

HMIS Data Quality Concerns in Bihar: A Comparative Study of HMIS and AHS Data

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Abstract:

Health Management Information System (HMIS) is responsible for collecting the routine data of the health facilities; whereas Annual Health Survey (AHS) gathers information from the community itself. The main purpose of this paper is to test the validity and reliability of health data generated through HMIS as compared to Annual Health Survey data (as AHS data is considered more accurate). The secondary data has been taken from DHIS-2 web portal for facility wise reporting from the period of April 2010 to March 2011. For testing the validity of HMIS data generated from each facility, information from AHS (2010-11) has been used. Selected Health indicators from AHS (2010-11) were calculated using the district wise HMIS Data. The variations between two sources are analysed. The findings suggest that 36 (97%) districts of Bihar have reported the “percentage mothers who consumed iron folic acid tablets for 100 days or more” higher than AHS data. Same number of districts has reported home deliveries, higher than HMIS data. All 38 districts have reported women who availed financial assistance for Institutional delivery under JSY, which is higher than HMIS data. Similarly, 23 (62%) districts have reported children aged 12-23 months received BCG, higher than HMIS data.

Through discussion, it is evident that the HMIS system of Bihar state is mainly focusing on quantity and not on quality of data i.e. reporting for most of the health indicators by the districts is found higher as compared to the AHS survey data. Also, data reported through HMIS is not in synchronization with data collected through independent survey. To improve the quality of service data, the state should regularly train the concerned staff on reporting format, compilation of reports and validity check.

Key-words: Health Management Information System, Annual Health Survey, difference in value of indicator, Comparison of indicator

Key Messages:

Health data generated through HMIS should be consistent and valid to make better use in planning and implementation of public health programmes in effective manner. The gaps can be identified by comparing the value of indicators from HMIS with AHS data. Service (HMIS) data should be matched for its reliability and consistency with the survey (AHS) data.

Introduction:

The present paper tries to compare the service data being generated through DHIS-2 web portal of State Health Society Bihar (SHSB) with that of the survey data (AHS) for the similar time period (2010-11). This will help to understand the degree of variations in reporting the coverage of health services by the HMIS as compared to the AHS findings.

Health Management Information System (HMIS) is a process of collection, processing, and reporting the relevant information to health care providers and managers for effective and efficient planning and service delivery. HMIS was computerized in 2008¹, resulting in improvement in data quality (timeliness, correctness and valid data).² As per Lungu, HMIS provides Data centralisation, increased efficiency, security and confidentiality of the data, storage and access to data, increased accuracy of data.³

The Ministry of Health & Family Welfare, in collaboration with the Registrar General of India (RGI), had launched an Annual Health Survey (AHS) in the erstwhile Empowered Action Group States (Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Uttarakhand, Uttar Pradesh, Orissa and Rajasthan) and Assam.

Data quality issues have been at the heart of many practitioners and researchers for a long period of time. Since quality of data has many dimensions, discussions on the definition of data quality issues have been approached from various perspectives. Different techniques for assessing quality of information have been discussed^{6,7}. Some of the approaches have concentrated on the conceptual aspects focusing on the design and operation of information systems.⁸ Other approaches have attempted to define and manage data quality in terms of definition, content and presentation⁹. Based on an empirical survey by Wand and Wang, identified accuracy and correctness as the most important quality attributes for end users¹⁰. Using the user criteria, C W Choo defines quality as a general excellence of the information product or service that includes accuracy, reliability, and validity¹¹.

Some of the facts which affect the data quality are: low understanding of the data elements (19 percent), followed by no record in Mother and Child Health Register (14 percent) and counting error (10 percent). The counting error is more in Ante Natal Care related data, the highest being 24 percent in ANC registered in 1st trimester, followed by 22 percent in three ANC check-up. No record was available for condom pieces and oral pills distribution. The low understanding regarding the 100 Iron Folic Acid tablet was found highest at 22 percent, followed by 12 percent in routine immunization sessions held and also in ANC registered in first trimester.¹³

Subjects and Methods:

Methods

Secondary data has been taken for the purpose of study for the period of April 2010 to March 2011. Service data, being generated through the HMIS, has been downloaded from District Health Information System-2 (DHIS2) web portal of State Health Society Bihar. The same HMIS data are compared with survey data of AHS (2010 -11) to check the degree of variations in reporting of different health services by the health facilities in Bihar. The comparison was done on excel sheets manually. In addition to this, the authors have tried to relate the findings of this analysis with their fieldwork experience in the different districts of the state from November 2009 to May 2013. They were involved in strengthening

HMIS by capacity building of the state, divisional, district and block level staffs, their handhold support, organizing review meetings, etc.¹.

