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FACTORS AFFECTING DATA QUALITY IN PRIVATE FACILITIES IN KALUNGU DISTRICT.THE CASE OF ST. JOSEPH OF GOOD SHEPHERD KYAMULIBWA H/C IV. A CROSS-SECTIONAL STUDY.

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ABSTRACT.

Background:
To find out how external and internal factors affect data quality in Private facilities in Kalungu district.

Methodology:
The study used a cross-sectional research design on a population that involved the staff of St Joseph of Good Shepherd Kyamulibwa H/ C IV. A total of 32 respondents were selected for the study. Both random and non-random sampling techniques were used in selecting the samples. The study was guided by a quantitative model. Data from the questionnaires was analyzed quantitatively using Statistical Package for Social Scientists (SPSS) Data from questionnaires was presented in the form of frequency tables and bar graphs.

Results:
Females were 18(56%) and 14 (44%) were males whose age was between 18 and above years. In regards to internal factors that affect data quality (69%) strongly agreed that the Compilation of inaccurate data by departments automatically distorts data quality in the long run, while 4(12%) disagreed that most departments don't have consistent data models that would ensure the integrity and quality of the data. 1(3%) strongly disagreed that the Completeness of information entered into the facility record is not dependable. In regards to the external factors, 13(41%) strongly agreed that monitoring and keeping track of data over time and reporting variations in the data affects the quality of data. While 1(3%) strongly disagreed that data compiled by departments is not relevant to what user's health needs requirements.

Conclusion:
The study findings confirmed that internal and external factors negatively affect data quality in private facilities.

Recommendation:
Private facilities should invest in formal training for all staff in data management, M&E topics included in the facilities' Continuous Medical Education (CME) sessions to translate into the culture of data demand and information use (DDIU), Mentorships, and forming Quality improvement projects (QI) to promote sustainability in private facilities.

Keywords: *Data quality, Private facilities, Kyamulibwa Health Center IV, Kalungu district*
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BACKGROUND OF THE STUDY.

Globally, reliable and accurate public health information is essential for monitoring health and for evaluating and improving the delivery of healthcare services and programs. As countries report their progress towards achieving the United Nations Millennium Development Goals, the need for high-quality data has been neglected. Furthermore, funding and support for public health activities, such as immunization programs, remain contingent on demonstrating coverage using routine statistics. However, assuring the quality of health information systems remains a challenge.

In Africa, studies of public health information systems frequently document problems with data quality, such as incomplete records and untimely reporting. Yet these systems are often the only data sources available for the continuous, routine monitoring of health programs. Efforts have been made to improve the quality and management of public health information systems in developing countries. According to Baryamureeba.M (2015), Two examples are the Health Metrics Network, an international network that seeks to improve the quality of health information from various sources, and the Performance of Routine Information System Management (PRISM) framework, which was developed as a method for assessing the strengths and weaknesses of routine

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health information systems (Baryamureeba .M 2015). Other initiatives, such as the Data Quality Audit, have been used by the GAVI Alliance to improve the monitoring of immunization coverage.

However, the complex nature of health information systems and the demands placed upon them have complicated efforts to improve the quality of routine data Mphatswe, W (2012).
Studies done in Kenya on the Prevention of Mother to Child Transmission (PMTCT) program me
showed that one unexpected complication that arose during the study could have reduced the effect of the data improvement intervention Baryamureeba.M (2015). The PMTCT program in Kenya is relatively dynamic and the names and definitions of the data elements used for monitoring are frequently changed (Mphatswe.W et al., 2012). Several challenging changes occurred during the study. For example, the data element used in the District Health Information System (DHIS) to record whether a baby had undergone a polymerase chain reaction test for HIV at 6 weeks as stated by Mphatswe.Wet al.,(2012) was initially titled, "HIV 1st test of baby born to HIV- positive woman" but was later changed to "HIV PCR test of baby born to HIV-positive woman at 6 weeks or later" Mphatswe. W et al., (2012). According to Mphatswe. W, et al.,2012, Such changes were made without the district offices providing definitions to the clinics. This could have caused considerable confusion at individual facilities and compromised the quality of reporting on that particular data element as stated by Mphatswe.W et al.,2012.

