



ORIGINAL ARTICLE

## Role of accuracy of data in the functionality of primary health care system of Pakistan: A comparative study.

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**ABSTRACT... Objective:** To evaluate the Quality and accuracy of existing Data, to know about the current situation of Infrastructure and Functionality of Primary Health Care (PHC), and to assess the District Health Information System (DHIS) Operational Needs. **Study Design:** Mixed Method Retrospective Descriptive study. **Setting:** Seven Tehsils of Rawalpindi District. **Period:** January to February 2020. **Material & Methods:** One BHU was randomly selected from each Tehsil to cover all geographical areas. Data was collected using questions derived from the Procedures Manual of DHIS and comparing with the monthly DHIS reports of PHC facilities. Data was analysed after entering into SPSS software (V-22). **Results:** The 57 % of the facilities' in-charges (4 out of 7) had DHIS training, while the remaining 43% were observed as either not trained or self-trained. The overall accuracy rate in DHIS was 71.43% but variance was observed in different variables. **Conclusion:** The current situation of DHIS demands initiative for additional collaborations among multiple vertical health programs. Some promising interventions in government policies, including skilled support programs and training of DHIS teams through regular sessions and workshops are highly recommended.

**Key words:** Accuracy, Health Management Information System, Primary Health Care, Quality Data.

### INTRODUCTION

Health Information System is a system that collects data, analyses and use the results for improving quality and efficiency of health services, along with better management at all levels specifically PHC.<sup>1</sup>

A proper DHIS is vital for improving the health indicators of a developing country like Pakistan with limited physical, human and financial resources. Timely and reliable data is crucial for appropriate planning and organization of health services. DHIS was introduced to replace Health Management Information System (HMIS).<sup>2</sup> Currently out of 140 districts 126 districts are reporting regularly in Pakistan.<sup>3</sup>

DHIS is nationally standardized system of data collection, analysis and feedback. Currently this is operational in public sector health facilities only.

The data provided by DHIS is used for planning, application and monitoring of diseases along with implementation of preventive services by utilizing the available resources.<sup>4</sup>

In our setting, PHC facilities comprises of two main setups, Basic Health Units (BHU) and Rural Health Centers (RHC). Here, Medical Officer is responsible for supervision of the overall work of the facility, its employees and health personnel involved in outreach/ community-based services. A standard checklist is provided at all PHC facilities.<sup>5</sup>

For administrative purposes, district Rawalpindi is divided into seven tehsils and has ninety-eight BHU's.<sup>6</sup> Report compliance of health facilities in Punjab is ninety nine percent (99%).<sup>7</sup> Lot quality assurance sampling (LQAS) has been anticipated as an effective tool for monitoring health programs

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and assessing the quality of data at health center.<sup>8</sup> However, there are very limited studies, who have analyzed the accuracy of data reporting from the BHUs in Rawalpindi. The deficiency in basic management skills of health teams is a major constraint in functionality of PHC in Pakistan. Therefore, we aimed to assess the quality of available data and evaluate the accuracy of reports (LQAS) of seven Basic Health Units of Rawalpindi district to know the current situation of infrastructure & functionality in these areas, highlighting the DHIS operational needs.

**MATERIAL & METHODS**

This study was conducted in seven tehsils of Rawalpindi district. One BHU was randomly selected from every tehsil to cover all geographical areas of the district. The list of names of all BHUs as shown in Table-I. Data was collected through semi-structured interviews and analysis of documents.

S. No	Name of BHU	Name of UC	Tehsil
1.	Hayal Sharif	Dharmyal	Rawalpindi
2.	Karore	Karore	KotliSattian
3.	Pindnoshari	Thatha Khalil	Taxila
4.	Phalina	Phalina	KalarSaidan
5.	Sahang	Sahang	Gujar Khan
6.	Treet	Treet	Murree
7.	Dakhali	Dakhali	Kahuta

