations, monitor trends over time, detect and hence facilitate prompt response to any unusual trends. In Tanzania, the HMIS is the major information system, established during the early 1990s [2, 3]. It is composed of facility-based health records that are used for routine management of health services, providing indicators for data on morbidity, mortality, health infrastructure and service coverage. To strengthen the HMIS in Tanzania, the Government adopted the District Health Information System (DHIS2), a web-based soft-ware package for the collection, validation,

analysis, and presentation of aggregate statistical data, tailored to integrated health information management activities.

The effectiveness of a health information system, depends on the capacity to collect, analyse, interpret and utilise the information properly at all levels [4, 5, 6]. However, most often data are not collected properly, analysed, interpreted, or utilised to their maximum. Generally, in many Sub-Saharan African countries data utilization at all levels of the health care system is low [4, 7–11]. Available literature suggests that, despite some notable successes, the impact of HMIS on the decision-making process within Africa health systems remains limited [4, 11, 12]. Several barriers have been reported to prevent investments in HMIS from achieving full potential in Africa [13, 14]. Institutional, technological, and logistical issues are also likely to be perceived factors that either enable or impede the successful implementation and use of HMIS [15]. It has been reported that though the HMIS offers opportunities to inform health decision making at all levels of the health systems, its usefulness is realised only when it allows for the transformation of generated data into meaningful information and knowledge for action [7]. The capacity of individuals and organizations to analyse and utilize data in a timely fashion is also of critical importance.

Routine health information is important for both operational and strategic decision-making at all levels of the health system. Increased investment in health is dependent on efficient and reliable health management information systems. With increased investment in disease control programmes in Tanzania, there is a critical need for a good health information system to support decision making at all levels. It is envisaged that improved HMIS would enhance evidence-based decision and policy making leading to improved accountability and effectiveness at all levels of the health system. In the efforts to promote information utilization and evidence-based decision making, the Global Summit on Measurement and Accountability for Health has called for action for all countries to have health information flows that involve the use of data locally to improve services and programmes [16]. The objective of this study was to determine the utilisation of HMIS data and factors influencing the performance of the system at the district and primary health care facility levels in Tanzania.

## Methods

# Study sites and design

This cross-sectional study was carried out in November 2017 and involved 11 districts of Tanzania. It involved primary data collection at the health facility and district levels. For the purpose of this study, the country was categorized into eight geographical zones. We used a multistage sampling technique to select the study regions and districts within the zones. Within zones, 1–3 regions were selected and in each region, one district was selected randomly using a random generator function in MS Excel. Details of the study site selection have been described elsewhere [6].

# Data collection

Data were collected using a standard questionnaire and an observational checklist. Semi-structured guides for conducting interviews with health facility and district office staff were developed in English and translated into Kiswahili. The questionnaire collected information on data management including analysis and use. The interviewees were asked how the data are analysed and used at their respective levels and feedback obtained from different levels. At this stage, observations of displays indicating the use of data were done (at the health facility and district health offices). Minutes from meetings were also reviewed to assess if data use is among the agenda in their routine discussions. The availability of dedicated staff responsible for health information, training on HMIS, and availability of organizational and behavioural assessment was documented.

# Statistical analysis

Data collection forms were organized, sorted by similar grouping, and provided with unique identification numbers. Data entries were checked for immediate errors and corrected. Separate data entry forms for checklists and verification tools for the indicators were developed in EpiData 3.1. The data was migrated to STATA 13 software for further manipulation and analysis. Quality check was done by comparing a random pick of entered data with the one on original forms. Thematic content analysis was used to analyse the in-depth interviews. Briefly, the interview data were translated into English. Then analysis was done by developing a code list from multiple readings of transcripts. This was followed by open coding to identify major themes and sub-themes that emerged from the data. Results obtained from both methods were triangulated for interpretation.