Selection of Health Indicators

The next step is to selection of health indicators which are comparable between HMIS and AHS data. Health Specific indicators are selected from AHS (2010-11) that can be calculated from the HMIS data generated from DHIS 2 web portal.

In this comparative study, selected indicators from AHS (2010-11) were calculated using the district wise HMIS data (April, 2010 to March, 2011) from DHIS-2 web portal of State Health Society Bihar. SHSB provides an Expected Level of Achievement (ELA) for 21 Indicators to all districts.

Colour Coding has been used (Green, Yellow, and Red) to demonstrate Data Match, positive deviation, and negative deviation.

| | | |
|----|---------------|--|
| 1. | Red colour | Indicates Data Mismatch HMIS/DHIS-2 >AHS |
| 2. | Yellow colour | Indicates Data Mismatch AHS>HMIS/DHIS-2 |
| 3. | Green Colour | Indicates Data Match within -10<x>10 |

Results:

Results and Findings

Table 1 presents indicator wise comparison of reporting of health services by 37 districts of Bihar in HMIS and Annual Health Survey for the same time period of 2010-11. Results of comparison between HMIS/DHIS-2 data and AHS data are represented in number and percentage form i.e. The number and percentage of districts showing different levels of coverage of health services for the same time period by two different sources of data i.e. HMIS and AHS.

Table -1: Indicator wise percentage of districts reporting the coverage of health services in HMIS (DHIS-2) and AHS survey (2010 -11)¹⁵

| Indicator (n=37) | District DHIS 2 > AHS | District AHS > DHIS 2 | District Data Match |
|--|-----------------------|-----------------------|---------------------|
| Percentage pregnant women aged 15-49 years registered for Antenatal check-up | 16 (43%) | 7 (19%) | 14 (38%) |
| Percentage pregnant women who had Antenatal Check-up in First Trimester | 6 (16%) | 15 (41%) | 16 (43%) |
| Percentage pregnant women who received 3 or more Antenatal check-up | 12 (32%) | 3 (8%) | 22 (59%) |
| Percentage pregnant women who consumed IFA for 100 days or more | 36 (97%) | 0 (0%) | 1 (3%) |
| Percentage delivery conducted at home | 0 (%) | 36 (97%) | 1 (3%) |

