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Evaluation of the Health Data Management Practices and Related Factors among Saudi Arabian Health Professionals at Public Health Facilities in 2024

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ABSTRACT

Background: Health care practice depend on on evidence-based decisions and needs the use of quality health care data. Health management information system (HMIS) is among the core elements of health system building blocks. Information and data are essential to the process of making decisions about reforming the health system. Health workers still struggle with a lack of fundamental data management skills despite the vast sums of money spent on the creation of health information systems. Therefore, this study aims:To assess health data management practices and associated factors among health professionals in public facilities in Jeddah, Saudi Arabia.

Method: A facility-based cross-sectional survey was conducted among 442 health professionals working in Jeddah, Saudi Arabia from January to Febraury 2024. Data were entered into Epi-Data V.4.6, and then it was exported to SPSS V.28 statistical software for processing and analysis. Bi-variable and multivariable logistic regression analyses were computed to see the association between health data management practiceand selected independent variables. The bi-variable logistic regression analysis model was used to identify candidate variables for multivariable regression, with a p value <0.2 fitted into the multivariable logistic regression analysis model; a p value less than 0.05 and an adjusted OR (AOR) with a 95% CI were used to declare statistical significance associated with the dependent variable.

Results: The prevalence of good health data management practices among health professionals was found to be 51.1%, with a 95% CI (45.9 to 55.7). In this study, received training on health data management (AOR=1.82, 95% CI (1.06 to 3.13)), used appropriate technology (AOR=1.78, 95% CI (1.09 to 2.91)) and competency (AOR=6.62, 95% CI (4.06 to 10.80)) were positively associated with health data management practice among health professionals.

Conclusion and recommendations: Nearly half of health professionals had poor health data management practices. All healthcare facilities should have appropriate and functional health data management technology.

Keywords: Health Data Management, Health Professionals, Practices and Related Factors.

INTRODUCTION

One of the fundamental components of a health system is health information management. By using evidence-based practices, HMIS quality enhances service delivery quality and accessibility. An integrated process of gathering, processing, analyzing, reporting, and using health data for decision-making within a health system is known as a well-functioning HMIS. A healthy health system depends on more than just data availability. Information that is timely, accurate, and dependable is also essential. Evidence indicates that developing nations face significant obstacles, especially at the primary health care level, despite the strong demand for high-quality

data at PHC levels [1, 2].

By involving healthcare professionals in the creation, evaluation, and interpretation of health data for decision-making through performance assessments and seminars, such subpar data-use cultures can be addressed [3, 4]. Additionally, there is evidence that health practitioners in underdeveloped nations are less inclined to use health information in their work units. Health information is mostly gathered for reporting purposes, and there is a poor culture of data and information consumption in healthcare facilities. Additionally, studies highlight the necessity of leadership dedication to enhancing the highest quality of health information and encouraging its use for wise judgments within the healthcare system [5-7].

The system for delivering healthcare and the decision-making process for reforming the health sector depend heavily on data and information. Data collection, analysis, decision-making, and information use are crucial to healthcare operations[8].One Managing health information is the foundation of managing health data. To increase the efficacy and efficiency of healthcare services, the following steps must be followed: data collecting, processing, reporting, and utilization[9]. In order for managers, decision-makers, and service providers to make evidence-based decisions, high-quality data is a necessity for effective data management practices[10, 11].

Ineffective health data management practices (HDMP) have a significant impact on population health, the development of the health system, and the information revolution, which is one of the foundations of the health system [12]. The measurement of data quality and information use to gather important data on the difficulties and constraints of providing health services and implementing programs is gaining attention on a global scale. Mechanisms for quality assurance that support dependable data collection, storage, and management are necessary because of this dependence on data quality and information consumption [13].

The lack of fundamental data management skills still plagues health professionals worldwide, despite the enormous resources spent to enhance HDMP [14]. According to studies, the percentage of countries with good health data management (HDM) practices was 33.3% in the UK, 39% in Germany, and 48% in Jamaica[11, 15, 16]. Poor HDM practice has resulted from the numerous issues that HDM systems have encountered throughout the years, most of which were related to paper and manual recording procedures[17, 19]. The knowledge required to enable decision-making is not provided by HDM practice in poor nations. Some of the reasons are poor quality of data, weak data analysis, and lack of information culture, lack of trained personnel and health information system (HIS) activities seen as a burden due to high workloads especially at the health facility level [20].