# Results

### *Socio-demographic characteristics of the respondents*

This study involved 115 health facilities in 11 districts. A total of 93 health facility workers and 13 district officials were interviewed. About two-thirds (65.6%) of them were Diploma holders. Clinical officers accounted for the majority of the respondents (43.0%) followed by nurses (16.1%) and midwives (11.8%). Most (52.6%) of the respondents had over 10 years of working experience (Table 1). At the district office, 13 members of the Council Health Management Team were interviewed. They included District Medical Officers, District HMIS and Reproductive Health Focal Persons.

### *Utilisation of HMIS data at facility and district levels*

*Health facility level:* About two-thirds of the facilities (60%) claimed to use the HMIS data they collect. Data were used for comparing performance in terms of services coverage (53%), determining morbidity and mortality trends over time (50%), providing public health education and promotion (55%), and for determining the requirements for drugs and other medical supplies (37%). The commonly identified types of data displayed at health facilities were top ten diseases (58%). More than half (56%) of the facilities had displayed recent data analysis outputs (during the past three months). However, most of the displayed information, did not indicate dates hence it was difficult to detect the respective period covered.

Most facilities did not have statistics to compare values but rather listing the top ten diseases. Less than 10% (n=11) of the facilities were found to conduct proper analysis and use of their data.

Most facility respondents described the quality of data collected by the facilities to affect its utilisation in evidence-based decisions. However, most respondents believed that always decisions are made based on the evidence or actual needs, at both facility and district levels. These included the actual needs of the service population and considering costs or the financial capacity of the facility. Furthermore, it was found that in few instances decisions at health facilities were made based on directives from higher authorities. Few good practices on data use were claimed not to be noticed by superiors and about two-third complained that staff was not rewarded for their good work but always made responsible for their poor performance. Regarding the importance of collecting health information, health facility workers strongly agreed that they do understand why they are required to collect and submit data. However, most of them agreed that collecting data that is not used for decision making discourages them.

Nearly all (96.3%) of the health facilities reported to have routine meetings to review managerial and/or administrative matters. Most of the health facilities (46.6%) reported that the meetings were held monthly and nearly all (92.2%) maintained official records of the meetings. More than half (58%) of the facilities were able to provide copies of proceedings of their previous meetings within the respective quarters. However, when the proceedings were examined, the majority (62.8%) did not have data as an agenda for discussions. Issues related to data that were observed from the proceedings included management of HMIS (data quality and reporting) (57%) and discussion about commodity stock-out (60%). Most of them (70.9%) had made decisions based on their discussion. Only about half (49.1%) of the facility reported to participate in meetings convened by the district office to discuss HMIS data during the last three months.

*District level:* Data-use at the district level was reported by more than half of the respondents (9/13). The district respondents reported to use HMIS data mainly for monitoring and evaluating set district targets. They reported that their districts produce reports that contain information from HMIS data. The commonly produced reports included: annual Council Comprehensive Health Plan, quarterly Council Health Management Team reports, and Reproductive and Child Health reports. Nine of the 13 district respondents reported to systematically receive feedback on the quality of their reports from higher authorities. However, eight respondents reported that the district office does not provide feedback reports to the health facilities upon receiving the HMIS monthly reports.

Five out of 13 district respondents reported to analyse data from the HMIS. A larger proportion (10/13) of the respondents reported that the district office does not routinely hold meetings to review HMIS information as illustrated by one respondent: *"We do not have routinely scheduled meetings hence no records of meetings are available. Our data are of poor quality because only a very few staff have received proper training on data management" (*Tandahimba*).* The three reported examples of promotion and use of reported data at the district level included public health education, annual budgeting, forecasting demand, and procurement of supplies. One of the district respondent said: "*The data help us to budget and forecast on-demand and procurement" (Njombe).*

Districts were asked if the distribution of resources take into account facilities that excel in HMIS performance. HMIS focal persons from 9 districts (Kinondoni, Tandahimba, Mbulu, Hai, Mbinga, Nkasi, Njombe, Igunga, and Dodoma urban), reported that priority is given in the allocation of resources to facilities with good performance. Only two districts (Kahama, Kibaha) reported not to consider facility performance in the allocation of resources. Other criteria used for resource allocation in the annual plans included the size of the facility, the number of clients served, the number of services offered, disease burden, geographical location, and service priorities. However, only Kinondoni and Igunga districts were able to provide performance improvement tools such as flow charts and control charts to monitor the performance of their facilities. More than half (7/11) of the districts reported having a mechanism for generating funds for HMIS. Half of the respondents reported having a long-term financial plan for supporting HMIS activities while the other half reported having no such plans.