**Table-I. List of BHUs selected along with the Union Councils (UC) and Tehsils**

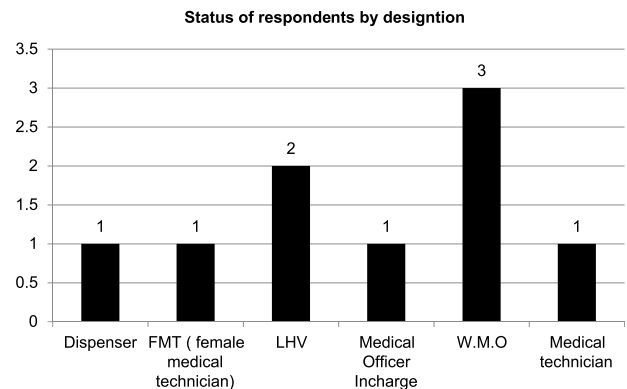
This was a mixed method retrospective descriptive study on the data recorded in the months of October, November and December 2019, while the data was gathered in January-February 2020. Monthly reports and data recorded in DHIS was used to compare and check for accuracy and application of reports.

A self-constructed DHIS questionnaire, adapted from different tools of DHIS was used. Qualitative data collection was done through semi-structured interviews, observation of participants and analysis of documents, checklists and reports. Data was analyzed by content analysis methods and reorganized according to seven themes developed during the study. These

themes are data generation; data management; data analysis, transmission, and reporting; data interpretation; feedback and; training on DHIS method. Quantitative data was collected from DHIS registers and its reporting on DHIS forms. Results were analyzed using SPSS 22, using descriptive statistics and frequency distributions.

**RESULTS**

The participants of the study consisted of professionals and qualified staff, which compliments the credibility of data. This is shown in Figure-1.



**Figure-1. Number and type of respondents in the study**

There was no difference between reported forms and registered figures in outpatient attendance per capita in all BHUs of study area. The study showed that the highest number of OPDs were found in BHU Sahang and lowest in Tret. A difference between reported and registered figures was found in BHU Phalina and Tret. As in Tret, a trained Lady Health Visitor (LHV) was responsible for maintaining DHIS form while in Phalina, Women Medical Officer (WMO) responsible for DHIS reporting was not trained.

For pneumonia, there was no difference found in the month of October and the reporting accuracy was 100%. Accuracy ratio was 82% in November. Difference between Reported and registered was found in BHU Phalina in which reported numbers were higher than registered. The accuracy ratio for the month of December was 90.47%.

For diarrhea, difference was found in two BHUs (Karor and Dakhali). Data accuracy ratio was

71.42%. Low reporting was observed in the month of November while there was no reporting in Sahang BHU. The accuracy of all three months was 71.43%. The overall accuracies of these indicators are shown in Table-II.

Parameter	Accuracy (%) of Reports
Daily OPD attendance	80.95
Pneumonia under 5 years	90.47
Diarrhea under 5 years	71.43
Suspected Malaria	95.00
TB-DOTS	42.85
Full immunization	66.66
Family planning visit	66.47
Antenatal care visit	85.71

**Table-II. Accuracy of DHIS reported parameters**

Difference was not found in any BHU's data for suspected cases of malaria in the months of October and December. However, for the month of November, difference in Phalina BHU was found and the accuracy ratio was 85.71%.

Karor and Tret BHUs reported zero cases of Tuberculosis. In November, reported and registered figures were different in four BHUs and no patient was reported or registered in two BHUs. The accuracy was 42.85% for all three months. Only one BHU (Hayal Sharif) had a case of positive AFB but reported figure was high than register. Only one BHU (Phalina) reported that they had referred an AFB positive patient to another hospital.

For immunization, BHU Hayal sharif, and Tret had a difference in reported and registered figures. The accuracy in October was 71.42%, in November 85.71% and in December 2019. Data accuracy was 42.85% in all BHUs.

There was no entry of family planning visit in registers but 43 visits were reported in BHU Hayal Sharif. Difference in reported and registered figures were found in three BHUs. The accuracy

was 57.14% in October. Data difference was observed in two BHUs and same results of Hayal Sharif was observed in November and December for which the accuracy rate was 71.14%. In all three months reported figures were higher than registered figures. Moreover, no Antenatal care visit was recorded in BHU Karor and Tret during the study period. Difference between reported and registered figures was found in two BHUs namely Hayal Sharif, and Phalina. Antenatal Care visit accuracy ratio was 100%, 85.71% and 71.42% in October, November and December respectively.

During the survey, it was found that only one facility was in charge of filling the reporting form of DHIS. Among them 57.1% were trained in DHIS instruments; they had acquired training from a local office. About 85% (6 out of 7) of the health facilities recommended having refresher training in DHIS. The data analysis pointed out that 14% BHUs faced the shortage of tools and medical equipment.

