Organizational Factors Influencing the Utilization of Health Information among Health Workers in Juba County, South Sudan

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Abstract

Organizational factors shape whether routine health information is used to guide decisions. In South Sudan, health decisions in primary health care facilities are sometimes made without health information, even as the Ministry of Health strengthens the web-based national health information system (DHIS2).To examine organizational factors influencing the utilization of routine health information among health workers in Juba County. A cross-sectional survey was conducted among 220 health workers, sampled from a target population of 423 in 12 purposively selected public health facilities, using structured self-administered questionnaires. Data were analyzed using descriptive statistics, chi-square and Fisher's exact tests, and adjusted odds ratios (AORs) at a 5% significance level. All 220 questionnaires were returned (100% response rate), and 106 respondents (48.2%) reported always using routine health information. Access to a computer and to the internet was significantly associated with the frequency of use. Health workers trained in data utilization (56.9% versus 38.5%; $p = 0.013$) and in HMIS software (59.4% versus 39.5%; $p = 0.028$) were more likely to report always using data, whereas general HMIS training ($p = 0.059$) and training in data collection, data analysis, and data management were not significantly associated. In adjusted analyses, all 95% confidence intervals for the training variables included 1 (for example, data utilization: AOR = 2.88, 95% CI 0.55–15.17). Support for data management was rated low or very low by 40.5% of respondents. Training focused on data utilization and HMIS software, together with functional computers, internet access, and stronger support for data management, is likely to improve the use of routine health information in Juba County. The adjusted estimates were imprecise and should be confirmed in larger studies.

Keywords: *health information utilization, health management information system (HMIS), DHIS2, organizational factors, health workers, South Sudan*

1.0 Introduction

Effective use of health information is central to evidence-based planning, resource allocation, and service delivery. Organizational factors determine the effectiveness and efficiency of health service planning, the management of critical service delivery, decision-making, and health system development. Organizational culture, which reflects the norms, values, and basic assumptions of a given organization, has been recognized as an important influence on how health information is used.

South Sudan established its Health Management Information System (HMIS) in 2011, at a time when the country's health concerns called for an internationally recognized framework and standardized HMIS guidelines. The Ministry of Health is now implementing projects to build and enhance the nation's web-based national health information system, DHIS2, which collects data from across the health system. Even so, Morris et al. (2024) described South Sudan's data management framework as only partially functional, with delayed data collection and inaccurate data. A district-level assessment in Tanzania similarly emphasized that proper interpretation and communication of accurate data analysis enables decision-makers to access relevant information for effective disease prevention and control planning (Rumisha et al., 2020).

Health systems function well only when their organizational arrangements improve service coverage and advance the right to the highest attainable standard of health. The critical test of any HMIS is not whether data are collected, but whether they are used.

Despite the availability of DHIS2, a web-based platform designed to collect, validate, analyze, and present aggregate health data, the use of these data for local decision-making remains minimal. Evidence on the factors that influence HMIS use in public health facilities in Juba County is scarce; to the authors' knowledge, these factors have not been systematically evaluated. This study therefore examined the organizational factors influencing health information use among health workers in public health facilities in Juba County, South Sudan.

Literature Review

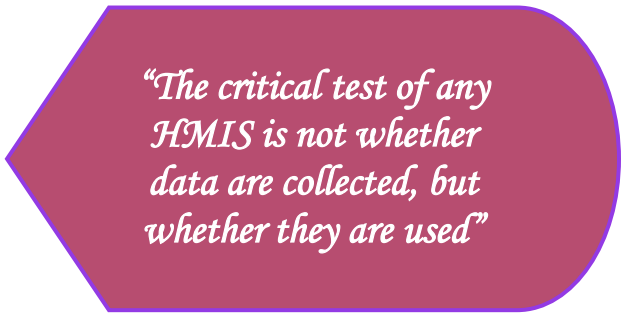
Organizational Factors and the Utilization of Health Information

Organizational factors interact to influence a Health Management Information System (HMIS) and its data analysis, which produces summary statistics that support integrated health information management. The assessment of disease burden depends on the HMIS together with morbidity and mortality tracking, which enables timely decision support through the identification of anomalies.