## *Factors influencing HMIS performance*

*Inadequate human and financial resources:* The number of staff specifically responsible for HMIS activities differed from one district to another. All the facility respondents reported on the inadequacy of human resources for data management. The majority of those responsible for HMIS activities reported having received short training on data management focusing only on data collection with very elementary analysis. However, few claimed that no specific training has been provided to them except on job training. A relatively large proportion (41.4%) of the facility's personnel had not received any training on data management related to HMIS in the past 12 months. On average there were 5 staff involved in HMIS activities per facility while about 21 staff were trained during the previous 12 months (Table 2). One main challenge emphasized by district key informants was limited human capacity in HMIS to apply the analytical tools and methods to synthesize information for decision-making. This was attributed to poor/inadequate training. Lack of financial resources was attributed to inadequate in-service training of staff on data management.

All district HMIS focal persons reported having HMIS training manuals. Some reported having received on-job training (6/11) and a few reported to have district training plans (3/11). The duration of the training (usually 2 -14 days) was described to be adequate by the majority of the district respondents. More than half of district respondents (n=7) reported that those responsible for HMIS activities were also responsible for other activities.

*Supervision:* Less than half (42%) of the health facilities reported that members of the district office provided supportive supervisory visits to the facilities during the three months' before this assessment. However, over half (52.4%) reported that the district supervision team did not have a supervision checklist. The majority of the facility respondents (72.1%) reported that the district team had conducted an audit of their data quality. Two-thirds of the facility respondents reported that the district team discussed the performance of the health facility based on the data provided. Only a few (9.6%) of the health facilities reported to have a clear schedule for district supervisory visits. Some respondents

(37.5%) explained that most of the time district teams just pay visits without informing the respective facilities. Less than half of the respondents (44.9%) were able to provide the district supervisory reports (Table 3). In contrary to the facility report, 9/11 districts reported to have checklists, visit schedules, and 10/11 to have supervisory reports.

*Standard procedures for data management:* Different types of procedures and logs for receiving reports which resulted in poor filing and loss of transmitted reports from lower levels were common. Some districts did not have a proper mechanism of receiving reports from health facilities. In such districts, any person who happened to be present at the district office when a report is delivered could receive the report without verification of proper filling or even document acknowledging its receipts. Feedback on reporting and quality of reports from the district office to health facility workers was mentioned by only 54% of respondents, and this was mostly oral feedback. Such practices and communication gaps provided room for the incorrectly/poorly filled and incomplete reports from a lower level to be received by the district and the inability to mark late reports. During interviews with district officials, almost all districts (90%) reported that there were no written procedures in place to address late, incomplete, inaccurate, and missing reports including follow-up with the facility on data quality issues, as one respondent said: *"There were no written procedures, just verbal discussions were provided some times through phone calls"* (Kinondoni).

Registers, tally sheets, or report forms with no identification of health facility, a period of use, were common. The registers, though filled with data, could not be used because the data could not be linked with an appropriate monthly report during the verification exercise. Only six facilities were found to have a logbooks available for marking and reporting submitted reports and only two districts reported to stamp the forms to indicate the receiving date. Only half of the districts reported having had quality control in place for data entry from paper-based to computer DHIS-2. Different versions of HMIS tools were used by different facilities. Some of the versions did not have the variable of interest.