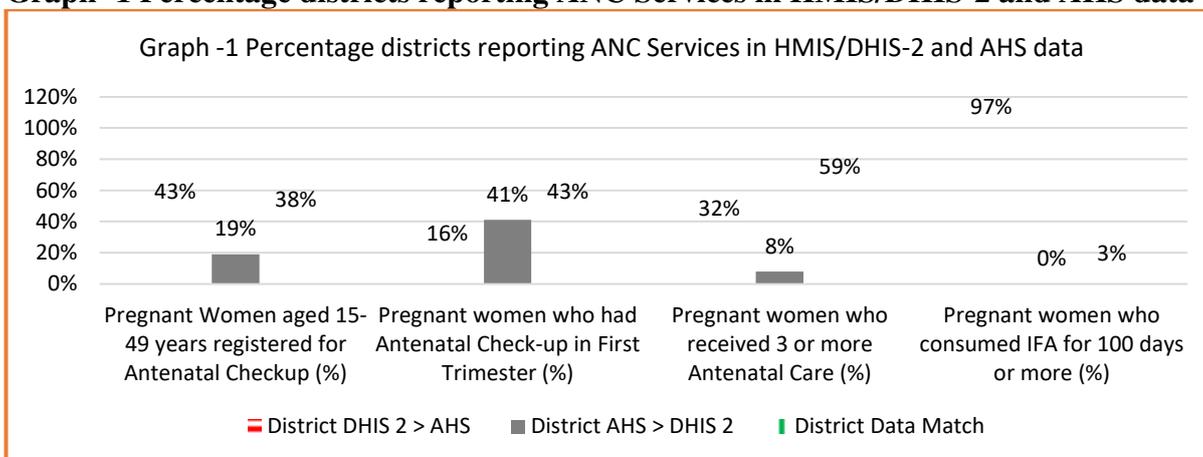
| | | | |
|---|-------------|--------------|-------------|
| Percentage delivery conducted by skilled birth attendant at home | 27 (73%) | 3 (8%) | 7 (19%) |
| Percentage delivery conducted at Government Institution | 15 (41%) | 4 (11%) | 18 (49%) |
| Percentage caesarean section deliveries out of total delivery taken place in Government Institution | 2 (5%) | 24 (65%) | 11 (30%) |
| Percentage pregnant women who availed financial assistance for Institutional delivery under JSY | 0 (0%) | 37 (100%) | 0 (0%) |
| Percentage new-borns breastfed within one hour of birth | 32 (86%) | 0 (0%) | 5 (14%) |
| Percentage women who received Post-natal Check-up within 48 hours after delivery | 4 (11%) | 26 (70%) | 7 (19%) |
| Percentage children aged 12-23 months who have received BCG | 5 (14%) | 23 (62%) | 9 (24%) |
| Percentage children aged 12-23 months who have received 3rd dose of Polio vaccine | 1 (3%) | 18 (49%) | 18 (49%) |
| Percentage children aged 12-23 months who have received third dose of DPT vaccine | 2 (5%) | 18 (49%) | 17 (46%) |
| Percentage children aged 12-23 months who have received Measles Vaccine | 5 (13%) | 18 (49%) | 14 (38%) |

In general, the variations in the reports are very high for some of the health indicators. The highest match between DHIS-2 data and AHS data was found to be for the indicator Percentage pregnant women who received 3 or more Antenatal check-up (59 percent) and minimum match was for more than one indicator viz. Percentage pregnant women who availed financial assistance for Institutional delivery under JSY (0 percent), percentage pregnant women who consumed IFA for 100 days or more, and percentage delivery conducted at home (only 3 percent each).

For better visualization of result, we have divided the above 15 indicators in the following groups:

1. Ante Natal Care (ANC) Services

Graph -1 Percentage districts reporting ANC Services in HMIS/DHIS-2 and AHS data



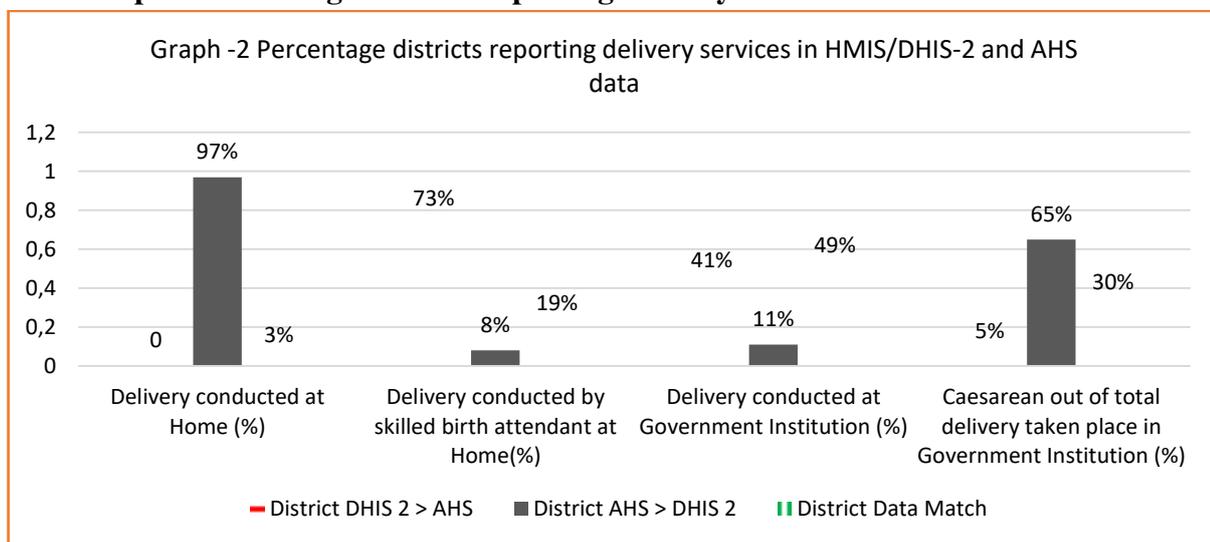
Reporting of different types of ANC services by the districts is shown in the Graph-1. It can be seen from the below graph that only 38 percent districts have reported the data similar to AHS data, while 43 percent districts reported more than AHS data for the first indicator of ANC services i.e. Percentage pregnant women aged between 15-49 years who were registered for ANC at the facility. Only a few