Reported levels of routine health information use are generally modest across African settings. In East Gojjam Zone, Ethiopia, 45.8% of 668 health workers had a good level of routine health information utilization, and HMIS training, data analysis skills, supervision, regular feedback, and a favorable attitude were significantly associated with better use (Shiferaw et al., 2017). In the same zone, only 38.4% of 250 health center and department heads routinely used facility health information for two or more purposes beyond reporting; residence, computer access and skills, data management knowledge, workload, supportive supervision, HMIS training, and the availability of HMIS guidelines and formats were the determinants (Asemahagn, 2017). In Hadiya Zone, southern Ethiopia, 62.7% of 480 health workers reported a good level of utilization (Wude et al., 2020). In Ghana, only 26% of community-level facilities used DHIMS2 data to inform annual action plans (Odei-Lartey et al., 2020), and a study of district health management information systems in Kenya reported that use of information at the point of

collection stood at 22% (Odhiambo-Otieno, 2005).

Evidence from South Sudan and neighboring settings points in the same direction. In Maridi County, South Sudan, a study of 12 health facilities found that regular feedback from the County Health Department and the training of personnel in HMIS were associated with the completeness of data (Morris et al., 2024). Studies elsewhere in the region have likewise examined the factors associated with the quality of routine health data in Somalia (Osman et al., 2026) and the data management practices of health extension workers in Ethiopia (Melaku & Yohannes, 2024). Across these settings, workload, HMIS knowledge, staff motivation, competency, an information-use culture, data analysis skills, standardized indicators, and computer access have been identified as factors that influence the use of health information, and they are plausibly relevant in Juba County as well.



HMIS Policy Governing Design, Implementation, and Operations, and Its Utilization

The implementation of health information systems creates job-related challenges and psychological pressures for professionals in the field (Chaulagai et al., 2005). Health information systems can also enhance operational efficiency through process automation, generating the performance reports that support management, quality assessment, and planning (Hemmat et al., 2021). Their integration can further improve patient outcomes, contribute to medical research, and influence policy and strategic decisions (Tilahun et al., 2021).

Standardization Tools and Their Effect on Health Information Use

Standardization is a key instrument for tackling emerging health challenges because it provides guidance and training improvements that promote workflow efficiency, as illustrated by ventilator bundles for pneumonia prevention (Klompas et al., 2016). Resolving health system problems demands standardized procedures for data collection and production at all levels of care. Standardized data systems allow extensive statistical analyses at all levels, from individual facilities to state governments, which enhances service delivery. Standardization remains essential for health information integration, but local health institutions need the flexibility to tailor standards to their own requirements (Hanseth & Bygstad, 2015). The use of health care data is limited by weak data management systems, weak leadership involvement, inadequate infrastructure, a lack of supervisory support, and high staff turnover (Mucee et al., 2016).

Sæbø et al. (2011) compared strategies for integrating fragmented health information subsystems in South Africa, Zanzibar, Sierra Leone, and Botswana. Zanzibar, Sierra Leone, and Botswana each pursued incremental data warehouse approaches to standardizing health data, and the cases showed that integration depends as much on aligning organizational and political actors as on technical solutions. In South Sudan, the completeness of HMIS reporting improved from 50% in 2011 to 70% in 2013 but declined to 50% in 2016. The decline was attributed to the creation of new states and counties, ongoing conflict, and problems with human resources for health and operations (Ministry of Health South Sudan, 2016).

Information Technology and Its Impact on Health Information Utilization

Information technology (IT) contributes institutional, technological, individual, and logistical capabilities that affect the successful adoption and use of data from Health Management Information Systems (AbouZahr & Boerma, 2005). Effective use of an HMIS depends on turning raw data into actionable knowledge and useful information (Lungo, 2008). In Tanzania, for example, district health workers rated the reliability of DHIS software highly but its usability low (Lungo, 2008). The World Health Organization (WHO, 2015) noted that the African Region, home to about 12% of the world's population, carries a disproportionately large share of the global disease burden. The slow implementation of health information technology (HIT) compounds existing health care challenges because it fails to improve patient treatment and service quality.