# Discussion

Generally, the utilization of health data collected from health facilities in Tanzania is relatively poor. About two-thirds of the facilities reported using the HMIS data they collect; mainly for comparing performance between service coverage, determining disease trend over time, and for community health education and promotion. However, at the district level, the main use of HMIS was for preparing reports and annual planning. This suggests the underutilization of all important data collected from health facilities. Several studies have identified weaknesses in data use and response in Tanzania, while recognizing that these are critical components for sound public health decision-making [4, 12, 18–21]. A similar low utilisation of routine facility data has been reported elsewhere in Sub-Saharan Africa. In a study in Ethiopia, training, data analysis skills, supervision, regular feedback, and favourable attitude were factors related to routine health information system utilization [22]. The findings of this study and from others elsewhere indicate that data is collected for reporting purposes and there is minimal utilisation of the information to inform decisions. Usually, to most health workers in low-income

countries, HMIS is associated with the filling of registers, compiling, and submitting reports to the next level without its utilisation [23–24].

Studies elsewhere have reported that data generated by health facilities are most often not sufficiently utilised to improve health care [25–27]. Generally, in Sub-Saharan Africa, the level of health information utilisation at primary health care, and the district is poor [23]. In Ethiopia, the level of HMIS data utilisation for different decision-making purposes has been reported at 57.9%-62.7% [28–30]. In a recent study in Zanzibar, it was reported that only 42% of the healthcare workers used HIMS data for monitoring and evaluation, 35% for planning, 23% for supply and drugs management, 18% for budgeting, and 10% for disease outbreak preparedness [31]. Factors associated with good utilization of HMIS data have been described to include staff motivation, training, supportive supervision, a good perceived culture of health information, competence, and decisions based on superior directives [29–30].

Several factors including a limited number of staff and skills, low motivation, inadequate resources, lack of training and refresher courses, combined with lack of incentives and tools have been pointed out by some studies to be responsible for the underperformance of HMIS in low- and middle-income countries [13, 32–35]. In this study, inadequate human resource for data management was observed in all health facilities. In a study in Ethiopia, the availability of a standard set of indicators, skilled human resources, well-designed reporting formats, and staff trained to fill formats increase the likelihood of achieving data quality [36]. Organisational factors that influence the performance of HMIS include the culture of using information, availability of resources planning, governance, training, supportive supervision, and availability of finances [37]. In Tanzania, Simba and Mwangu [20] found that trained staff on HMIS and seeking or provision of frequent feedback were significantly associated with performance.

In a recent study in Kenya, there was a significant positive relationship between the availability of adequate staffing for HMIS tasks, training of staffs, supervision of HMIS activities, availability of plans for HMIS, promotion of a culture of information, staff motivation, and the performance of routine health information [38]. In our current study, less than half of the health facilities reported that members of the district team visited their facility for supervision. However, when supervision visits were made, the team did not have a supervision checklist. Already health workers' data analysis skills, feedback, and regular supervision have been described to affect the successful implementation and use of routine health information systems [22, 36, 39, 40]. A study in Uganda reported that self-efficacy and the presence of RHIS staff have a direct influence on the use of HMIS information [41]. Moreover, it has been reported that an effective supportive supervision and health facility performance review to be significantly associated with good performance in HMIS [42]. Lack of standard operating procedures (SOPs) was reported as a barrier in the performance of health workers in data management. SOPs for data management at health facility level have been shown to help improve HMIS data quality in Rwanda [43].

In this study, the majority of the HMIS focal persons were non-health information technicians. Lack of staff with core competence in data management and analysis is one of the core weaknesses that was identified to affect data performance in several studies [6, 21, 33]. Similar findings have been reported in

other studies elsewhere [44]. It is high time for the government of Tanzania to create an appropriate carder for data analysis and define clear responsibilities at all levels. To do that there is a need for a proper team made of people with the relevant skills and competence at all levels. For an HMIS to work effectively and efficiently there must be consistency and integrity between the human, supplies, and process aspects.

## Conclusions

Poor data utilisation was common in most of the districts and health facilities in Tanzania. Data management skills, inadequate supervision and feedback, inadequate resources, and inadequate capacity building were factors related to routine health management information system performance in Tanzania. The study, therefore, recommends that there is a need to have adequate staffing who are trained in HMIS tasks and have clear governance structures for the system that are communicated to all the health workers. There is a need to conduct periodic support supervision for HMIS activities, use innovative ways to motivate staff to perform HMIS related tasks, and use evidence from routine health data to make decisions.