districts (19 percent) reported less than AHS data for the same indicator. The second indicator of ANC services – percentage pregnant women who had antenatal check-up in first trimester, only 16 districts (43 percent) have data reporting similar to AHS data, while 6 districts (16 percent) reported more than AHS data. But many districts (41%) report less than AHS data.

For the indicator percentage pregnant women who received three or more antenatal check-up, 22 districts (59 percent) have data reporting similar to AHS data, while 12 districts (32 percent) reported more than AHS data. Only a few districts (8 percent) reported less than AHS data. Similarly, for the indicator percentage pregnant women who consumed IFA tablets for 100 days or more, most districts 36 out of 37 (97 percent) are reporting more as compared to the AHS data and only 3% district reporting is matched with AHS data for this indicator (Graph-1).

2. Delivery

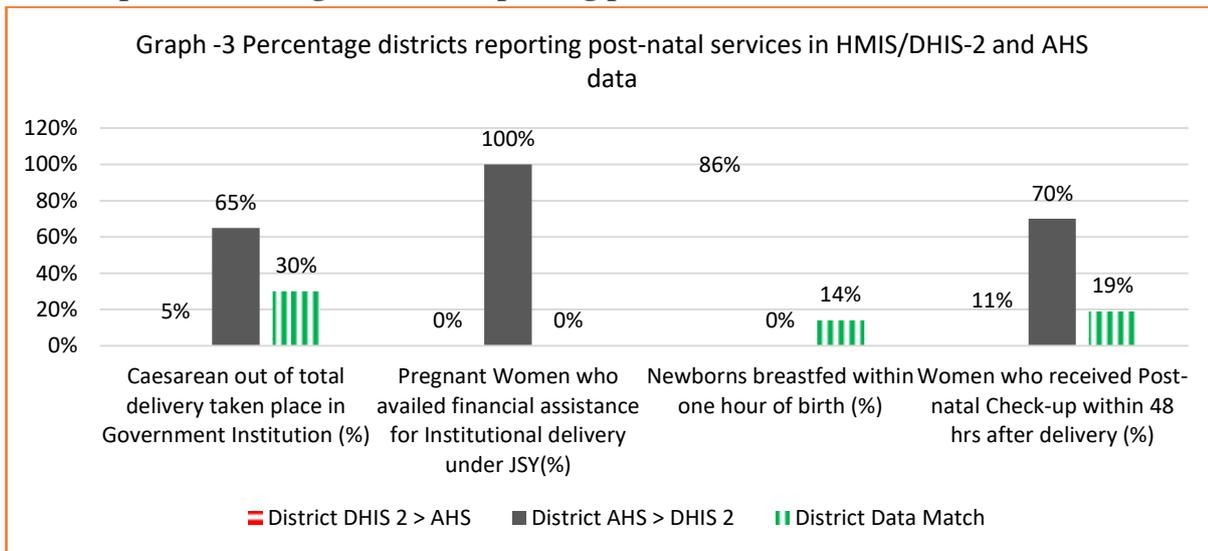
Graph -2 Percentage districts reporting delivery services in HMIS/DHIS-2 and AHS data



According to Graph 2, for indicator “Delivery conducted at Home”, 36 districts’ (97%) home delivery rate from AHS data is much higher than DHIS-2 data. For indicator “Delivery at Home conducted by skilled birth at attendant (%)” only 7 districts (19%) has data reporting similar to AHS data, while 73% districts report more than AHS data. Some districts (8%) report less than AHS data.