Data Collection Strategy and Its Effect on Health Information Use

The efficiency of health management information systems must improve so that they deliver data that meet standards of timeliness, accuracy, and relevance for health care decisions and interventions. An HMIS serves its main purpose by generating valuable information that supports strategic planning and decision-making. Asiimwe (2016), studying private health facilities in Kampala, Uganda, identified insufficient supervision and weak knowledge-sharing cultures as major organizational deficiencies. Health interventions at the population level also face challenges in disease surveillance and monitoring because standard assessment measures do not exist.

2.0 Materials and Methods

Study Design and Setting

This study used a quantitative, descriptive, cross-sectional design to examine organizational factors influencing health information utilization. The design allowed data to be collected at a single point in time and supported statistical analysis of the relationships between variables. The study was conducted in 12 purposively selected public health facilities in Juba County, South Sudan, representing all levels of the health system (Table 1).

Study Population and Sampling

The target population comprised 423 health workers who use health information within the HMIS framework. A 10% non-response adjustment was applied to obtain a final sample of 220 participants. Multistage sampling, combining purposive selection of facilities with proportional stratified sampling of health workers, was used to ensure representativeness (Table 1).

Table 1

Health workers and sample size by health facility

Health facility	Total workers	Proportion (%)	Sample size
African Inland Church PHCC	20	4.73	10
El-Sabah Children's Hospital	43	10.17	23
Juba Teaching Hospital	150	35.46	79
Kator PHCC	21	4.96	11
Lologo PHCC	25	5.91	13
Mangalla PHCC	20	4.73	10

Health facility	Total workers	Proportion (%)	Sample size
Juba Military Hospital	43	10.17	23
Ghabat PHCC	21	4.96	11
Munuki PHCC	19	4.49	9
Nyakuron PHCC	20	4.73	10
Gurei PHCC	20	4.73	10
Gumbo PHCC	21	4.96	11
Total	423	100.00	220

Note. PHCC = primary health care center.

Data Collection

Data were collected using structured, self-administered questionnaires with closed-ended Likert-scale items. Health information utilization was measured as the self-reported frequency of using routine data (never, rarely, sometimes, or always).

Data Analysis

Data were coded, entered, cleaned, and analyzed using Epi Info version 7.2.6.0. Descriptive statistics (means, standard deviations, frequencies, and percentages) were computed, and associations were tested using chi-square and Fisher's exact tests. Adjusted odds ratios (AORs) with 95% confidence intervals are reported in Table 4. A significance level of $\alpha = 0.05$ was applied.

Ethical Considerations

Ethical approval was obtained from Kenya Methodist University (KeMU) and the National Commission for Science, Technology and Innovation (NACOSTI), Kenya, and permission was obtained from the Ministry of Health of the Republic of South Sudan (MoHRSS). Informed consent was obtained from all participants, and confidentiality and voluntary participation were assured.

3.0 Results and Discussion

Response Rate and Overall Use of Health Information

All 220 questionnaires distributed to sampled health workers across the 12 health facilities in Juba County were completed and returned, a response rate of 100%. Because a low response rate risks introducing bias into study findings (Brick & Williams, 2013), this response rate reduces the likelihood of nonresponse bias. Overall, 106 of 220 respondents (48.2%) reported always using routine health information, 72 (32.7%) sometimes, 35 (15.9%) rarely, and 7 (3.2%) never (Table 4).

Organizational Barriers to the Use of Routine Health Data

Respondents identified several organizational barriers that hindered the effective use of routine health data. The most frequently reported were excessive time spent preparing reports (48.6%), inadequate technical capacity due to limited training opportunities (47.7%), the frequent introduction of additional performance indicators without removing outdated ones (44.5%), poor understanding of the importance of data use (43.2%), and a heavy focus on output-based indicators (37.3%).