Furthermore, Mphatswe, W et al.,2012 states that despite these limitations, the improvement in PMTCT data quality observed in this study is encouraging, for it suggests that similar approaches could improve the quality of the data needed for decision-making and resource allocation in other public health programs Mphatswe.W et al.,2012. The rationalization of data collection tools, clear definitions of data elements, continuous feedback on data quality, and intermittent but regular data audits are effective ways of improving data quality (Barymureeba.M (2015). However, while this study shows that public health information can be improved, the final result falls short of what we should accept from our health information systems.

In hospitals in Uganda, health care data collected provide government authorities like the Ministry of Health with the information required to not only review the services of all hospitals under their control but also to plan for the future. In addition, the use of a disease classification system at the primary healthcare level enables the government to collect data on the health status of the community and provide detailed national health statistics. According to Baryamureeba .M, 2015, In some countries, the Ministry of Health determines whether hospitals are required to supply information only on the main conditions or on all diagnoses treated and procedures performed.

Baryamureeba .M, 2015 says that for most private facilities in Uganda, many clinicians assume that the data contained and portrayed in their health systems is absolute and error-free, or that the errors are not important. However, error and uncertainty are inherent in all data, and all errors affect the final uses that the data may be put to. Most facilities rush to submit forged data sets upon request and this normally contains acute problems traceable right from conversion entry. In addition to forging data sets, most of the facilities avail raw data in the form of health reports which are sometimes written in ink and these data sets are very hard to integrate in case they are needed to provide some meaningful information on health issues in health facilities. Hence, in addition to threatening patient safety, poor data quality increases healthcare costs and prevents health information exchange, research, and performance measurement initiatives.
Worse still, some of the facilities tend to wait for the periods when this information is needed and normally, a compilation of data sets begins one or two months before the dates when they know that officials from the district will come in to collect this data. This implies that such data sets have loopholes given that they have not fully represented the period in which they are supposed to be compiled. This therefore leaves a lot to be desired, given the fact that the data sets are urgently needed to address public health concerns in certain regions Baryamureeba .M 2015.

Purpose of the study.

The purpose of the study was to establish the factors affecting data quality in private facilities in Kalungu district with special emphasis on St. Joseph of Good Shepherd Kyamulibwa H/C IV.

Objectives.

- To examine the effect of internal factors on Data Quality at St. Joseph of Good Shepherd Kyamulibwa H/C IV.
- To find out how external factors affect Data Quality at St. Joseph of Good Shepherd Kyamulibwa H/C IV.

Hypothesis.

Internal factors affect Data Quality in the private facilities. There is a relationship between external factors and Data Quality in the private facilities.

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METHODOLOGY.

Study design.

A descriptive cross-sectional study design was used to conduct this study using quantitative collection methods. This was because it helped the researcher to describe data without changing the meaning in comparison to other studies and data was collected at a particular point in time. The quantitative method was used because the data was in numerical form.

Study setting.

The study was conducted at St Joseph of the Good Shepherd Kyamulibwa H/C IV which is located about 115km from Kampala's capital city. It is located 35km from Masaka town and 20km from Villa Maria. St Joseph of the Good Shepherd Kyamulibwa H/C IV services the districts of Kalungu, Gomba, and Bukomansimbi-Uganda The health facility offers a variety of services including; Dental, maternal & child health, immunization, laboratory, Outpatient department (OPD), and Inpatient services. These various departments generate data for the facility. The common language spoken in this area is Luganda with the main economic activity being farming. The study setting was selected because the researcher noted inaccurate, incomplete, and late submission of reports from this facility. The study focused on a time frame from 2019 to 2021. This was a guidance period that gave a clear picture of how different factors had affected data quality.

Study Population.

The study population included the staff of St Joseph of Good Shepard Kyamulibwa H/C IV this is because the staff were directly involved in data generation at various points.

Sample size calculation.

We used the Kish and Leslie formula for cross-sectional studies as follows.n=N/1+N(e)2,
Where;
n= sample size
N= population size (Number of staff at St Joseph of Good Shepard Kyamulibwa HCIV)E= level of precision (95%)
Thus; n=N/1+N(e)2 = 35/1+35(0.05)2 =32.183
Therefore, our sample was 32 staff at St Joseph of Good Shepard Kyamulibwa HCIV)

Sampling procedures.

