ORIGINAL ARTICLE

ASSESSMENT OF HEALTH INFORMATION SYSTEM IN DISTRICT NOWSHERA, KHYBER PAKHTUNKHWA, PAKISTAN

Rab Nawaz[1], Shahzad Ali Khan[2], Ghulam Sarwar Khan[1], Shah Nawaz[3], Fatima Nasir[4], Tayyaba[5]

[1]Department of Community Medicine, Pak International Medical College, Peshawar- Pakistan

[2]Department of Public Health, Health Services Academy, Islamabad - Pakistan

[3]Department of Biochemistry, Nowshera Medical College, Nowshera

[4]Khyber Teaching Hospital, Peshawar- Pakistan

[5]Peshawar Institute of Medical Sciences, Peshawar- Pakistan

ABSTRACT

Objective: To evaluate the general status and functioning of health information system (HIS) in district Nowshera.

Methodology: An observational study was conducted in district Nowshera Khyber Pakhtunkhwa, Pakistan between June 2015-2016.The study population included all districts, health information system (HIS) health workers in Khyber Pakhtunkhwa. District Nowshera was selected for the purpose on non-probability sampling technique. The data collection instruments used in this study was adapted from the PRISM tool package that was modified for the purpose of this study.

Results: A total of 30 health facilities of District Nowshera were assessed for Quality of Data and Use of Information through DHIS Diagnostic Tool. 60% of the health facilities compile DHIS data and 93% do not get feedback from DHO office. 94% of the health facilities have not displayed map of their catchment areas. 87% of the health facilities do not arrange meetings regarding the managerial issues. Regarding the use of information, no documentation is available in any health facility of the district. The DHIS workers were assessed and interpreted according to the scale of Mann-Whitney-U method. The organizational and behavioral assessment was done which was statically insignificant.

Conclusion: There is an immediate need to install the system wide up gradation of technology and software. The manageable data would help the health personnel and managers to formulate the policies that would be helpful in up grading the standard of HIS and a universal HIS should be operated throughout the province.

Key words: Health Information System, WHO, DHIS, RHIS

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INTRODUCTION

According to the World health Organization, health system consists of six core elements of the i.e. provision of services, health information system, workforce for health services, reach to necessary medication, resources and leadership or governance. Among these he most essential constituent is the Health information system (HIS) [1]. Health information system is the systematic procedure that works by collecting the data, generates reports for improvement of efficacy and effectiveness of the services of health and plans the health programs for improving the status of a health sector [2].

Correspondence
Dr. Rab Nawaz
Department of Community Medicine, Pak-International Medical College, Peshawar - Pakistan
Email: nawazrab7861@gmail.com
Cell: +92-333-9996711
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A recent study revealed that there is direct relationship between deficiency of information and overall health status of the community [3]. The Health Information system (HIS) provides benefits to patients, their families, and the healthcare providers. Despite these benefits, the health information system utilization in Pakistan is very low and health care providers are not adopting the latest trends and technology in the information interpretation [4]. Healthcare is the least developed department in case of technological development. The developed nations have effectively implemented primary healthcare setup but almost all of these lacks in interpretation of the electronic health information records of the patents and exchange of this health information with the particular health provider for decision making and policy planning [5]. HMIS intends to strengthen the procedures for the data collection and composing the events related to the health, to reproduce the authenticity, value ability and credibility to the available data, to utilize the available information for the analysis and interpretation and taking the evidence based decisions, to disseminate the health information on the regular

basis to all the relevant stake holders and to improve the behavior of all the health providers for effectively improving the delivery and response of the services [6]. A RHIS is a system utilized for assembly, distribution and utilization of data in providence of routine information at systematic intervals for predicting the intervention to address the public health processes and needs [7].

The government of Pakistan, in 2001 felt the need for a system that could cover the first-level health facilities more effectively and precisely. The government of Pakistan then with the technical assistance and cooperation of Japan installed a new system in Pakistan that is District Health Information System (DHIS) with an objective of planning and operating the routine processes of the health system at particular districts.