LQAS test of Hayal Shaarif was in lowest accuracy (56.42%) with a missing data ratio of 12.82%. BHU Dakhali's data was the most accurate among all the BHUs (95%) and missing data percentage was 25.64%. BHU Tret had an accuracy ratio of 82% but had the highest missing data ratio (35.89%), BHU Karor had an accuracy of 70% and Sahang had an accuracy of 74% but missing data ratio was higher in Karor (35.89%) than Sahang (28.2%). The overall accuracy in this study was 75% and missing data ratio was 25%. The LQAS results are shown in Table-III.

## DISCUSSION

DHIS provides the basic data for planning, execution and monitoring on main indicators of disease pattern, preventive services and available resources.<sup>11,12,13</sup>

	Hayal Sharif	Karor	Tret	Sahang	Dakhali
Accuracy Level (%)	56.42	70	82	74	95
Missing Data (%)	12.82	35.89	35.89	28.2	25.64

**Table-III. LQAS result of BHUs surveyed**

At PHC level, Medical Officer in-charge is responsible for the overall supervision although supervisory role has not been clearly mentioned in their job descriptions.<sup>14</sup> This was depicted in our study that the personnel responsible for filling out the registers were not all medical officers; hence they were not properly trained for doing this task.

One of the significant indicators to assess functioning of health facility is the outpatient attendance per capita.<sup>15</sup> If Out Patient Department (OPD) attendance is found to be high in the public health facilities, it suggests that the population is extremely satisfied with the services in these facilities.<sup>16</sup> The accuracy ratio in OPD data was 80.95%, matching the results of other developing countries. As in Uganda, 85.3% of health facilities used OPD registers while only 61.8% were correctly filled. Reporting trend in our study was same as in Uganda but we had better socioeconomic indicators.<sup>17</sup>

Pakistan ranks among the ten countries having highest under-5 mortality burden, both for diarrhea and lower respiratory infection.<sup>18,19</sup> A survey conducted in a rural Pakistani community showed that for childhood diarrhea and pneumonia, caregivers prefer to seek consultation from doctors (97%), of which 75% caregivers pursued care from private and 45% from public sector.<sup>20</sup> However, our study showed no patients of Pneumonia in 71.42% BHUs, possibly because they refer Pneumonia cases to other hospitals. Among those BHUs, where Pneumonia cases were documented, the accuracy ratio was 90.47% and during peak months no patient was recorded in these seven BHUs. In addition, there was highest number of diarrheal patients in BHU Tret, with accuracy ratio of 66%.

Our study showed a 95% accuracy in reporting of malaria cases. This is because of a high number of malaria cases in our community with estimated 1.5 million annually.<sup>17</sup>

Tuberculosis (TB) is one of the major public health issues in Pakistan accounting for 61% of the TB burden in the WHO Eastern Mediterranean

Region.<sup>21</sup> Our study showed careless behavior in DHIS data, as two BHUs were not reporting the data properly and a huge variation was observed in remaining BHUs, where the registered cases of TB were higher than reported data.

For immunization coverage, one such study reported that the coverage of individual vaccines was 76% for BCG, 61% for DPT 1, 49% for DPT 2, 45% for DPT 3 and about 27% for measles.<sup>22</sup> Comparatively, UNICEF reports, BCG coverage is less at 67%, DPT 3, is much higher at 63% and measles also higher at 57%.<sup>23</sup> From these discrepancies, it is obvious there is problem with the reporting of vaccination status.

No data is available on the accuracy of family planning and ANC visits. A study conducted in Punjab, Pakistan showed that overall, 28% of BHUs and RHUs had poor infrastructure. 16% of the health facilities were deficient in equipment. Essential Laboratory items, such as urine strips for albumin, blood sugar testing strips, and hemoglobin reagents, were particularly shortly stocked.<sup>24</sup>

A study conducted in Lahore, Pakistan showed regarding data recording and reporting tools, that out of 40 lady health workers (LHWs) interviewed, 32 (80%) had good knowledge, 6 (15%) had satisfactory knowledge, while 2 (5%) had an unsatisfactory knowledge. Only 47.5% of reports were found accurate, according to our scoring system. Additionally, 35% of reports had missed data entries, misrepresented data and simulated material.<sup>25</sup> Moreover, a study conducted in African countries, showed that data gathering has low priority and is unreliable.<sup>26</sup> This is reflected in our study as well, where there was low accuracy ratio of data in most BHUs and missing data frequency was high.