Sampling methods refer to how samples are obtained. A convenient sampling technique was used in this study. This would help the desired number of samples in the stipulated data collection time, thus the study respondents who met the inclusion criteria were recruited until when the desired number was met.

Inclusion criteria.

The study included purposively selected staff at St Joseph of Good Shepard Kyamulibwa HCIV during the data collection days who were willing to voluntarily consent to participate in the study.

Exclusion criteria.

The study excluded staff who do not generate and handle data such as the Askari, cleaners plus those not available at the time of the study.

Study variables.

Dependent variables.

Data quality.

Independent variables.

Internal factors affecting data quality.
External factors affecting data quality

Research Instruments.

Data was collected using a semi-structured approved self-administered questionnaire .

Data Collection Procedure.

Before approaching and collecting data from respondents at the health center, the researcher sought permission from the management of MIHS, in charge of the health facility, and the respondents. The researcher administered a semi-structured approved self-administered questionnaire to the staff who voluntarily consented to participate at St Joseph of Good Shepard Kyamulibwa HCIV. The researcher sampled 8 respondents per day for 4 working days until when the desired sample of 32 respondents was achieved. The process took 20-30 minutes for each respondent.

Data management.

Data management included; checking for completeness and mistakes if any to ensure clarity before the respondents left the study site. The questionnaires were kept in a bag carried home safely and kept under lock and key.

Data analysis and presentation.

The data was tallied manually, coded, edited, and entered in a database and presented in tables and figures such as

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graphs because it was numerical.

Quality Control.

The researcher pre-tested the research tool on five (5) staff at Kabungo H/C III which enabled the researcher to assess its clarity, accuracy, and reliability and thus make the necessary adjustments. He also pre-visited the study area a week before and familiarized himself with the study area, met the In-charge of St Joseph of Good Shepard Kyamulibwa H/C IV, and secured permission to carry out the study. The researcher also personally checked the data collected by reading through, and checking for mistakes if any. The researcher verified with the respondent straight away to ensure the reliability and validity of the data.

Ethical Consideration.

A letter of introduction was obtained from MIHS introducing the researcher to the administration of St Joseph of Good Shepard Kyamulibwa H/C IV seeking permission to carry out the study. After permission was granted, the facility In-charge introduced the researcher to the staff of the facility. Respondents were assured of maximum confidentiality and that only numbers instead of names would be used to identify the respondents. The study commenced after explaining the study to the respondents and obtaining their voluntary consent for participation.

RESULTS.

Socio-demographic characteristics of respondents.

Table 1: Showing the socio-demographic characteristics of respondents.

Variable	Category	Frequency (n)/percentage (%)	Total
Gender	Male	14 (44%)	32 (100%)
	Female	18 (56%)	
Age	18-25 years	9 (28%)	32 (100%)
	26-35 years	14 (44%)	
	36-45 years	7 (22%)	
	46+ years	2 (6%)	
The period spent on the job	<1 year	6 (19%)	32 (100%)
	1-5 years	21 (66%)	
	6-10 years	4 (13%)	
	11+ years	1 (3%)	
Level of education	Certificate	11 (34%)	32 (100%)
	Diploma	19 (59%)	
	Degree	2 (6%)	

According to table 1,

The majority of the respondents were females 18(56%) and 14 (44%) were males 14(44%). Thefindings meant that both males and females participated in the study.
Respondents were also asked to mention their age and the majority 14(44%) were aged 26-35, followed by 9 (28%) who were aged 18-25 while 7 (22%) and 2 (6%) were aged 36-45 and 46+respectively.

Regarding the period spent on the job, 21 (66%) had spent 1-5 years on their jobs whereas 6 (19%) had spent less than a year on their jobs. 4 (13%) had spent 6-10 years on their jobs but only 1 (3%)had spent more than 11 years. The findings meant that most of the respondents had spent considerable time on their jobs and were in a better position to offer the required information.

In terms of Level of education, a large number 19(59%) of the respondents had completed the diploma level followed by 11(34%) at the Certificate level, and only 2(6%) had attained degree level.
The findings meant that the respondents had at least the minimum education level which was vital in the interpretation of the data collection tools.