Pakistan has traditionally had poor health outcomes relative to other countries in South Asia and East Asia. In Khyber Pakhtunkhwa, many weaknesses and challenges have been identified in the current Health Sector Strategy (HSS), including poor access to and utilization of health services, low quality and effectiveness of care, limited managerial capacity and weak accountability at all levels [8, 9]. As per the Khyber Pakhtunkhwa Health Survey 2017, 67.5% of births were delivered in health facilities, but only 26.8% stayed for at least 12 hours for postnatal care. The neonatal mortality rate is 41 per 1,000 live births, the infant mortality rate is 58 per 1,000 live births, and the maternal mortality ratio is 206 per 100,000 live births.9 Of children aged 12–23 months, 55.5% are reported to be fully immunized (based on records and mother's recall). Approximately 17.3% of children aged 0–23 months have not received any vaccination at all. Over 40% of women have nutritional health problems [8].

There is a critical and dire requirement for enhanced improvement of the health information system in the health sector of the country in general and Khyber Pakhtunkhwa in specific. Hence, the current study was designed to study the existing weaknesses and strengths of the district health information system in Khyber Pakhtunkhwa and recommend some ways to improve the health information system.

MATERIAL & METHODS

This was an observational cross-sectional study conducted at district Nowshera between June 2015 and June 2016. The study included all districts and health information system (HIS) health workers. The research included census of primary and secondary health care facilities in Nowshera district. This study was carried out to analyze the functioning of Provincial District Health Information (DHIS) Cell, Districts Health Offices, and Health Facilities and the health staff involved in the process of health information systems. The data collection instruments used in this study was adapted from the PRISM tool package that was modified for the purpose of this study.9 This tool package addresses the utilization of routine health information system (RHIS) data that is collected within 1 year range from the health facilities[10]. This tool helps to identify the strengths and weaknesses of the health information system. HIS Performance Diagnostic Tool determines the overall DHIS performance by looking at quality of data and use of information to identify weak areas. This diagnostic tool identifies strengths and weaknesses; the other three tools identify the underlying technical, organizational, and behavioral factors for strengths and weaknesses. PRISM performance tool provides four types of diagnostic tools which include:

1. Data Quality Assessment at District or Higher level
2. Use of Information Assessment at District or Higher level
3. Data Quality Assessment at Facility Level
4. Use of Information Assessment at Facility Level

The following data collection tools (questionnaires) were adopted for the assessment of the health information system in district Nowshera:

- Organizational and Behavioral Assessment Tool (OBAT)
- DHIS Diagnostic Tool Health Facility Proforma: Quality of Data
- DHIS Diagnostic Tool Health Facility Proforma: Use of Information
- Data was analyzed through SPSS version 22.

RESULTS

There were a total of 30 facilities from where data was collected at Nowshera District. Table 1 illustrates the responses of participants regarding the use of information at the respected facility. For question regarding compilation of DHIS data, sixty percent i.e. 18 out of 30 facilities responded in negative. Only 2 out of 30 facilities displayed mother related health information while only a single facility displayed pediatric health information on DHIS websites. See table 1.

In organizational and behavioral domain, the DHIS workers were assessed and interpreted according to the scale of Mann-Whitney-U method in which p value of 0.05 or less is considered significant. Various queries were designed concerning the basis on which health decision were taken in the department, behavior of supervisor and staff in strategic planning and the self-efficacy of the health system. We could not get a single significant value in this regard.

Majority of the employee claimed that in health departments, the decisions are based on either political interference or personal likings. The mean score for decisions based on facts and evidence was very low i.e. 1.9. See table 2 for details.

Majority claimed that collecting information related to health, makes them feel bored. They further added that they are held accountable for poor performance. See table 2.

In table 3, the quality of data (health information) is demonstrated. 7/30 (23.3%) facilities kept proper records. However, the majority i.e. 60% claimed that they regularly reported data to the district head office. In more than one-half of the facilities, there was no specific person appointed for the collection of monthly report. The data accuracy was challenged in many facilities. The majority of the facilities' employees claimed that they find the report form difficult and complex. See table 3 for details.