## Abbreviations

CHMT
Council Health Management Team
DHIS
District Health Information System
HFR
Health Facility Register
HMIS
Health Management Information System

## Declarations

# Ethics approval and consent to participate

This study received ethical approval from the Medical Research Coordinating Committee of the National Institute for Medical Research Ref. No. NIMR/HQ/R.8a/Vol. IX/2230. No identifiable variables, such as names of individuals were collected for this work. Informed written consent to participate was received from all interviewees. All methods were carried out in accordance with relevant guidelines and regulations.

### Consent for publication

Not applicable

# Competing interests

The authors declare that they have no competing interests.

# Funding

This study received financial assistance from the Global Fund for AIDS, Malaria and Tuberculosis through the Tanzania Ministry of Health, Community Development, Gender, Elderly and Children.

# Authors' contributions

LEGM and SFR conceptualized, designed the research study, drafted and reviewed the manuscript; SFR, DM, and IRM performed the statistical analysis and results interpretation; DM, IRM, and EPL did data collection and took part in reviewing the manuscript. All authors read and approved the final version of the manuscript.

# Acknowledgements

We are grateful to all the management of the districts and health facilities who participated in the study. Special thanks to the District Health Management Information Systems (HMIS) Focal persons, District Reproductive, Child and Neonatal Health Coordinators, District AIDS Control Coordinators and the entire Council Health Management Teams of the study districts for their support throughout data collection exercise. We are grateful to our research assistants: John Ng'imba, Joyce Kaswamila, Simon Alfred, Jesca Kivinge, Leilath Mtui, Jesca Massawe, Gilbert Mwageni, Glory Lema, Nicholas Lubange, Estaban Mremi, Osyth Sylivester, Neema Lauwo and Isolide Massawe for enthusiasm and dedication. Prof. Gasto Frumence is thanked for his critical review of the earlier version of the manuscript.

## References

1. AbouZahr, C. & Boerma, T. Health information systems: the foundations of public health. Bull World Health Organ. 2015; 83 (8):578–83. doi: 10.1590/S0042-96862005000800010.
2. Kimaro HC, Nhampossa JL. The challenges of sustainability of health information systems in developing countries: comparative case studies of Mozambique and Tanzania. J Health Inform Dev Ctries. 2007; 1(1): 1–10.http://www.jhidc.org/index.php/jhidc/article/view/3.
3. Mahundi M, Kaasbøll J, Twaakyondo, H. Health Information Systems Integration in Tanzania: Tapping the contextual advantages. IST-Africa 2011 Conference Proceedings. IIMC International Information Management Corporation, 2011, ISBN: 978-1-905824-B24
4. Mboera LEG, Rumisha SF, Magesa SM, Kitua AY. Utilisation of Health Management Information System in disease surveillance in Tanzania. Tanzania Health Res Bull. 2001; 3 (2): 15–17.

https://doi.org/10.4314/thrb.v3i2.14213.