Access to Functional Equipment and Use of Health Information

Table 2 presents respondents' access to functional equipment at the workplace in relation to the frequency of using health information. Access to a computer, data backup units, a calculator, and the internet was significantly associated with the frequency of use, whereas access to a printer was not (p = 0.423). These findings are consistent with Asemahagn (2017), who identified computer access and skills among the determinants of information use in Ethiopia, and with Asiimwe (2016), who reported that inadequate access to computers reduced health workers' ability to obtain and effectively use information for decision-making.

Table 2

Access to functional equipment at the workplace and frequency of using health information, n (%)

Equipment	Access	Never	Rarely	Sometimes	Always	Test and *p*-value
Computer	Yes	2	22 (10.0)	45 (20.5)	74 (8.6)	χ^2 = 10.444, df = 2, p < 0.001
	No	3	20 (9.5)	98 (43.2)	69 (8.2)	
Printer	Yes	2	4 (24.1)	10 (26.4)	12 (18.4)	Fisher's exact, p = 0.423
	No		29 (13.2)	39 (17.7)	0 (0.0)	
Calculator	Yes	2	3 (6.8)	6 (46.4)	4 (12.3)	Fisher's exact, p = 0.028
	No		39 (17.7)	13 (5.9)	24 (10.9)	
Data backup units (flash disk, disc, CD, etc.)	Yes	1	5 (5.0)	10 (35.0)	12 (13.2)	χ^2 = 10.119, df = 2, p = 0.037
	No		23 (10.5)	48 (21.8)	32 (14.5)	
Access to internet	Yes		43 (19.5)	65 (29.5)	30 (13.6)	χ^2 = 10.234, df = 2, p = 0.012

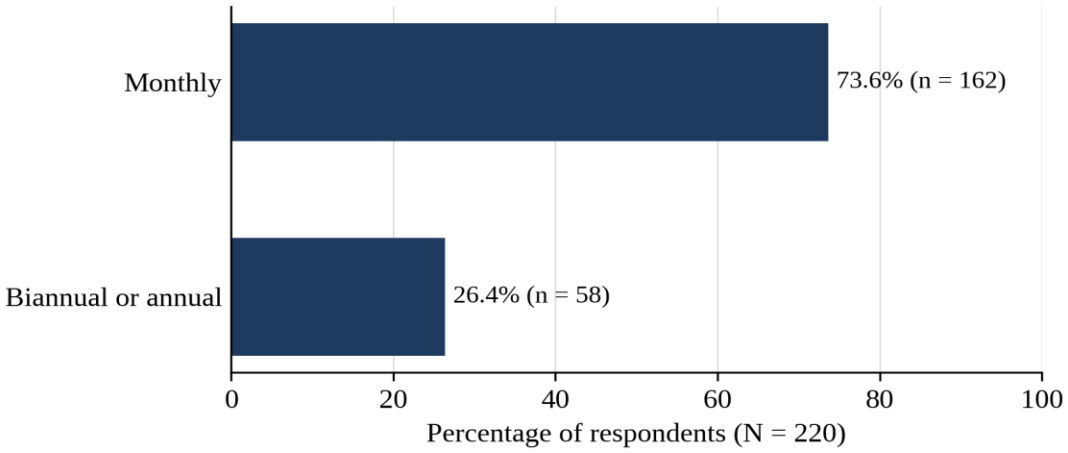
Note. Values are as reported by the authors. Source: Field survey data (2025).

Managerial and Administrative Meetings and Use of Health Information

A majority of respondents (162; 73.6%) indicated that their facilities held monthly meetings to review managerial and administrative issues, whereas the remaining 58 (26.4%) reported meetings only twice a year or annually (Figure 1). These meetings provided opportunities to discuss operational matters and to evaluate service delivery performance within the health facilities.

Figure 1.

Frequency of managerial and administrative meetings (N = 220)



Source: Field survey data (2025).