## CONCLUSION

The current situation of DHIS demands that the policy makers have to take initiative for collaborations among various health programs. Some promising interventions for appointing and retaining staff along with improving government regulations are highly needed. We highly

recommend training of health teams through workshops and sessions, along with on-site support on regular basis.




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## REFERENCES

- Nshimiyiryo A, Kirk CM, Sauer SM, Ntawuyirusha E, Muhire A, Sayinzoga F, et al. **Health management information system (HMIS) data verification: A case study in four districts in Rwanda.** PLoS ONE. 2020; 15(7): e0235823. <https://doi.org/10.1371/journal.pone.0235823>
- Maheen H. **Improving women's access to continuum of maternity-care services: A maternity-care model for rural Sindh, Pakistan.** Deakin University. 2017.
- DHIS Annual Report- 2019 by National Health Information Resource Center (NHIRC) Islamabad,** [https://dghs.punjab.gov.pk/system/files/DHIS%20Annual%20Report%202019\\_0.pdf](https://dghs.punjab.gov.pk/system/files/DHIS%20Annual%20Report%202019_0.pdf)
- Farnham, A., Utzinger, J., Kulinkina, A. V., & Winkler, M. S. **Using district health information to monitor sustainable development.** Bulletin of the World Health Organization. 2020; 98(1):69–71. <https://doi.org/10.2471/BLT.19.239970>.
- Pakistan Demographic Health Survey 2017-2018.** <https://dhsprogram.com/pubs/pdf/FR354/FR354.pdf>
- Health Information System Punjab Annual Report- 2017, MIS Cell Director General Health Services Lahore, Punjab.** <https://phkh.nhsrsc.pk/sites/default/files/2019-06/HIS%20Review%20Pakistan%20Dec%202017.pdf>
- Rath RS, Solanki HK. **Review of lot quality assurance sampling, methodology and its application in public health.** Nepal J Epidemiol. 2019; 9(3):781-787. Published 2019 Sep 30. doi:10.3126/nje.v9i3.24507.
- Procedures manual for district health information system (DHIS).** National Health Information Resource Center (NHIRC) Ministry of Health, Pakistan. <https://www.scribd.com/document/144112089/Procedures-Manual-Final-NHIRC>
- Lorenzi, N. M., Riley, R. T., Blyth, A. J., Southon, G., & Dixon, B. J. **Antecedents of the people and organizational aspects of medical informatics: Review of the literature.** Journal of the American Medical Informatics Association: JAMIA. 1997; 4(2):79–93. <https://doi.org/10.1136/jamia.1997.0040079>.
- Mitchell J. A. **Basic principles of information technology organization in health care institutions.** Journal of the American Medical Informatics Association: JAMIA. 1997; 4(2 Suppl):S31–S40.
- Javed, T. A., & Amin, S. **Health sector reforms programme in Punjab: A primary healthcare initiative.** Clinical medicine (London, England). 2007; 7(1):19–22. <https://doi.org/10.7861/clinmedicine.7-1-19>.
- Begum, T., Khan, S. M., Adamou, B., Ferdous, J., Parvez, M. M., Islam, M. S., Kumkum, F. A., Rahman, A., & Anwar, I. **Perceptions and experiences with district health information system software to collect and utilize health data in Bangladesh: A qualitative exploratory study.** BMC health services research. 2020; 20(1):465. <https://doi.org/10.1186/s12913-020-05322-2>.
- Raeisi AR, Saghaeiannejad S, Karimi S, Ehteshami A, Kasaei M. **District health information system assessment: A case study in Iran.** Acta Inform Med. 2013; 21(1):30-35. doi:10.5455/aim.2012.21.30-35.
- Dehnavieh, R., Haghdoost, A., Khosravi, A., Hoseinabadi, F., Rahimi, H., Poursheikhali, A., Khajehpour, N., Khajeh, Z., Mirshekari, N., Hasani, M., Radmerikhi, S., Haghghi, H., Mehrolhassani, M. H., Kazemi, E., & Aghamohamadi, S. **The District Health Information System (DHIS2): A literature review and meta-synthesis of its strengths and operational challenges based on the experiences of 11 countries.** Health information management: Journal of the Health Information Management Association of Australia. 2019; 48(2):62–75. <https://doi.org/10.1177/1833358318777713>.
- Joudyian, N., Doshmangir, L., Mahdavi, M., Tabrizi, J. S., & Gordeev, V. S. **Public-private partnerships in primary health care: A scoping review.** BMC health services research. 2021; 21(1):4. <https://doi.org/10.1186/s12913-020-05979-9>.
- McLean S, Gee M, Booth A, Salway S, Nancarrow S, Cobb M, Bhanbhro S. **Targeting the use of reminders and notifications for uptake by populations (TURNUP): A systematic review and evidence synthesis.** Health Services and Delivery Research. 2014; 2(34).
- Oguttu, D. W., Matovu, J., Okumu, D. C., Ario, A. R., Okullo, A. E., Opigo, J., & Nankabirwa, V. **Rapid reduction of malaria following introduction of vector control interventions in Tororo District, Uganda: A descriptive study.** Malaria journal. 2017; 16(1):227. <https://doi.org/10.1186/s12936-017-1871-3>
- GBD Diarrhoeal Diseases Collaborators. **Estimates of global, regional, and national morbidity, mortality, and aetiologies of diarrhoeal diseases: A systematic analysis for the Global Burden of Disease Study 2015.** The Lancet. Infectious diseases. 2017; 17(9):909–948. [https://doi.org/10.1016/S1473-3099\(17\)30276-1](https://doi.org/10.1016/S1473-3099(17)30276-1)