The majority of healthcare professionals in developing nations end up being one of the barriers to efficient and successful management in the provision of medical care[21]. Data management responsibilities including capture, processing, analysis, storage, reporting, and usage, which are primarily responsible for operational activities, have issues at the primary level, where service delivery is the primary task[22, 23].The availability and utilization of high-quality HIS data are critical to all aspects of public health policy and the health system [21, 24]. However, the performance of the health system and the general well-being of society are being impacted by inadequate HDMP and a lack of high-quality data. Frequent supply overstocks and shortages, inadequate epidemic identification and management, and a lack of human resources at various points in time are all signs of this [25].

Since 2015, Saudi Arabia has made remarkable progress in the implementation of digital health. However, only a few studies have assessed the current status of Saudi Arabian digital health efforts. One study analysed the readiness of Saudi Arabian healthcare facilities to change in accordance with the Saudi National Healthcare Plan of Saudi Vision 2030 [26]. Based on a review of different resources on organizational readiness for change, the study concluded that many factors would facilitate the efficient implementation of the Saudi healthcare transformation plan. These factors mainly depend on the determination of the organization, the effort of the members of the organization, and the availability of resources[26].

Another study assessed the state of digital health maturity in Saudi Arabia compared to other countries[27]. The study used the Global Digital Health Index Platform (GDHI), which has seven main dimensions: strategy and investment, workforce, legislation and policy, leadership and governance, standards and interoperability, infrastructure, and services and applications. The study concluded that there are many digital health initiatives in the country; multiple key implementation solutions have been launched, and digital health in Saudi Arabia is evolving steadily[27]. Moreover, a recent study published in 2021 measured the status of HIS implementation in 18 hospitals in the Eastern Province in Saudi Arabia – which is the same geographical setting as this study – the results showed a variety in implementation stages, however, most of the hospitals indicated using the basic functionalities such as clinical documentation[28].

The Saudi MoH strongly supports continuous progress in digital health transformation by focusing on building digital infrastructure and improving healthcare quality. However, it is unclear whether the current level of digital health implementation fulfils the expectations of Saudi Vision 2030. This study aims to assess health data management practices and associated factors among health professionals in public facilities in Jeddah, Saudi Arabia.

METHODS

A facility-based cross-sectional survey was conducted among 442 health professionals working in Jeddah, Saudi

Arabia from January to Febraury 2024. All health professionals worked at public health facilities that were involved. There are 878 permanent and contract health professionals working at public health facilities. All selected health professionals who were unit heads, department heads, case teams, health managers and focal persons worked at public health facilities in Jeddah, KSA; those who had more than 6 months' work experience and were available during the data collection period were included in the study.Contract employers of health professionals were excluded from the study.All health professionals fulfilling the inclusion criteria were included in the final analysis.

Dependent variables: A HDM practice was measured as poor or good.Independent variables: Sociodemographic characteristics: sex, age, marital status, educational level, work experience, field of study, position, and working unit.Behavioural factors: knowledge, attitude and competency.Technical factors: user friendliness of reporting tools, standardised indicator and availability of appropriate technology for data management.Organisational factors: training, feedback, workload, supervision, reward on performance, management support, availability of data management guidelines, availability of reporting format, functional computer and availability of stationery materials.

Operational definitions

Good data management practice: the health professionals who score above the mean value from 10 item questions have a good HDM practice if not poor[29-31].Good knowledge:- health professionals who were scored above or equal to 60% out of a total of 12 yes/ no questions[29- 31].Poor knowledge:- health professionals who were scored below 60% out of a total of 12 yes/no ques- tions[30, 31].Good attitude:- health professionals who were scored greater than the mean of six questions [29].Poor attitude:-health professionals who were scored less than the mean of six questions[29].Good competence: average score of respondents equal or more than 75% of competence questions was considered as good competence[13].Poor competence: average score of respondents less than 75% of competence questions was considered as poor competence[13].