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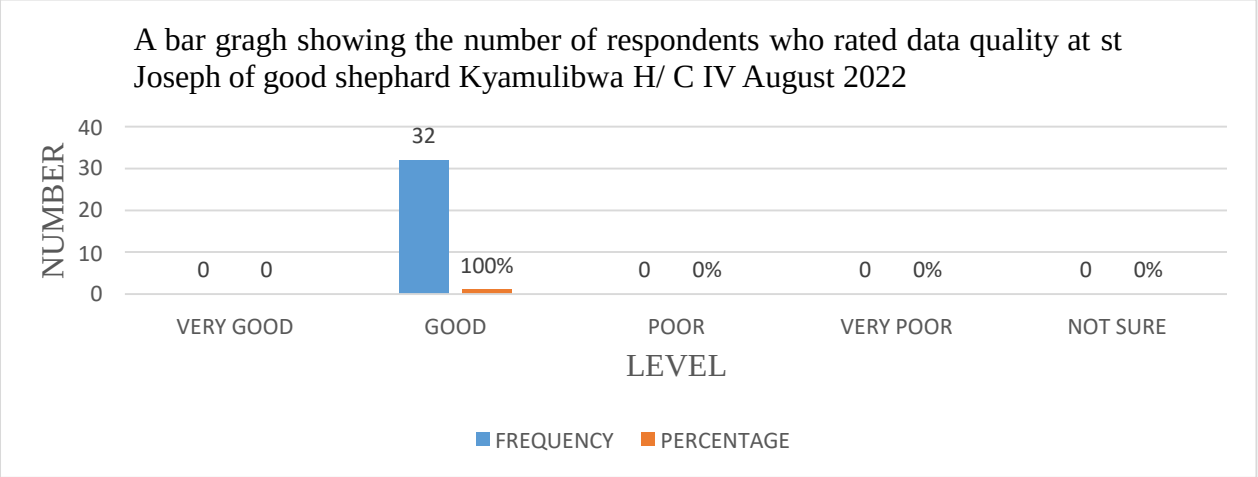
Fig I: Rating Data quality issues at St Joseph of Good Shephard Kyamulibwa H/C IV.



When asked to rate data quality at their facility, all the respondents 32(100%) said that the facility data was good as illustrated in figure 1.

Table 2: Ways of compiling data.

Level	Frequency	Percentage
Electronic system	00	0%
Registers /tools	25	78%
Both	7	22%

Respondents were also asked to mention how they compiled data in their respective departments and 78% noted that they used registers; whereas 22% said that they used both registers and electronic systems. And 0% noted that they used electronic systems only. The findings therefore meant that most private facilities still used registers to compile patient data.(Table 2)

Table 3: Respondents' participation in departmental data compilation.

Response	Frequency	Percentage
YES	22	69%
NO	10	31%

Respondents were asked whether they participated in departmental data compilation and 22(69%) had participated in departmental data compilation, whereas 10(31%) did not participate in data compilation.

***Table 4: Received* formal training in data management.**

Response	Frequency	percentage
YES	9	41%
NO	13	59%

Table 5: Last time respondents had training in data management.

Year	Frequency	Percentage
2022	1	11%
2021	6	67%
2020	2	22%

The study further wanted to know of those who participated in data compilation, and how many had ever

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had formal training. Only 9(41%) had formal training while 13(59%) had never had formal training in data management. Of the 9 that had formal training in data management, only 1(11%) had recently been trained, while 6 (67%) were trained in the year 2021, and only 2(22%) were trained in 2020. The findings meant that most employees entrusted with data management positions like entry and analysis in most private facilities did not have any formal training to do the job, which may also have serious implications on data quality in most private facilities in Kalungu District.

In their views when asked how best can they improve data quality in private facilities in Kalungu, as follows:

Forming Quality improvement projects
CME's
Motivation of staffs
Giving rewards to staff
Data harmonization of tools
Proper documentation
Mentorships
Data reviews
Using electronic other than registers
Training of staffs

Fig. 2: A bar graph showing the number of respondents with different views to improve data quality in private facilities in Kalungu.

