Opinion and Analysis

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Evolution and Challenges of Public Health Data Systems for Family Planning Service Delivery in Punjab Province, Pakistan

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Abstract

An effective and responsive health system is based on timely decision-making based on accurate and real-time data. Strong health information systems are a pre-requisite for effective health system especially in the context of family planning service delivery. This opinion piece provides an overview of health data system fragmentation in Punjab specifically the ones related to family planning, including the District Health Information System (DHIS), Lady Health Workers-Management Information System (LHW–MIS), Contraceptive Logistic Management Information System (cLMIS), Electronic Medical Records (EMR), and the Hospital Management Information System (HMIS). While each system is well intended to serve a particular purpose, however, their lack of compatibility and integration has created data silos and redundancies, which presents a major challenge for effective decision making. The main hurdles for a seamless health information system start from ambiguous and fragmented policies, human resource shortages, limited digital infrastructure and staff technical capacity to manual data-entry and insufficient and irregular data validation. These obstacles affect real-time monitoring of contraceptive availability and utilization and effectiveness of service delivery. The restructuring of health department in Punjab - merger of Health and Population Welfare departments and outsourcing of Basic Health Units (BHUs) and Rural Health Centers (RHCs) to private medical practitioners, without standard guidelines for data reporting, recording and management have further aggravated the issues. This opinion piece recommends that the data systems be integrated into a unified health information platform for data-entry and reporting.

Keywords: Data systems, integration, public health, family planning data

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Introduction

Punjab is the most populous province of Pakistan and effective family planning programming has gradually become an existential issue for the over-stretched resources of the province. Robust public data systems that make real time monitoring of service delivery and assessment of programmatic impact possible, lead to informed policy decisions and effective programming(1). These data systems provide basic and essential information regarding family planning commodities and clients like number of clients served for family planning, family planning method breakup, which is necessary for estimating the number of family planning clients served through the government's system (2). An in-depth understanding of the data systems in Punjab can be gained by detailed study operational parameters including captured indicators and challenges for producing correct and timely information (1). Data enables policy makers and healthcare providers to make responsive policies and effective programs, improving family planning accessibility reducing unmet need. Accurate data facilitates effective monitoring, ensuring contraceptive availability, and identifying gaps in reproductive health programs. The data analysis helps identify trends according to which governments can optimize resource allocation, outreach strategies, and tailor interventions to meet community needs.

Family Planning Information Systems in Punjab

A multilayered family planning service reporting and recording system operates in Punjab (3). The following data systems in Punjab province are used to maternal and child health indicators as well as family planning indicators:

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1. **Service Delivery Record Registers** – Individual client data are recorded in the District Health Information System (DHIS) Family Planning registers by the Lady Health Visitor (LHV) at the Department of Health's service delivery points – Basic Health Units (BHUs), Rural Health Centers (RHCs), Tehsil Headquarter Hospital (THQ), and District Headquarter Hospitals (DHQs) (4). Generally, Family Welfare Workers (FWWs) are responsible for data recording in Family Planning registers, in the health facilities of Population Welfare Department,
2. **District Health Information System (DHIS)** – The vital system recording and managing health data, including family planning, was launched in 2006 (4). Lady Health Visitors (LHVs), stationed at BHUs and RHCs are responsible for daily uploading service delivery summary online. Family planning commodities receipt and consumption is reported monthly on DHIS by the Dispenser. The information is compiled at district MIS cells, and is readily available to the provincial MIS cell for detailed analysis, ensuring effective monitoring and policy development (5).

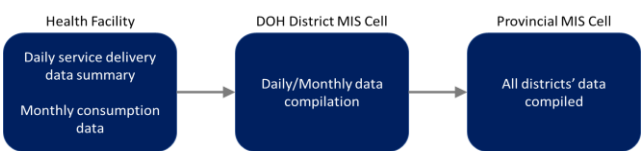

Figure 1: DHIS Reporting System

The MIS Cell in Punjab is housed and operationalized under the Director General Health Services (DGHS) Punjab. The Director DHIS is responsible for providing provincial oversight and the District Coordinator supervises district-level operations. At the district level, DHIS operates under the CEO Health office, supported by a Statistical Officer and a Computer Operator, who responsible for data management and reporting (6).

3. **Lady Health Workers-Management Information System (LHW–MIS)** – The LHW–MIS in Punjab, Pakistan is part of the Integrated Reproductive, Maternal, Neonatal, and Child Health (IRMNCH) Program, launched in July 2013 (6). This system helps track the activities of Lady Health Workers (LHWs), including their role in family planning service delivery, maternal health, and community outreach.