Indicator “Delivery conducted at Government Institution (%)”, 18 districts (49%) has data reporting similar to AHS data, while 41% districts report more than AHS data. Few districts (11%) report less than AHS data. In the Graph Indicator “Caesarean out of total delivery taken place in Government institution (%)”, only 11 districts (30%) have data reporting similar to AHS data, while very few districts (5%) report more than AHS data. But many districts (65%) report less than AHS data.

Graph -3 Percentage districts reporting post-natal services in HMIS/DHIS-2 and AHS data

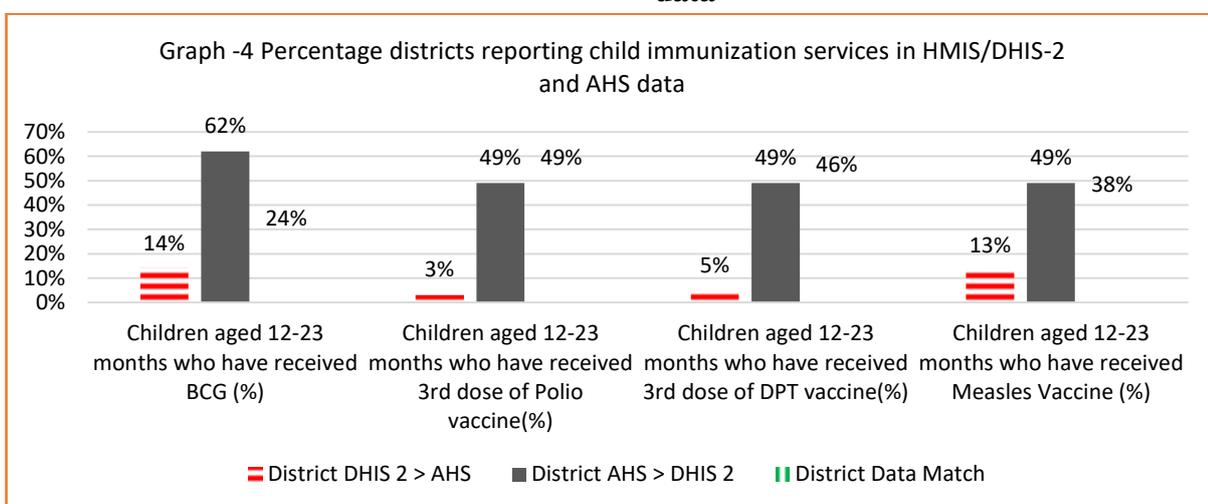


The next graph shows the percentage districts reporting delivery and post-partum related services in both DHIS-2/HMIS and Annual Health survey. It can be seen from the Graph-2 that all the districts of Bihar have lower reporting on DHIS-2 than AHS data for the indicator percentage pregnant women who availed financial assistance for the institutional delivery under JananiSurakshan Yojana (JSY).

Percentage districts reporting the indicator new-born breastfed within one hour of birth shows that only 5 districts (14 percent) have data similar to AHS data while remaining 32 districts (86 percent) reported more than AHS data. For the third indicator i.e. Percentage women who received post-natal check-up within 48 hours of delivery, only 19 percent districts have data match between DHIS-2/HMIS and AHS data, while most of the districts (71 percent) reported more than AHS data. Only a few districts (11 percent) reported less than AHS data.

3. Immunization

Graph 4, Percentage districts reporting child immunization services in HMIS/ DHIS-2 and AHS data



In Graph 4, Indicator “Children aged 12- 23 months who have received BCG (%)”, only 24% districts have data reporting similar to AHS data, while some districts (14%) reported more than AHS data while

more than half districts (62%) reported less than AHS data. For indicator “Children aged 12-23 months who have received third dose of Polio vaccine (%)”, 18 districts (49%) reported similar to AHS data and same percentage of districts reported less than AHS data.