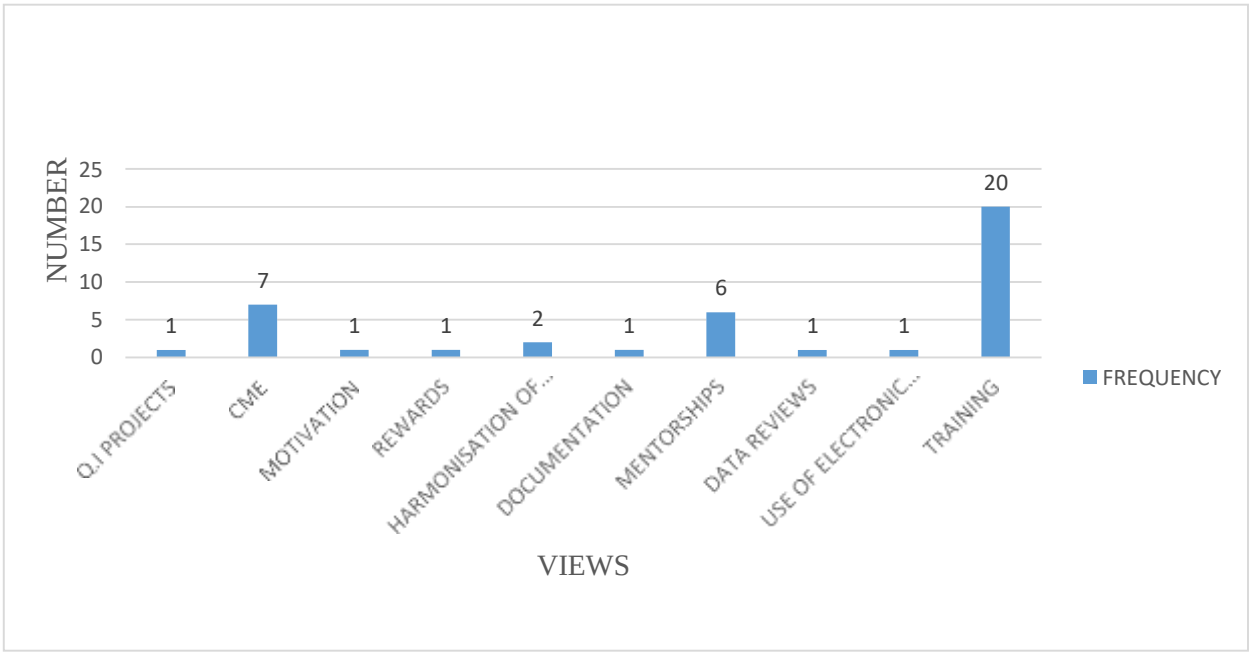

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Table 6: Internal factors affecting data quality at St Joseph of Good Shepherd Kyamulibwa H/C IV.

Internal factors	Response				
Statements	Strongly agree	Agree	Disagree	Strongly disagree	Not sure
Quality healthcare data depends on the availability of data itself in the departments.	20(62%)	12(38%)			
Poor documentation within departments has adverse effects onthe final data set to be compiled	19(59%)	12(38%)	1(3%)		
Compilation of inaccurate data bydepartments automatically distorts dataquality in the long run	22(69%)	10(31%)			
Insufficient data communication results in errors and adverse incidents in final data sets	17(53%)	14(44%)		1(3%)	
Cases of poor data collection, sharing, and reporting impacts reduces data quality in private facilities	16(50%)	16(50%)			
Most data lack appropriate content in a usable and accessible form which negatively affects data quality	12(38%)	16(50%)	3(9%)	1(3%)	
Accurate data leads to quality information that is required forquality decision-making and patient care.	14(44%)	18(56%)			
Most departments don't have consistent data models that would ensure the integrity andquality of the data	7(22%)	21(66%)	4(12%)		
Completeness of information entered into the facility record isnot dependable	7(22%)	20(63%)	4(12%)	1(3%)	

Respondents were asked to respond to statements on how internal factors affect data quality at StJoseph of Good Shepherd Kyamulibwa H/C IV and 22(69%) strongly agreed that the Compilation of inaccurate data by departments automatically distorts data quality in the long run, While 4(12%) disagreed that Most departments don't have consistent data models that would ensure the integrity and quality of the data. Whereas 1(3%) strongly disagreed that the Completeness of information entered into the facility record is not dependable (table 6).

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Table 7: External factors affecting data quality at St Joseph of Good Shepherd Kyamulibwa H/C IV.