19. GBD 2015 Lower Respiratory Infections Collaborators. **Estimates of the global, regional, and national morbidity, mortality, and aetiologies of lower respiratory infections in 195 countries: A systematic analysis for the Global Burden of Disease Study 2015.** The Lancet. Infectious diseases. 2018; 17(11):1133-1161. doi: 10.1016/S1473-3099(17)30396-1.
20. Aftab, W., Shipton, L., Rabbani, F., Sangrasi, K., Perveen, S., Zahidie, A., Naeem, I., & Qazi, S. **Exploring health care seeking knowledge, perceptions and practices for childhood diarrhea and pneumonia and their context in a rural Pakistani community.** BMC health services research. 2018; 18(1):44. <https://doi.org/10.1186/s12913-018-2845-z>.
21. **WHO World Health Organization Geneva, (2017) Switzerland**<http://apps.who.int/iris/bitstream/handle/10665/259366/9789241565516-eng.pdf?sequence=1> Global Tuberculosis Report. (WHO/HTM/TB/2017.23) 2017
22. Rehman SU, Siddiqui AR, Ahmed J, et al. **Coverage and predictors of routine immunization among 12-23 months old children in disaster affected communities in Pakistan.** Int J Health Sci (Qassim). 2017; 11(1):1-6.
23. Butt M, Mohammed R, Butt E, Butt S, Xiang J. **Why have immunization efforts in Pakistan failed to achieve global standards of vaccination uptake and infectious disease control?.** Risk Manag Healthc Policy. 2020; 13:111-124. Published 2020 Feb 12. doi:10.2147/RMHP.S211170
24. Majrooh, M. A., Hasnain, S., Akram, J., Siddiqui, A., Shah, F., & Memon, Z. A. **Accessibility of antenatal services at primary healthcare facilities in Punjab, Pakistan.** JPMA. The Journal of the Pakistan Medical Association. 2013; 63(4 Suppl 3): S60-S66.
25. Mahmood, S., & Ayub, M. **Accuracy of primary health care statistics reported by community based lady health workers in district Lahore.** JPMA. The Journal of the Pakistan Medical Association. 2010; 60(8):649-653.
26. Gimbel, S., Mwanza, M., Nisingizwe, M. P., Michel, C., Hirschhorn, L., & AHI PHIT Partnership Collaborative. **Improving data quality across 3 sub-Saharan African countries using the Consolidated Framework for Implementation Research (CFIR): Results from the African Health Initiative.** BMC health services research, 2017; 17(Suppl 3):828. <https://doi.org/10.1186/s12913-017-2660-y>.

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