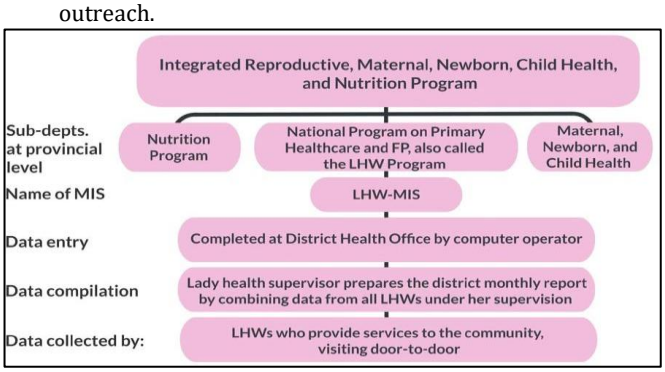

Figure 2: LHW-MIS Framework (6)

LHWs collect data from the communities and submit to their respective Lady Health Supervisor (LHS) for compilation. LHS uploads data online on LHW-MIS, and is compiled at the district level. Once information is entered into the LHW–MIS, it is available to all tiers—i.e., it is available at the district, provincial, and federal levels (6).

4. **Contraceptive Logistic Management Information System (CLMIS)** – Pakistan's first public sector's computerized, web-based Logistic Management Information System (LMIS) was launched in 2011 with the contraceptive component being referred to as the Contraceptive Logistic Management Information System (cLMIS) (7). Population Welfare Department is the prime custodian of the cLMIS, which is aimed at providing central, district, and service delivery-level stock sufficiency, consumption, inventory management, storage, and distribution data for publicly-offered FP products and select NGO FP commodities (6,7).

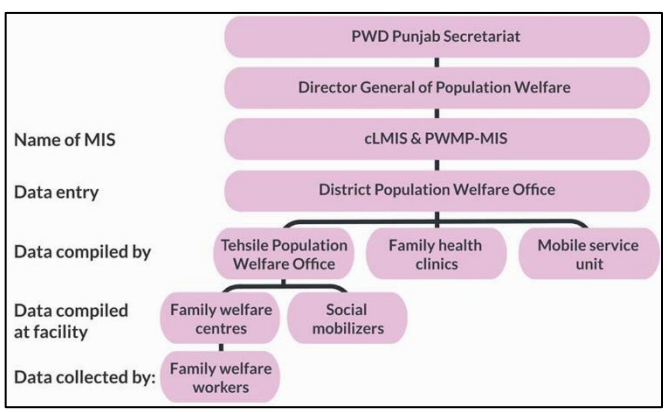

Figure 3: cLMIS Reporting Mechanism (6)

The service delivery data are maintained in registers at the PWD service delivery points. Monthly summary is prepared at the service delivery point and submitted to the *Tehsil* offices, where data are compiled. The tehsil data are submitted to district PWD office for data entry and digitization. The Family Health clinics – housed within tertiary care hospitals - and Mobile service Units directly submit their data to the district population welfare office for further data entry into the cLMIS.

5. **Electronic Medical Record (EMR) / Hospital Information Management System (HMIS)**

The electronic medical record (EMR) system was introduced in Punjab, in 2017 (5). The Health Information and Services Delivery Unit (HISDU) rolled out EMR in Basic Health Units and Rural Health Centers across the province, transforming healthcare service delivery. In 2018, plans were approved to implement the Hospital Information Management System (HIMS) solution at 33 district and tehsil headquarters hospitals. The EMR system implementation in government health facilities in Punjab followed a structured process led by HISDU. Starting with

system development and IT infrastructure upgrades including provision of tablets for data-entry, biometric systems, and internet connectivity at the health facilities was followed by phased trainings of all relevant health facility staff on data entry and system usage to support digital data entry. The rollout occurred in phases, and included continuous monitoring to resolve technical challenges and improve functionality. The EMR system is aimed at enhancing patient registration, medical history tracking, e-prescriptions, and inventory management, ultimately contributing to efficient healthcare delivery in Punjab (5,6).

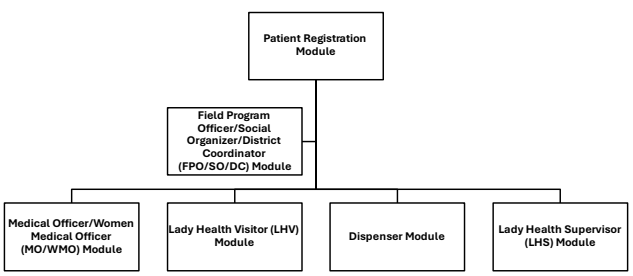

Figure 4: Electronic Medical Record (EMR) Modules (8)

EMR has multiple interlinked modules (8). Family planning service delivery is captured through Lady Health Visitor's (LHV) Module, documenting contraceptive method selection, and follow-up visits. Medical Officer/Women Medical Officer (MO/WMO) Module records patient consultation, contraceptive counseling, and prescription details while dispensation of contraceptives and medication is recorded in the Dispensers module. In theory a client cannot be served until data entry is completed in above three in addition to patient registration module.

6. Integrated Hospital Management Information System (HMIS)

Starting with Pakistan Kidney and Liver Institute (PKLI) in 2017, HMIS was launched in many secondary and tertiary hospitals in Punjab, in a phased manner. EMR is also part of HMIS, that was rolled out at the primary health care facilities in Punjab. Following the initiation of the World Bank backed Punjab Family Planning Program in September 2023, process to have an integrated HMIS for family planning was accelerated, with an aim to compile family planning service delivery data at one place, facilitating effective decision making (5). For the same purpose EMR was rolled out at all service delivery points of Population Welfare Department in later part of 2024.