External factors	Response				
Statements	Strongly agree	Agree	Disagree	Strongly disagree	Notsure
Maintaining quality data providedby departments offers a challengein ensuring the integrity of the healthcare data	9(28%)	22(69%)	1(3%)		
Documentation and data content within departments are not universallyunderstood by data users, thus affecting its quality	12(38%)	17(53%)	3(9%)		
Monitoring and keeping track of data over time and reporting variations in the data affects quality of data.	13(41%)	16(50%)	3(9%)		
Data compiled by departments is not relevant to what users'health needs and requirements	9(28%)	14(44%)	8(25%)	1(3%)	
Departments compile insufficient data compared to what is required by the data users	11(34%)	18(56%)	3(9%)		
Once data sets are hard to interpret, it would become very hard for users to pick any meaningful information out of it, hence compromising data quality	10(31%)	21(66%)	1(3%)		

Respondents were further asked to respond to statements on how external factors affect dataquality at St Joseph of Good Shepherd Kyamulibwa H/C IV and 13(41%) strongly agreed that Monitoring and keeping track of data over time and reporting variations in the data affects the qualityof data. While 1(3%) strongly disagreed that data compiled by departments is not relevant to what user's health needs requirements (*table 7*).

DISCUSSION.

Socio-demographic characteristics of respondents.

The majority 18(56%) of the respondents were females aged 26-35 years 14(44%).
Most of the respondents had spent 1-5 years on job 21(66%). The findings meant that most of the respondents had spent considerable time on their jobs and were in a better position to offer the required information.

In terms of Level of education, a large number 19(59%) of the respondents had completed the diploma level followed by 11(34%) at the Certificate level, and only 2(6%) had attained degree level.

Internal factors affecting data quality data quality at St. Joseph of Good Shepherd Kyamulibwa H/C IV.

Findings revealed that poor documentation within departments has adverse effects on the final data set to be compiled and most departments compile inaccurate data which automatically distorts data quality in the long run. The findings are complemented by Weiskopf, N.G. and Weng, C., (2013) who also argued that the processes that manipulate the data inside the health care databases like documentation affect the data quality.
Findings showed that quality healthcare data depends on the availability of data itself in the facility which implied that databases rarely begin their life empty and, hence, must be available which means that the starting point in the lifecycle is a data conversion from some previously

existing data source, which is this case the patient and if it is a bad beginning, it affects the overall data quality.
Furthermore, findings showed that there is insufficient data communication which results in errors and adverse incidents in final data sets which means that data is rarely exchanged between the systems through real-time interfaces.
In addition to the above, findings confirmed that there are cases where poor data collection, sharing, and reporting impacts reduce data quality in private facilities which negatively affects data quality. This is similar to a study done by Baryamureeba.M (2015) who argued that poor data entry in health forms and instructions increases data entry problems internally.

Baryamureeba.M 2015 says that the Majority of the respondents also revealed that most clinics do not have consistent data models that would ensure the integrity and quality of the data and completeness of information entered into the facility records is not dependable implying that, without data dependability, quality of data would not process because undependable data is useless for decision making. Baryamureeba.M., (2015)
The analysis of data revealed that internal factors in private facilities significantly and negatively affect data quality. The findings are similar to the one done by Kamau, S.M., (2014) who argued that timeliness affects data quality and many more internally motivated factors that reduce data quality on an everyday basis. The findings are however contradicted by Baryamureeba.M,2015 who noted that it was only a wrong precision within data sets that have negatively affected data quality in many organizations.

External factors affecting data quality at St. Joseph of Good Shepherd Kyamulibwa H/C IV.