Good management support: study participants who were scored above the mean from 6-item questions.Poor management support: study participants who score below the mean from 6-item questions.Health professionals: in this study, health professionals are defined as those employees who record and handle data, generate data, use generated data for their decision making and those who serve as thefocal person and unit head within their unit, departments and health facilities.Appropriate technology: in the facility of each depart- ment had functional computer with DHIS and intranet access.

The study was conducted using a structured, pretested and self-administered questionnaire. The questionnaire was adapted from WHO, Performance of Routine Information Systems Management tools, and from previous related studies with the addition of some variables[29-31]. A total of three trained diploma HIT as data collectors and two B.Sc. HIT as supervisors participated in the data collection process. A pretest was taken 5% of the sample size and checked for internal constancy by Cronbach's alpha test before the actual data collection time. Amendments to the instrument, such as unclear questions and ambiguous words, were checked accordingly.

For data collectors and supervisors, a half-day orientation was given on the objective of the study, instrument and data collection procedures by the principal investigator. Furthermore, public health research experts reviewed the tool. The principal investigator and supervisors were conducting supervision. To ensure data quality, data collectors check the questionnaires from each study participant for completeness on a daily basis. The supervisors and principal investigator also reviewed each ques- tionnaire and checked for completeness daily.

Data were checked for completeness and consistency; after that it was coded and entered into Epi-Data V.4.6, then exported to SPSS V.28 statistical software for analysis. Different frequency tables, graphs and descriptive summaries were used to describe the study variables. Binary logistic regression analysis was used to see significance of association between dependent and inde- pendent variables. Model fitness was checked by using Hosmer and Lemeshow goodness of fit test. Bi-variable logistic regression analysis model was used to identify the potential predictor variable, with p value <0.2 was fitted into the multivariable logistic regression analysis model; p value less than 0.05 and an adjusted OR (AOR) with a 95% CI was used to declare statistical significance associated with HDM practice.

The ethical permission letter was obtained from Ethical Review Committee of Medicine and Health Sciences. A supporting letter was taken from the Health Department. Informed consent was obtained from health centre administrators and study participants after clear explanation of study objectives, data collection procedures, confidentialityand their rights.

RESULTS

Table (1) showed that sociodemographic characteristics of the study participants. From a total of 484 participants, 442 health professionals working in public health facility with a response rate of 91.32%. The mean ages of respondents were 28.48±4.91(SD) years. More than half of study participants, 245 (55.4%) were married. Majority of the study participants, 342 (77.4%) have less than 6 years' experience. Nearly half 233

(52.7%) of study participants were diploma in their educational status.
In this study, behavioural factors were assessed through data management with knowledge about HDM,competence and attitude. Majority of the study participants, 418 (94.57%) had good knowledge about HDM.

Table 1: Sociodemographic characteristics of study participants (n=442)

Characteristics	Category	Frequency	Percent
Age	<31	354	80.10
	31–40	77	17.40
	>40	11	2.50
Educational status	Diploma	233	52.70
	Degree	193	43.70
	Master andabove	16	3.60
Sex	Male	282	63.80
	Female	160	36.20
Maritalstatus	Married	245	55.40
	Single	179	40.50
	Divorced	18	4
Filledofstudy professional	Nurse	203	45.90
	HIT	16	3.60
	Midwifery	81	18.30
	Healthofficer	76	17.20
	Doctor	10	2.30
	Laboratory	21	4.80
	Pharmacy	23	5.20
	Others	12	2.80
Workingarea	MCH	120	27.10
	OPD	178	40.30
	IPD	11	2.50
	Pharmacy	22	5
	Laboratory	21	4.80
	Management	40	9
	Under-5	28	6.30
	ART	13	2.90
	Other	9	2
Positionstatus	Unitfocal	264	59.70
	Case ordepartmentHead	133	30.10
	Others	45	10.20
Experience	<6years	342	77.40
	6–10years	77	17.40
	>10years	23	5.20%

ART, antiretroviral therapy; HIT, health information technology; MCH, maternal and child health; OPD, outpatient department.