Interconnectivity and Integration of Data Systems

The data systems in Punjab province remain fragmented despite the ever-present aim of having an integrated information system (5,6,8). The cLMIS is the nearest actualization of this long held dream whereby cLMIS combines the district level reporting of commodities consumption data from LHW-MIS and DHIS. Both data systems are linked with cLMIS through a systems bridge at the district level with healthcare facility level data being available for the Population Welfare department. Currently, there is no connectivity of EMR/HMIS with DHIS and/or cLMIS.

Challenges in Data Recording and Reporting

Family planning record-keeping in Punjab is facing several challenges at recording, reporting, and compilation levels because of fragmented systems, and limited resources and technical capacity. Key issues include:

i- Fragmentation and Lack of Interoperability

- DHIS, LHW-MIS, EMR/HMIS, and cLMIS function in isolation resulting in data silos and inconsistencies.

ii- Inconsistent Data Recording and Quality Issues

- Manual data entry at primary healthcare levels increases the risk of errors and duplication.
- Shortage and overburdening of staff – in most of the cases LHV is responsible for majority of service delivery i.e., family planning, maternity services, vaccination as well as data entry in manual registers, DHIS and EMR. This leads to incomplete and inconsistent data entries in different data systems.
- Lack of data validation – Neither regular data validation processes are operational nor is there any effort to match and triangulate data from different systems i.e., manual registers, DHIS, EMR and cLMIS.
- Competing priorities – DHIS is housed within Director General Health's office while EMR/HMIS is owned by DoH secretariat. Although there has been talk of integrating both systems but no real action has been taken to this effect. The multiple data entry systems lead to incorrect and incomplete information in all data systems which affects real-time decision-making.

iii- Limited Digital Infrastructure and Connectivity

- Internet connectivity is unstable or absent in many basic health units (BHUs) and rural health centers (RHCs) leading to delayed transmission of data.
- Multiple software and limited technological skills slow down data processing.
- Failure to maintain tablets properly and regularly has resulted in increased staff effort in manual data-entry instead of decreasing it.

iv- Supply Chain & Service Delivery Gaps

- cLMIS struggles with contraceptive stock tracking, leading to shortages or overstocking.
- LHW–MIS lacks real-time updates, affecting community-level service monitoring.

v- Policy and Institutional Barriers

- Ambiguous standard operating procedures – The departmental restructuring - merger of DOH and PWD as Health and Population department, outsourcing of BHUs – without clear operational SOPs has put data

management at the back burner, further complicating the question of data reliability (9,10).

- While the merger between Health and Population Welfare Departments has taken place at the higher level, operations continue to remain independent resulting in data systems being isolated.
- Outsourced BHUs enter data only into the EMR as per their pay-for-performance agreement with IRMNCH. The outsourced staff has not yet received trainings on DHIS; hence, data are missing from outsourced facilities in DHIS, cLMIS, and LHW-MIS.
- Limited funds are available for integrating the different MIS and build staff capacity.

Recommendations for Improving the data environment

1. Unified Health Information Platform - Accelerate and focus the integration of multiple data systems at one platform to ensure seamless data flow and consistency.
2. Matching right person for the right job – health service delivery staff are skilled at providing health services, with minimum exposure to data management skill or training. Innovative solutions should be encouraged for facilitating the data relating function by engaging community volunteers, students though existing community engagement mechanisms at the health facility level e.g., community / village health committees.
3. Ensure data validation – reactivate data validation mechanism, at least on monthly basis, to ensure data quality and completeness both at facility and district levels.
4. Upgrade health management software with user-friendly interfaces and automated data synchronization.
5. Allocate sustained funding for capacity-building programs, data system upgrades, and health worker training.

Conclusion

Improving family planning data systems in Punjab is critical for ensuring effective service delivery, informed policy decisions, and optimal resource allocation. Currently, fragmented data platforms such as DHIS, LHW–MIS, EMR, HMIS, and cLMIS operate independently, leading to inconsistencies, data silos, and inefficiencies in tracking contraceptive use, service delivery, and supply chain management.

A unified and interoperable health information system is essential to significantly enhance data accuracy, streamline reporting, and facilitate real-time decision-making. This would improve the ability of healthcare providers to track service utilization, and ensure timely contraceptive availability, directly contributing to higher contraceptive prevalence rates and better reproductive health outcomes.

Investing in digital infrastructure upgrades, automated data synchronization, and workforce training will empower frontline healthcare workers to capture accurate service data while reducing administrative burdens. Additionally, ensuring real-time validation and integration of family planning records across systems will enhance monitoring, planning, and policy responsiveness, ultimately leading to sustained improvements in family planning uptake.

With strong political will, adequate funding, and strategic coordination, Punjab province can transition toward a modernized, data-driven approach that supports sustainable population management, improved maternal health, and equitable access to reproductive services.

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Authors' Contribution:

All Authors: Design, analysis, writing of the manuscript, final review

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