The study findings revealed that maintaining quality data provided by facilities offers a challenge in ensuring the integrity of the healthcare data and documentation and data content within departments is not universally understood by data users, thus affecting its quality. These findings are similar to the ones done by Weiskopf, N.G. and Weng, C., (2013) who noted that processes that bring data into the database from outside either manually or through various interfaces and health data integration techniques affect health data quality.
Furthermore, poor monitoring and keeping track of data over time and reporting variations in the data affects the quality of data which means that such data is not of any important use because it may be distorted once it is not followed up very strictly by the relevant users especially the Ministry of Health officials and other authorities. The findings meant that the lack of data monitoring affects data quality since trustworthy data motivates users to attach the information in new ways, giving rise to fresh ideas and helping them when to eliminate inaccuracies and duplication from information systems.
The study found that data compiled by private facilities is not relevant to what users of health data need.
The study also showed that departments compile insufficient data compared to what is required by the data users. This is complemented by Baryamureeba.M (2015) who noted that sufficiency challenges in data management in health centers reduce data quality in many organizations. Wherever possible data is collected, and sufficiency systems and records are also created to ensure it is as accurate and complete as possible.
Furthermore, the study findings confirmed that the facility data sets are hard for external users to interpret and it therefore becomes very hard for users to pick any meaningful information out of it, hence compromising data quality. The findings therefore confirm that data quality should not be compromised right from the start up to interpretation.
The study confirmed a negative relationship between external factors and data quality in private facilities in Kalungu which therefore implies that external factors like unfriendly data users and incomplete information provided by patients during data collection and entry.
The findings are in agreement with Chapman, A. D. 2005 who argued that many data quality principles apply when dealing with species data and especially with the longitudinal aspects of those data and if these principles are not involved at all stages of the data management process, it negatively affects data quality.

CONCLUSION.

Internal factors affecting data quality in private clinics.

The study confirmed that internal factors have a negative relationship with data quality implying that if these internally driven factors are not improved or fixed, data quality in private clinics will continuously be poor and vice versa.

External factors affecting data quality in private clinics.

The study confirmed that external factors have a negative relationship with data quality implying that if these externally-driven factors are not improved or rectified, data quality in private clinics will continuously be poor and vice versa.

RECOMMENDATIONS.

The study recommends that Kalungu district in partnership with the Ministry of Health should organize formal training for all facility staff that handle patients' data to equip them with skills that can enable them to collect clean and reliable data.

Empowering the facilities with data management skills and having M&E topics included in the facilities' Continuous Medical Education (CME) sessions would translate into the culture of data demand and information use (DDIU) which is the ultimate reason for compiling data.

The study further recommends mentorships of the staff Private facilities need to motivate their employees to reduce the high levels of staff turnover that create knowledge gaps where all the trained and mentored staff in data management keep leaving the facilities for greener pastures in Government facilities.

Kalungu district through her Implementing Partners should invest in electronic systems in these private facilities if they are to collect accurate and reliable data. Since the use of papers and registers is very laborious and prone to many errors.

Lastly, the study recommends that Kalungu district through the DHO's office should start supervising private facilities not only for licenses but also for quality assurance across all departments.

CONTRIBUTION OF THE STUDY.

The findings will benefit the Ministry of Health as they highlight gaps within data management that need to be closed to receive correct and accurate data from private facilities for improved health service delivery.

Kalungu District will use the findings of this study to come up with strategies to bridge the gaps that were identified to improve the quality of data in private facilities.

The study findings will add new concepts and knowledge to the existing body of knowledge of data quality.

The study findings will provide up-to-date literature to the academicians who may wish to carry out similar or related studies.

The study findings should stimulate further research into data quality issues.

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LIST OF ABBREVIATIONS.

PMTCT	Prevention of Mother to Child Transmission
DHIS2	District Health Information System Two
HIV	Human Immunodeficiency Syndrome
ICT	Information and Communications Technology
MIHS	Mildmay Institute of Health Science
SPSS	Statistical Package for Social Sciences
CME	Continuous Medical Education
DDIU	Data Demand and Information Use
M&E	Monitoring and Evaluation
QA/QI	Quality Assurance and Improvement
IV	Independent Variable
DV	Dependent Variable
MoH	Ministry of Health
IAIDQ	International Association for Information and Data Quality

Operational Definitions.

Data: This refers to unprocessed information or raw facts and figures that have no meaning.

Data Quality: Data are of high quality if, "they are fit for their intended uses in operations, decision making and planning" (Flavia.K.Ouma et al.,2010)

Private facilities: These are facilities owned by private individuals/organizations set up with the main purpose of making profits.

Data cleaning refers to the process of "fixing" errors in the data that have been identified duringthe validation processes.

Validation is a process used to determine if data are inaccurate, incomplete, or unreasonable. The process may include format checks, completeness checks, reasonableness checks, limit checks, review of the data to identify outliers or other errors, and assessment of data by subject area experts.

SOURCE OF FUNDING.

The study had no funding.

CONFLICT OF INTEREST.

The author had no conflict of interest.

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