Table (2)showed that 195 (44.12%) of participants had received training on HDM. The study findings also revealed that 305 (69.0%) of respondents got supportive supervision from higher officials.

Table 2: Organisational related factors of study participants (n=442)

Individual related factors	Category	Frequency	Percent
Training on health data management	Yes	195	44.12
	No	247	55.88
Get super vision from higher official	Yes	305	69
	No	137	31
Received regular feedback	Yes	283	64.03
	No	159	35.97

Individual related factors	Category	Frequency	Percent
Any reward forperformance	Yes	112	25.34
	No	330	74.66
Managementsupport	Good	223	50.45
	Poor	219	49.55

Table (3)showed that in 409 (92.53%) of respondents, there is standard set of indicator and 409 (92.5%) a well-designed data collection and report formats. More than half 241 (54.52) % of health professional did not use appropriate technology for HDM. In this study finding, 226 (51.1%) with 95% CI (45.9 to 55.7) of study participants had good HDM practice.

Table 3: Technical related factors of study participants (n=442)

Institutional related factors	Category	Frequency	Percent
Standardized indicator	Yes	409	92.53
	No	33	7.47
Data management tools	Yes	409	92.53
	No	33	7.47
Availability of technology for data management	Yes	201	45.48
	No	241	54.52
Use of friendly reporting format	Yes	366	82.80
	No	76	17.20

Factors associated with HDM practice among health professionals

In bivariable analysis, 13 variables, namely position, knowledge, attitude, competency, management support, the use of standardized indicators, well design recording and reporting format, friendly format, use appropriate technology, training on data management, get supportive supervision, received regular feedback and get any reward, were candidate variables for multivariable logistic regression at a p value of less than 0.2.In multivariable logistic regression, 3 of 13 variables were significantly associated with HDM practice among health professionals at 5% level of significance. The significant factors of HDM practice were use of appropriate technology, training on data management and competency, had a statistically significant association with HDM practice among health professionals.

Participants who received training on data management were two times more likely had good HDM practice as compared with who did not get training (AOR=1.82, 95% CI 1.06 to 3.13). On the other hand, those who use appropriate technology were two times more likely had good HDM practice as compared with not use appropriate technology (AOR=1.78, 95% CI (1.09 to 2.91)). Those who had good competency were six times more likely had good HDM practice as compared with those who had poor competency (AOR=6.62, 95% CI (4.06 to 10.80)) (Table 4).

Table 4: Factors associated with HDMP among health professionals working (n=442)

Variables	Health data management practice		COR(95%CI)	AOR(95%CI)
	Good	Poor	Bivariable model	Multi variable model
Position				
Unitfocal	130	134	1	1
Case manager/ head nurse	5	11	0.47(0.16to1.39)	0.29(0.08to1.09)
CEO/HChead	56	61	0.95(0.61to1.46)	0.71(0.42to1.23)
Department coordinator	13	6	2.23(0.82to6.05)	0.95(0.28to3.15)
HMIS/qualityfocal	22	4	5.67(1.90to16.90)	1.69(0.48to5.99
Knowledge				
Poor knowledge	6	18	1	1
Good knowledge	220	198	3.33(1.30to8.57)	1.44(0.46to4.50)
Attitude				
Negative attitude	104	135	1	1
Positive attitude	122	81	1.96(1.34to2.86)	1.45(0.91to2.32)
Management support				

Variables	Health data management practice		COR(95%CI)	AOR(95%CI)
	Good	Poor	Bivariable model	Multi variable model
PoorMgtsupport	89	130	1	1
GoodMgtsupport	137	86	2.33(1.59to3.41)	1.05(0.65to1.70)
Standardised set off indicators				
No	12	27	1	1
Yes	214	189	2.55(1.26to5.17)	1.13(0.41to3.14)
Well-designed format				
No	10	23	1	1
Yes	216	193	2.57(1.20to5.55)	1.10(0.34to3.56)
Friendly format				
No	25	51	1	1
Yes	201	165	2.49(1.48to4.18)	1.71(0.85to3.44)
Use of appropriate technology				
No	90	151		1
Yes	136	65	3.51(2.37to5.21)	1.78(1.09to2.91)*
Data management training				
No	91	156	1	1
Yes	135	60	3.86(2.59to5.75)	1.82(1.06.3.13)*
Get supervision from officials				
No	44	93	1	1
Yes	182	123	3.13(2.04.4.79)	1.246(0.60to2.58)
Get feedback from official				
No	52	107	1	1
Yes	174	109	3.29(2.18to4.94)	1.93(0.96to3.89)
Rewards for m management				
No	157	173	1	1
Yes	69	43	1.77(1.14to2.74)	1.00(0.55to1.81)
Competency				
Poorcompetence	48	149	1	1
Goodcompetence	178	67	8.25(5.37to12.68)	6.62(4.06to10.80)***