Percentage districts reporting the indicator “Children aged 12 – 23 months who have received 3rd dose of DPT vaccine (%)”, 18 districts (49%) reporting similar to AHS data and approximately same (46%) percentage of districts report less than AHS data. For the next indicator “Children aged 12 – 23 months who have received Measles vaccine (%)”, 14 districts (38%) have data reporting similar to AHS data, while some 14% districts report more than AHS data. Half of the districts (49%) report less than AHS data.

Discussion:

Data quality is very important aspect of any kind of information system. The entire effort put up by the different agencies including the state and central Governments got wasted if the quality of data is not good as the incorrect information not only misguide the implementation of the health programmes but also the planning based on HMIS data will not be realistic. In case of HMIS Data collected from public health facilities by the health workers, the quality of data has to suffer from various barriers and biases. The barriers included the limited resources such as stationary, recording registers, reporting formats, etc. Limited understanding of the health workers involved in the process on HMIS issues such as quality data (accuracy, consistency, validity)¹³ and its use in planning, implementation of programmes, and evaluations.

The service data travels through different stages of health facilities for its compilation and uploading i.e. Health Sub-Centre to PHC to DHS to RPMU level to the state level. At each of this stage, there is a considerable amount of pressure especially to show better performance in the district ranking at the state level.

As per Justin and Amanda, the official statistics (in our case HMIS) systematically exaggerate development process. There are discrepancies between administrative data and independent surveys in African countries. These are results of government misreporting to foreign donors and national government are themselves misled by frontline service providers.¹⁴

There are some indicators which are better when their values are higher called as positive indicator such as:

- Percentage Pregnant Women aged 15-49 years registered for ANC
- Percentage Pregnant Women who had Antenatal Check-up in First Trimester
- Percentage Pregnant Women who received 3 or more Antenatal Care
- Percentage Pregnant Women who consumed IFA for 100 days or more
- Percentage Delivery conducted at Government Institution
- Percentage New-borns breastfed within one hour of birth
- Percentage Women who received Post-natal Check-up within 48 hrs. Of delivery
- Percentage Children aged 12-23 months who have received BCG
- Percentage Children aged 12-23 months who have received 3rd dose of Polio vaccine
- Percentage Children aged 12-23 months who have received 3rd dose of DPT vaccine
- Percentage Children aged 12-23 months who have received Measles Vaccine

Some health indicators are better when their values are lower. These indicators are called as negative indicators such as:

- Percentage Delivery conducted at Home
- Percentage Delivery conducted by skilled birth attendant at Home
- Percentage Caesarean out of total delivery taken place in Government Institution
- Percentage Pregnant women who availed financial assistance for Institutional delivery under JSY

Based on the above comparative analysis of the AHS and HMIS data, it can be safely stated that the quality of HMIS data is far from the satisfactory level. It may be observed that major MCH indicators calculated from HMIS data does not match with those from the AHS data for the same time period. As per the above data analysis from two different sources for the same time period, data for positive health indicators are reported more in HMIS data reported by the public health facilities in comparison to the AHS data; while some public health facilities reported lower values for every indicator in comparison to the AHS data.

Conclusions and Suggestions

The values of the indicators differ from both the sources. Public Health Facilities in the state provides higher value of the positive indicator and lower value of negative health indicators through HMIS. Most of the indicators reported in HMIS are on higher side as compared to the AHS data. This is suggestive of data quality issues. The HMIS data may have improved over the period of time, but the inconsistency found in the analysis need to be monitored for effective planning and programme implementation and monitoring and evaluation of health programmes.

To improve the quality of service data generated through HMIS, the state should sensitize the concerned health staffs on the data quality issues (accuracy, consistency, and validity of data)^{16, 17}. The staffs should also be regularly trained on the NRHM monthly reporting formats, compilation of the reports and validity checks and use of data in decision making and planning. There is a need for a support system in the form of handhold support and regular feedback on the data, especially to the frontline health workers and PHC staffs in order to improve the data quality parameters.

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