5. Rumisha SF, Mboera LEG, Senkoro SF, Gueye D, Mmbuji PL. Monitoring and evaluation of Integrated Disease Surveillance and Response in selected Districts in Tanzania. Tanzania Health Res Bull. 2007; 9: 1–11. doi: 10.4314/thrb.v9i1.14285.
6. Rumisha, S.F., Lyimo, E.P., Mremi, I.R., Tungu, P.K., Mwingira, V.S., Mbata, D. et al. Data quality of the routine health management information system at the primary healthcare facility and district levels in Tanzania. BMC Med Inform Decis. 2020; 20:340 https://doi.org/10.1186/s12911-020-01366-w.
7. Lungo JH. The reliability and usability of district health information software: case studies from Tanzania. Tanzania J Health Res. 2008; 10 (1): 39–45.doi: 10.4314/thrb.v10i1.14340.
8. Gimbel S, Micek M, Lambdin B, Lara J, Karagianis M, Cuembelo F. et al. An assessment of routine primary care health information system data quality in Sofala Province, Mozambique. Popul Health Metr. 2011; 9(1): 12. doi: 10.1186/1478-7954-9-12.
9. Kihuba E, Gathara D, Mwinga S, Mulaku M, Kosgei R, Mogoa W, et al. Assessing the ability of health information systems in hospitals to support evidence-informed decisions in Kenya. Global Health Act. 2014; 7: 24859. doi:http://dx.doi.org/10.3402/gha.v7.24859.
10. Mucee EM, Otieno O, Kaburi LW, Kinyamu RK. Routine Health Management Information Use in the Public Health Sector in Tharaka Nithi County, Kenya. Imp. *J.* Interdiscip. Res. 2016; 2(3): 660–672.
11. Muhindo R, Joloba EN, Nakanjako D. Health Management Information System (HMIS); Whose data is it anyway? Contextual challenges. Rev Public Adm Manag. 2016; 4:2. doi: 10.4172/2315-7844.1000190.
12. Mghamba JM, Mboera LEG, Krekamoo W, Senkoro KP, Rumisha SF, Shayo EH. et al. Challenges of implementing Integrated Disease Surveillance and Response strategy using the current Health Management Information System in Tanzania. Tanzania Health Res Bull. 2004; 6: 57–63. doi: 10.4314/thrb.v6i2.14243
13. Gladwin J, Dixon RA, Wilson TD. Rejection of an innovation: health information management training materials in East Africa. Health Policy Plan. 2002; 17 (4): 354–61. doi: 10.1093/heapol/17.4.354.
14. Mutemwa RI. HMIS and decision-making in Zambia: re-thinking information solutions for district health management in decentralized health systems. *Health Policy Plan*. 2006; 21 (1): 40–52. https://doi.org/10.1093/heapol/czj003.
15. Endriyas M, Alano A, Mekonnen E, Ayele S, Kelaye T, Shiferaw T. et al. Understanding performance data: health management information system data accuracy in Southern Nations Nationalities and People's Region, Ethiopia. BMC Health Serv Res. 2019; 19: 175. https://doi.org/10.1186/s12913-019-3991-7
16. World Bank. Measurement and Accountability for Results in Health submit. 2015. https://live.worldbank.org/measurement-and-accountability-for-results-in-health-summit.
17. Nsubuga P, Eseko N, Wuhib T, Ndayimirije N, Chungong S, McNabb S. Structure and performance of infectious disease surveillance and response, United Republic of Tanzania. Bull World Health Organ. 2002; 80: 196–203.