*p<0.05, **p≤0.001, ***p<0.0001, Hosmer and Lemeshow goodness of fit test=0.336.
AOR, adjusted OR; CEO, Chief Executive Officer; COR, crude OR; HC, Health Center; HMIS, health management information system; Mgt, Management.

DISCUSSION

The aim of this study to assess health data management practices and associated factors among health professionals in public facilities in Jeddah, Saudi Arabia. The percentage of HDM practice in this study was 51.1% (95% CI 45.9 to 55.7). This result is consistent with research conducted in Bench-Maji (46.8%) and East Gojam Zone (53.3%) [31, 32]. This study, however, is less than earlier ones conducted in North Wollo, Ethiopia (56.1%) and Gamo Gofa (74.3%) [29, 30]. This disparity could perhaps be explained by variations in supervision, feedback, and training.

The study showed that93.6% of health extension workers were supervised, and 61.6% of the participants got training in data management. On the contrary, only 44.1% of the respondents got training, and 69% of them were supervised in the current study. The other possible explanation could be that the study setting was health posts, whereas the current study was conducted in health centres and hospitals. Due to this reason, the friendliness of the data management format might vary between those health posts and this study setting.

On the other hand, it was considerably higher than the HIS assessment conducted in Jamaica and Zanzibar, where the scope of HDM practice was 48% and 27%, respectively[15].This explanation might be due to the difference in the study setting and the variation in health information system structures between KSA and those countries. The increment in the current study might be due to the study period. There is about an 11-year gap between the previous study and the current study; hence, the government's concern for data management might

change within this gap.

Concerning the factors, the use of appropriate technology was significantly associated with HDM practices. Participants who use appropriate technology were more likely to have good HDM practices compared with those who do not use appropriate technology. This was consistent with the study done in North Gondar[33],and Western Amhara[34]. This might be due to the fact that the use of technology is important for easy, fast and accurate management of data. It also reduces wastage of time, decreases the workload of workers and simplifies tasks.

Training on data management was significantly associated with HDM practices. Accordingly, healthcare professionals who get training are more likely to have good HDM practices as compared with those who did not get training. This finding is congruent with a study done in the NorthWollo Zone[29],Hadiya southern Ethiopia[35]and Awi administrative zone[36].This could be a result of training, which can enhance the capacity to carry out data management activities and create skilled human resources that are confident and motivated to perform data management tasks.

Competency was significantly associated with HDM practices. Participants who had good competency were more likely to have good HDM practices compared with those who had poor competency. This finding is in line with the studies done in the North Wollo Zone[29],Gamo Gofa[30] and Western Amhara[34].The possible justification might be due to low competency, which shows the skill gap, and competency is crucial for performing data management tasks such as data quality checking, calculating percentages, plotting charts, providing a possible explanation of the findings of the data, explaining trends with chart, using and interpreting data.One of its most significant advantages of this study is that it provides a valuable source of information regarding the HDM practice.

CONCLUSION

The level of HDM practice among medical professionals is comparatively low. Among the elements linked to healthcare professionals' HDM practice were proficiency, data management training, and the utilization of suitable technology. To enhance healthcare personnel' HDM understanding and practice, it is advised that the health department organize capacity development trainings. For HDM to be effective and efficient, all healthcare facilities should also assign trained staff and have access to computers with internet service. To increase their expertise, health practitioners should look up, read, and discuss HDM format experiences with others. Program officers and planners should regularly supervise healthcare providers and provide them with feedback to help them become more proficient in routine information utilization.

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