Topics Discussed During Meetings

Several important subjects were frequently addressed during facility meetings (Table 3). The management of routine data, such as quality, reporting, and timeliness, was discussed most often (188 respondents; 85.5%), followed by supportive supervision (170; 77.3%), service coverage (169; 76.8%), findings of routine data such as disease statistics (155; 70.5%), standardization of tools (144; 65.5%), shortages of medicines and medical supplies (139; 63.2%), and patient utilization trends (135; 61.4%). Digital health was discussed least often (93; 42.3%).

Table 3

Topics discussed during facility meetings (N = 220)

Topic	Discussed, *n* (%)	Not discussed, *n* (%)
Management of routine data (quality, reporting, timeliness)	188 (85.5)	32 (14.5)
Supportive supervision	170 (77.3)	50 (22.7)
Service coverage	169 (76.8)	51 (23.2)
Findings of routine data (e.g., disease data)	155 (70.5)	65 (29.5)
Standardization of tools	144 (65.5)	76 (34.5)
Medicine stock-outs	139 (63.2)	81 (36.8)
Patient utilization	135 (61.4)	85 (38.6)
Digital health	93 (42.3)	127 (57.7)

Source: Field survey data (2025).

Continuing Professional Training and Use of Health Information

Table 4 shows the frequency of using routine health information by the type of training received. Respondents trained in data utilization were more likely to report always using data than untrained respondents (66 of 116 [56.9%] versus 40 of 104 [38.5%]; $p = 0.013$), as were those trained in HMIS software (57 of 96 [59.4%] versus 49 of 124 [39.5%]; $p = 0.028$). The difference for general HMIS training was smaller and not statistically significant (61 of 111 [55.0%] versus 45 of 109 [41.3%]; $\chi^2 = 7.369$, df = 3; Fisher's exact $p = 0.059$). Training in data collection ($p = 0.572$), data analysis ($p = 0.806$), and data management ($p = 0.206$) showed no significant association with the frequency of using data. In the adjusted analysis, the confidence intervals for all training variables included 1, so the adjusted associations are imprecise and should be interpreted with caution.

These findings are partly consistent with studies in Ethiopia, where HMIS training was an independent determinant of routine health information use (Shiferaw et al., 2017; Wude et al., 2020). In the present study, the association with general HMIS training was borderline, whereas training focused on data utilization and on HMIS software showed the clearest differences. This pattern suggests that the focus of training may matter as much as whether training is provided: training that teaches health workers how to interpret and apply data, and how to operate the HMIS software, appears more closely linked to use than training in data collection, analysis, or management alone.

Table 4

Continuing professional training and frequency of using routine health information, n (row %)

Training in	Trained	Never	Rarely	Sometimes	Always	*p*	AOR (95% CI)
All respondents		7 (3.2)	35 (15.9)	72 (32.7)	106 (48.2)		
HMIS	Yes	3 (2.7)	11 (9.9)	36 (32.4)	61 (55.0)	0.059	1.37 (0.30–6.28)
	No	4 (3.7)	24 (22.0)	36 (33.0)	45 (41.3)		
Data collection	Yes	4 (2.7)	21 (14.0)	51 (34.0)	74 (49.3)	0.572	1.64 (0.36–7.51)
	No	3 (4.3)	14 (20.0)	21 (30.0)	32 (45.7)		
Data analysis	Yes	4 (2.9)	20 (14.3)	47 (33.6)	69 (49.3)	0.806	1.33 (0.29–6.07)
	No	3 (3.8)	15 (18.8)	25 (31.3)	37 (46.3)		
Data utilization	Yes	2 (1.7)	12 (10.3)	36 (31.0)	66 (56.9)	0.013*	2.88 (0.55–15.17)
	No	5 (4.8)	23 (22.1)	36 (34.6)	40 (38.5)		
Data management	Yes	3 (2.6)	14 (12.0)	37 (31.6)	63 (53.8)	0.206	1.54 (0.34–7.03)
	No	4 (3.9)	21 (20.4)	35 (34.0)	43 (41.7)		
HMIS software	Yes	3 (3.1)	11 (11.5)	25 (26.0)	57 (59.4)	0.028*	Not reported
	No	4 (3.2)	24 (19.4)	47 (37.9)	49 (39.5)		