18. Mboera LEG, Rumisha SF, Mlacha T, Mayala BK, Bwana VM, Shayo EH. Malaria surveillance and use of evidence in planning and decision making in Kilosa District, Tanzania. Tanzania J Health Res. 2017; 19 (3): doi.org/10.4314/thrb.v19i3.7.
19. Franco L, Fields R, Mmbuji PKL, Posner S, Mboera LEG, Jimmerson A. et al. Situation Analysis of Infectious Disease Surveillance in two Districts in Tanzania, 2002. Working Paper. Bethesda, MD: The Partners for Health Reforms*plus* Project, Abt Associates Inc. 2003. http://www.phrplus.org/Pubs/WP004_fin.pdf.
20. Simba D, Mwangu MA. Quality of a routine data collection system for health: case of Kinondoni district in the Dar es Salaam region, Tanzania. S Afr J Inf Manag. 2005; 7:2. doi: 10.4102/sajim.v7i2.262
21. Mremi IR, Rumisha SF, Chiduo MG, Mangu CD, Mkwashapi DM, Kishamawe C. et al. Hospital mortality statistics in Tanzania: availability, accessibility and quality. Popul Health Metr. 2018; 16:16. https://doi.org/10.1186/s12963-018-0175-3.
22. Shiferawi AM, Zegeye DT, Assefa S, Yenit MK. Routine health information system utilization and factors associated thereof among health workers at government health institutions in East Gojjam Zone, Northwest Ethiopia. BMC Med Inform Decis. 2017; 17: 116.doi 10.1186/s12911-07-0509-2.
23. Heeks R. Health information systems failure, success and improvisation. Int Med Inform. 2006; 75(2): 125–137. doi: 10.1016/j.ijmedinf.2005.07.024.
24. Odhiambo-Otieno GW. Evaluation of existing district health management information systems: a case study of the district health systems in Kenya. Int J Med Inform. 2005; 74: 733–744. doi: 10.1016/j.ijmedinf.2005.05.007.
25. Singh A. Strengthening health systems to meet MDGs. Health Policy Plan. 2006; 21 (4): 326–328. https://doi.org/10.1093/heapol/czl008.
26. Nutley T, Reynolds HW. Improving the use of health data for health system strengthening. Global Health Act. 2013; 6: 20001. doi: 10.3402/gha.v6i0.20001.
27. Hung, Y.W., Hoxha, K., Irwin, B.R., Law, M.R. & Grépine, K.A. (2020) Using routine health information data for research in low- and middle-income countries: a systematic review. BMC Health Serv Res. 2020; 20: 790. https://doi.org/10.1186/s12913-020-05660-1.
28. Belay H, Azim T, Kassahun H. Assessment of Health Management Information System (HMIS) Performance in SNNPR, Ethiopia. MEASURE Evaluation. 2014. Available at: https://www.measureevaluation.org/resources/publications/sr-14-87.
29. Yarinbab TE, Kebede M. Utilization of HMIS data and its determinants at health facilities in East Wollega Zone, Oromia Regional State, Ethiopia: A health facility based cross-sectional study. J Medical Health Sci. 2018; 7(1): 4–9.
30. Wude H, Woldie M, Melese D, Lolaso T, Balcha B. Utilization of routine health information and associated factors among health workers in Hadiya Zone, Southern Ethiopia. PLoS ONE 2020; 15(5): e0233092. doi: 10.1371/journal.pone.0233092.

31. Ally RO. Determinants of Utilization of Routine Health Management Information System (HMIS) Data for Effective Decision Making at Selected Health Facilities in Zanzibar. 2019. http://hdl.handle.net/11192/3182.
32. Kiberu VM, Matovu JKB, Makumbi F, Kyozira C., Mukoyo, E. & Wanyenze, R.K. (2014) Strengthening district-based health reporting through the district health management information software system: the Ugandan experience. BMC Med Inform Decis. 2014; 14: 40. doi: 10.1186/1472-6947-14-40.
33. Ahanhanzo YG, Ouendo E-M, Kpozèhouen A, Levêque A, Makoutodé M, Dramaix-Wilmet M. (2015) Data quality assessment in the routine health information system: an application of the Lot Quality Assurance Sampling in Benin. Health Policy Plan. 2015; 30 (7): 837–843. doi: 10.1093/heapol/czu067.
34. Yazdi-Feyzabadi V, Emami M, Mehrolhassani MH. Health Information System in Primary Health Care: The challenges and barriers from local providers' perspective of an area in Iran. Int J Prev Med. 2015; 6: 57. doi: 10.4103/2008-7802.160056.
35. Kasambara A, Kumwenda S, Kalulu K, Lungu K, Beattie T, Masangwi S, et al. Assessment of implementation of the health management information system at the district level in southern Malawi. Malawi Med J. 2017; 29 (3):240–246. doi: 10.4314/mmj.v29i3.3.
36. Teklegiorgis K, Tadesse K, Mirutse G, Lerebo W. **Factors associated with low level of health information utilisation in resources limited setting, eastern Ethiopia**. Int J Intell Inform Syst. 2014; **3**(**6**): **69–75**.
37. Aqil A, Lippeveld T, Hozumi D. PRISM framework: a paradigm shift from designing, strengthening and evaluating routing health information systems. Health Policy Plan. 2009; 24 (3): 217–228. doi: 10.1093/heapol/czp010.
38. Silas NK. Factors influencing performance of Routine Health Information System: the case of Garissa Subcounty, Kenya. Thesis, Master of Arts in Project Planning and Management, University of Nairobi, Kenya, 2017.
39. Abajebel S, Jira C, Beyene W. Utilization of health information system at district level in Jimma Zone Oromia Regional State, South West Ethiopia. Ethiop J Health Sci. 2011; 21(Suppl 1): 65–76.
40. Mishra A, Vasisht I, Kauser A, Thiagarajan S, Mairembam DS. Determinants of Health Management Information Systems performance: Lessons from a district level assessment. BMC Proc. 2012; 6 (Suppl 5): O17. https://doi.org/10.1186/1753-6561-6-S5-O1.
41. Hotchkiss DR, Aqil A, Lippeveld T, Mukooyo E. Evaluation of the performance of Routine Information System Management (PRISM) framework: evidence from Uganda. BMC Health Serv Res. 2010; 10(1): 188. doi: 10.1186/1472-6963-10-188.
42. Komibamo T, Berhane Y, Astatkie A. HMIS performance and factors associated with its implementation. Publisher: LAP Lambert Academic Publishing. 2014. ISBN: 9783659478482.
43. Nisingizwe MP, Iyer HS, Gashayija M, Hirschhorn LR, Amoroso C, Wilson R, et al. Toward utilization of data for program management and evaluation: quality assessment of five years of health