Table 1: Use of Information among the facilities at district Nowshera

Serial	Query	Response from Facility	Percentage
FU1	Does this facility compile DHIS Data?	Yes 12	40.00%
		No 18	60.00%
FU2	Does the facility compile any report containing DHIS information?	Yes 8	26.67%
		No 22	73.33%
FU3	Did the facility receive any feedback report from district office on their performance for the last three months?	Yes 2	6.67%
		No 28	93.33%
Display of Information			
FU4	Does the district office display the following data;	Yes 2	6.67%
		No 28	93.33%
FU4a	Mother Health	Yes 2	6.67%
		No 28	93.33%
FU4b	Child Health	Yes 1	3.33%
		No 29	96.67%
FU5c	Facility Utilization	Yes 3	10.00%
		No 27	90.00%
FU5d	Disease Surveillance	Yes 1	3.33%
		No 29	96.67%
FU 6	Does the office have a map of catchment area?	Yes 2	6.67%
		No 28	93.33%
FU 7	The office displays a summary of demographic information	Yes 1	3.33%
		No 29	96.67%
FU 8	Any feedback (quarterly, yearly) report on DHIS data	Yes 2	6.67%
		No 28	93.33%
FU 9	If yes, what kinds of decisions are made in reports of DHIS data/information?		
FU 9a	Review strategy by examining actual performance on month to month comparisons	Yes 1	50%
		No 1	50%
FU9b	Review facility personnel responsibilities by examining service performance	Yes 0	0%
		No 2	100%
FU9c	Mobilization/shifting of resources based on comparison by services	Yes 0	0%
		No 2	100%
FU9d	Advocacy for more resources by comparing performance by targets	Yes 0	0%
		No 2	100%
Discussion and Decision on DHIS information			
FU10	Does the facility have routine meetings for reviewing managerial matters?	No 2	13.33%
		No 26	86.67%

FU11	How frequently is the meeting supposed to take place?	Yes 3	10.00%
		No 27	90.00%
FU12	How many times did the meeting take place during the last three months?	Yes 2	6.67%
		No 28	93.33%
FU13	Is an official record of management meetings maintained?	Yes 2	6.67%
		No 28	93.33%
FU14	If yes, please check the meeting records for the last three months:		
FU14a	Management of DHIS, such as data quality, reporting, or timeliness of reporting	Yes 2	15.38%
		No 0	0%
FU14b	Discussion on DHIS findings such as disease data, or service coverage, medicine	Yes 2	15.38%
		No 0	0%
FU14c	Have they made any decisions based on the above discussions?	Yes 1	7.69%
		No 1	7.69%
FU14d	Any follow-up action taken on the decisions made during the previous meetings?	Yes 1	16.67%
		No 1	16.67%
FU14e	Any DHIS related issues/problems referred to provincial level for actions?	Yes 1	16.67%
		No 1	16.67%
Use of Information by the District Office			
FU15	Facility received annual/monthly planned targets based on DHIS information?	Yes 4	13.33%
		No 26	86.67%
FU16	Did records of facility of last three months show that district directives?	Yes 1	3.33%
		No 29	96.67%
FU17	Did facility receive district DHIS office newsletter/report in last three months?	Yes 0	0%
		No 30	100%
FU18	Any documentation exists to show use information?	Yes 0	0%
		No 30	100%
FU19	Did the person in charge of the facility participate in meetings at district level to discuss DHIS performance for the last three months?	Yes 1	3.33%
		No 29	96.67%
FU20	Examples of how the facility uses DHIS information for health system management	Yes 1	3.33%
		No 29	96.67%
Supervision by the district health office			
FU21	Did the district supervisor visit your facility during the last three months?	Yes 0	0%
		No 30	100%
FU22	Did you observe supervisor having a checklist to assess the data quality?	Yes 0	0%
		No 30	100%
FU23	Did supervisor check the data quality?	Yes 0	0%
		No 30	100%
FU24	Did the district supervisor discuss performance of health facilities based on DHIS information when he visited your facility?	Yes 0	0%
		No 30	100%
FU25	Did the supervisor help you decide based on DHIS information?	Yes 0	0%
		No 30	100%