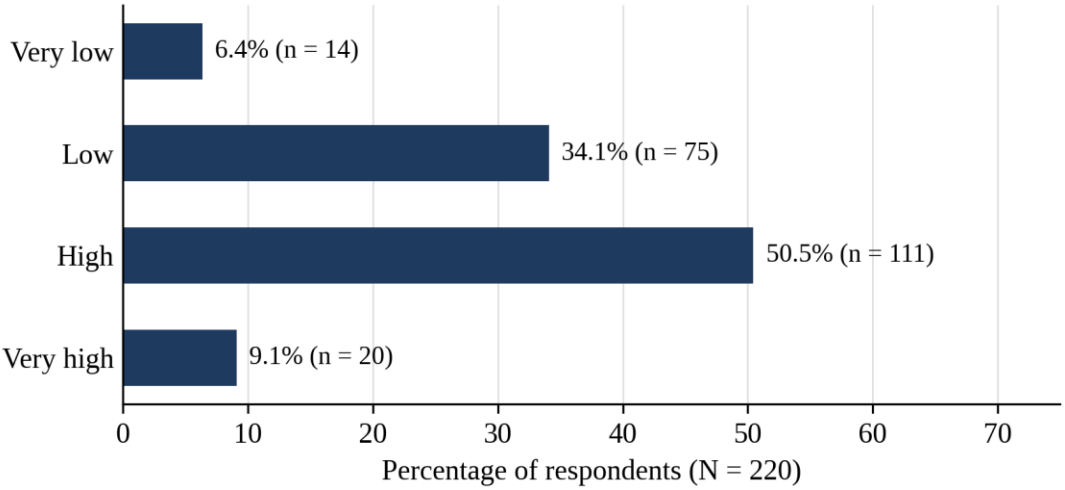
*Note. AOR = adjusted odds ratio; CI = confidence interval. Percentages are row percentages. p values are from chi-square or Fisher's exact tests. *p < 0.05. Source: Field survey data (2025).*

Level of Support for Health Information and Data Management

Figure 2 shows the level of support provided for health information and data management in the facilities. Support was rated high by 111 respondents (50.5%) and very high by 20 (9.1%), whereas 75 respondents (34.1%) rated it low and 14 (6.4%) very low; in total, 89 respondents (40.5%) rated support as low or very low. Some respondents explained that the absence of departmental meetings limited opportunities to discuss and review management-related concerns. Asemahagn (2017) similarly found supportive supervision to be a determinant of health information use among health centers in Ethiopia. Effective feedback systems also play a critical role in ensuring that information is properly interpreted, organized, documented, and incorporated into service improvement initiatives aimed at enhancing the quality of care (Sharma et al., 2016)

Figure 2

Level of support for health information and data management (N = 220)



Source: Field survey data (2025).

Basis for Decision-Making in Health Facilities

Table 5 shows the factors that respondents considered when making decisions in their facilities. Most respondents agreed or strongly agreed that decisions were based on comparing data with strategic health objectives (158; 71.8%), health needs (155; 70.5%), costs (148; 67.3%), and evidence or facts (144; 65.5%). Fewer respondents agreed that decisions were driven by funding availability (135; 61.4%), patient-centered communication (132; 60.0%), the preferences of international NGOs or donors (105; 47.7%), superiors' directives (85; 38.6%), or political interference (80; 36.4%). These results suggest that facility-level decisions are anchored largely in data and health needs, although cost, funding, and donor considerations also play a considerable role, and more than one-third of respondents agreed that superiors' directives and political interference influenced decisions.