management information system data in Rwanda. Glob Health Act. 2014; 7. doi:10.3402/gha.v7.25829.

44. Yusof MM, Kuljis J, Papazafeiropoulou A, Stergioulas LK. An evaluation framework for Health Information Systems: Human, organization and technology-fit factors (HOT-fit). Int J Med Inform. 2008; 77 (6):386–98. doi: 10.1016/j.ijmedinf.2007.08.011.

# Tables

**Table 1: Socio-demographic characteristics of health facility respondents**

| Variable | Response | Frequency | Percentage |
|---|---|---|---|
| Sex | Male | 45 | 48.3 |
| | Female | 48 | 51.6 |
| Education qualification | Certificate | 19 | 20.4 |
| | Diploma | 61 | 65.6 |
| | Bachelor/Master degree | 13 | 14.0 |
| Experience (in years) | <5 | 31 | 33.3 |
| | 5-10 | 13 | 13.9 |
| | >10 | 49 | 52.6 |
| Position | Nurse | 15 | 16.1 |
| | Midwife | 11 | 11.8 |
| | Clinical officer | 40 | 43.0 |
| | Laboratory personnel | 2 | 1.2 |
| | Medical Attendant | 4 | 4.3 |
| | Medical Officer | 10 | 9.8 |
| Total | | 93 | |

**Table 2: Status of district staff who received training of on new HMIS tools**

| District | No. of staff involved HMIS activities | No. staff trained |
|---|---|---|
| Kibaha | 7 | 1 |
| Kinondoni | 4 | 70 |
| Tandahimba | 2 | 1 |
| Mbulu | 3 | 1 |
| Mbinga | 5 | 2 |
| Nkasi | 9 | 0 |
| Njombe | 4 | 30 |
| Kahama | 3 | 40 |
| Dodoma | 7 | 19 |
| Igunga | 5 | 27 |
| Hai | 8 | 37 |
| Average | 5.2 | 20.7 |

Table 3: Health workers' responses on the availability of tools needed during district supportive supervision

| Item | Response | No. of respondents | Percentage |
|---|---|---|---|
| CHMT supervisory checklist | Yes | 50 | 47.6 |
| | No | 55 | 52.4 |
| | Total | 105 | |
| Schedule for CHMT visits | Yes | 10 | 9.6 |
| | No | 94 | 90.4 |
| | Total | 104 | |
| CHMT supervisory report | Yes | 45 | 44.9 |
| | No | 57 | 55.9 |
| | Total | 102 | |