Table 2: Mean score of facility staff on OBAT

Serial Item #		Mean Score	p-value
			Mann-Whitney-U
In health department, decisions are based on;			
D1.	Personal liking	5.1	0.073
D2	Superiors' directives	6.13	0.943
D3.	Evidence/facts	1.9	0.076
D4	Political interference	5.63	0.904
D5.	Comparing data with strategic health objectives	1.77	0.52
D6.	Health needs	1.8	0.962
D7.	Considering costs	3.4	0.435
In health department, superior officers;			
S1	Seek feedback from concerned persons	1.8	1
S2.	Emphasize data quality in monthly reports	1.93	0.881
S3	Discuss conflicts openly to resolve them	2.37	0.635
S4	Seek feedback from concerned community	2.4	0.22
S5	Use HMIS data for setting targets and monitoring	2	1
S6	Check data quality at the facility and higher level regularly	2	0.407
S7	Provide regular feedback to their staff through regular report based on evidence	2.53	0.87
S8	Report on data accuracy regularly	2.13	0.84
In health department, staff			
P1	Are punctual	2.2	0.605
P2	Document their activities and keep records	1.93	0.559
P3	Feel committed in improving health status of the target population	1.93	0.783
P4	Set appropriate and doable target of their performance	2.27	0.425
P5	Feel guilty for not accomplishing	2.43	0.353
P6	Are rewarded for good work	1.97	0.844
P7	Use HMIS data for day to day management of the facility and district	1.9	0.329
P8	Display data for monitoring their set target	2.2	0.896
P9	Can gather data to find the root cause(s) of the problem	2.07	0.864
P10	Can develop appropriate criteria for selecting interventions for a given problem	2.6	0.257
P11	Can develop appropriate outcomes for a particular intervention	2.37	0.366
P12	Can evaluate whether the targets or outcomes have been achieved	1.9	0.925
P13	Are empowered to make decisions	2.17	0.745
P14	Able to say no to superiors and colleagues for demands/decisions not supported by evidence	1.83	0.858
P15	Are made accountable for poor performance	5.77	0.844
P16	Use HMIS data for community education and mobilization	1.77	0.559
Personal			
BC1	Collecting information which is not used for decision making discourages me	2.37	0.509
BC2.	Collecting information makes me feel bored	5.9	1
BC3	Collecting information is meaningful for me	2	0.173
BC4	Collecting information gives me the feeling that data is needed for monitoring facility performance	2.53	0.103
BC5	Collecting information give me the Feeling that it is forced on me	1.87	0.323
BC6	Collecting information is appreciated by Co-workers and superiors	1.87	0.728

SE1	I can calculate percentages/rates correctly	0.67	0.643
SE2	I can plot data by months or years	0.67	0.643
SE3	I can compute trend from bar charts SE5	0.33	0.165
SE4	I can explain findings & their implications	0.67	0.643
SE5	I can use data for identifying gaps and setting targets	0.33	0.557
SE6	I can use data for making various types of decisions	and providing feedback	0.33

Table 3: Quality of Data in Nowshera District Facilities

Query	Response from Facility	Percentage
Keeping Record	**Yes 7**	**23.33%**
	No 5	16.67%
No of facilities actually reporting	Yes 18	60.00%
	No 12	40.00%
A Reporting Month A	Before deadline 16	53.33%
	After deadline 14	46.67%
Availability of person for collection of monthly report	Yes 14	46.67%
	No 16	53.33%
Data Accuracy	Yes 11	36.67%
	No 19	63.33%
Indicators for Each Facility Catchment Area	Yes 6	20.00%
	No 24	80.00%
Comparison among Facilities	Yes 2	6.67%
	No 28	93.33%
Comparison among Type of services	Yes 4	13.33%
	No 26	26.86%
Is monthly report form complex and difficult to follow	Yes 18	60.00%
	No 12	40.00%
Do you find that IT is easy to manage	Yes 10	33.33%
	No 20	66.67%
DHIS has information that is spread over in different information system	Yes 17	56.67%
	No 13	43.33%
(LAN) exist to provides access to information to all district managers	Yes 10	33.33%
	No 20	66.67%

DISCUSSION

In Pakistan, research has shown that many issues exist in the existing health information system. Many districts are still operating on the old-fashioned Health Information Management System HIMS. The few one which have installed the latest District Health Information System DHIS still face basic operating problems. As evident from our study, the most important of which are lack of facility to record the data systematically, lack of feedback system, lack of utilization of information in taking decisions and disease surveillance, inefficient management, power politics and the incapability of the staff to adapt to the modern system. These are the core issues that have been pointed out by our study. Other than these there are many other issues that need to be addressed in the future for a more efficient health information system.