Table 5

Basis for decision-making in health facilities, n (%)

Basis for decision	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Agree or strongly agree (%)
Comparing data with strategic health objectives	60 (27.3)	98 (44.5)	36 (16.4)	18 (8.2)	8 (3.6)	71.8
Health needs	49 (22.3)	106 (48.2)	35 (15.9)	21 (9.5)	9 (4.1)	70.5
Considering costs	32 (14.5)	116 (52.7)	34 (15.5)	20 (9.1)	18 (8.2)	67.3
Evidence or facts	35 (15.9)	109 (49.5)	32 (14.5)	25 (11.4)	9 (4.1)	65.5
Funding availability	38 (17.3)	97 (44.1)	38 (17.3)	20 (9.1)	27 (12.3)	61.4
Patient-centered communication	44 (20.0)	88 (40.0)	36 (16.4)	27 (12.3)	25 (11.4)	60.0
International NGOs or donors	42 (19.1)	63 (28.6)	58 (26.4)	44 (20.0)	13 (5.9)	47.7
Superiors' directives	32 (14.5)	53 (24.1)	63 (28.6)	49 (22.3)	23 (10.5)	38.6
Political interference	29 (13.2)	51 (23.2)	69 (31.4)	48 (21.8)	23 (10.5)	36.4

Note. Percentages are based on N = 220. The counts for "Evidence or facts" sum to 210. Source: Field survey data (2025).

Limitations

This study has several limitations. Its cross-sectional design precludes causal inference about the relationships observed. Data were self-reported and may be subject to social desirability bias. Facilities were purposively selected within a single county, which limits the generalizability of the findings to other settings in South Sudan. Finally, several subgroup comparisons involved small cell counts, and the adjusted odds ratios had wide confidence intervals, indicating imprecise estimates.

4.0 Conclusion

This study examined the organizational factors influencing the use of routine health information among health workers in Juba County, South Sudan. Fewer than half of the respondents (48.2%) reported always using routine health information. Training in data utilization and in HMIS software was significantly associated with more frequent use of routine data, whereas training in data collection, data analysis, and data management was not. The focus of training therefore appears to matter: to improve the use of health information, training should be directed at data utilization and its application in real-world decision-making, not at data handling alone. Access to computers and the internet was also associated with use, underscoring the need for basic information and communication technology infrastructure. The adjusted estimates were imprecise, however, and should be confirmed in larger studies.

Respondents also reported a heavy reporting burden, including the continual addition of performance indicators and long reporting times, and 40.5% rated support for data management as low or very low. These are systemic challenges that call for organizational as well as individual responses. Data quality and information use are closely linked, because users are more likely to use information they perceive as accurate, timely, and credible, while the quality of data depends on the care and skill with which they are collected and managed (Asemahagn, 2017). Strengthening organizational support for data use is therefore likely to require addressing the human, technical, and structural factors together.

5.0 Recommendations

Based on the study findings, the following recommendations are proposed:

1. The Ministry of Health and county health managers should redesign HMIS training programs to place greater emphasis on data utilization skills, specifically how to interpret data, identify performance gaps, and use findings to guide planning and resource allocation. Training in HMIS software operation should also be prioritized as a distinct and regularly updated component of capacity development.
2. Structured supervisory feedback mechanisms should be established and maintained across all 12 health facilities, together with monthly data review sessions at which health workers examine their facility's data and develop action plans to address identified gaps. Capacity development interventions to improve information utilization have been tested in a cluster randomized trial in Gofa Zone, southern Ethiopia (Doka et al., 2025), and similar approaches merit evaluation in Juba County.
3. The Juba County Health Department should invest in the physical infrastructure required to support HMIS use, including adequate computers, a stable power supply, and reliable internet connectivity at all facility types.
4. The Ministry of Health should lead a coordinated integration strategy to address the fragmented reporting system, in which non-governmental organizations maintain parallel reporting structures outside the national HMIS, and should review the performance indicator set so that new indicators are not added without retiring outdated ones. Together, these measures would reduce duplication and the reporting burden on health workers.

Areas For Further Research

Future research should examine the long-term impact of targeted HMIS training interventions on the use of health information in Juba County and similar low-resource settings. A longitudinal study that tracks changes in the use of information technology and in information utilization before and after structured training and feedback programs would provide stronger causal evidence than the cross-sectional design used in this study. In addition, research comparing organizational factors across service tiers, for example between national referral hospitals and primary health care centers, would help to identify facility-level factors that can be targeted with differentiated support strategies.

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