Results of our study are similar to the results of 20 studies from 11 countries that recognized proper management of data in the health sector [11]. In another research, it has been indicated that the public sector structure system and style of management in Pakistan are the main hurdles in the way moving forward. The managers and the subordinates are not content with the authority above them supervising them and the existing information system. Personnel working in the HMIS feel a lack of sense of job security when taking any action independently. They feel a sense of fear and threat of being transferred and held accountable for doing anything against the management.

Literature indicates that a true leadership could inculcate the essential values in the system and could play an important role in sustaining the values that could benefit the majority of the public. They should try to introduce a culture of submission of regular reports and data to the DHO and to the national level in particular, arranging the resources necessary for the usage of latest techniques in the HIS and minimizing the inaccuracies in the data.

Other studies show that lack of clear explanation of the nature of the job leads to un-clarity about the duties and responsibilities of the staff. That is one of the major causes of the inefficiency of the system. Absence of satisfaction, motivation, appreciation, and reward for efficient working are amongst the other causes. Literature has proven that in cases where steps were taken to introduce reforms in the existing HIMS, the focus is only paid towards the financial or the organizational reforms ignoring the human resource reform intervention. It is suggested that for the improvement in the system the top priority should be given to human resource policies, improving management skills, developing planning from grass root level to national level and initiation of the training programs to equip them with modern skills for operating the HMIS efficiently[12,13].

Current researches suggest that the main obstacle in improving the HIS is not shortage of tools but the poor management of the resources. The reasons behind this include: poor management of data, poor quality of data due to data duplication, selection of data without taking the technicalities into the account, lack of proper channel for timely and updated transmission of data to the national level and lack of coordinated efforts to address the problems of the periphery to the district and then to the national level respectively. The health workers do not have access to the proper and standardized training through which they could develop an understanding of procedure for collection and processing of the data. Furthermore, there is a lack of motivation and financial incentives for the health services worker due to which they tend to lose interest in their work and chances of errors increases. The lack of feedback system is another reason behind this poor quality of data.

On general assessment of the existing health system it was found out that the overall system is very feeble, the data collection system is not that much organized and information is disseminated in fragments. In view of this situation, efforts should be organized where the prime focus should be on the organization of data, utilization of the data and dissemination of the data to the respective stakeholder.

There is no proper management system that ensures the timely transmission of the data from district to provincial and from provincial to the national level. The ultimate result of which has to be faced by the HIS in the form of outdated, low quality data and decisions taken without any sound background data. As a result the staff and healthcare personnel have to make decisions based upon their gut feelings. As the HMIS is not of universal type across all the districts of Pakistan, the information generated by this software is of different standard from one another. This creates the problem at the provincial and national level when data is assimilated together to generate monthly or annual reports. In many facilities computers are not being used, reason is not the unavailability of the computer but the absence of skilled staff to operate the computer. The utilization of some very simple and sophisticated programs like SPSS, GIs, and EPIINFO is not very popular in the health sector. Regarding the training of the HMIS staff, it is of utmost necessity to up regulate and appraise the training process seriously. The possible reason behind the lack of implementation of an effective training process is lack of professional or ethical incentives for utilization of staff skills with maximum efficacy in routine work. Work ethics should be defined for all the workers and it should be implemented without any discrimination from the top level authority to the grass root level. Universal code of ethics should be institutionalized in every facility and its implementation should be followed strictly. A reliable HMIS should produce complete, authentic and timely information to the health managers and all the stakeholders. So that this information could be utilized as a basis for taking the timely decisions that would contribute in improving the quality and sustainability of the health programs.

The HMIS operating in the facilities could be used as the most powerful tool for planning and managing the health services. In order to establish a system that could prove to be efficient enough to respond to the needs of taking a decision based upon the information from the healthcare delivery system. We need to have a vast health information system that should have the ability to process all over the country in terms of infrastructure and networking.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Nawaz R: Study design, discussion, Manuscript writing.

Khan SA: Concept, critical review.

Khan GS: Analysis, interpretation.

Nawaz S: Literature search.

Nasir F: Bibliography.

Tayyaba: Statistical Analysis.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.