Specialist Services in the Indian Rural Public Health System for Maternal and Child Healthcare – A Study of Four States

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Abstract

The present study attempts to examine the role of specialist services in rural public health system of India in the areas of maternal and child healthcare. The study uses primary data collected through a survey of doctors and paramedical staff working at public health facilities regarding availability and quality of the specialist services in gynaecology, paediatrics and anaesthesia. The study discusses in detail the aspects of infrastructure, manpower and operational challenges faced in effective provisioning of specialist services through the rural health facilities of four largest states – Bihar, Madhya Pradesh (MP), Rajasthan and Uttar Pradesh (UP). The findings of the survey reveal significant dearth of specialist doctors with their concentration at the district level. Moreover, there are severe misallocations of the specialist doctors and, lack of manpower support, equipment and basic infrastructure within the public health system causing serious challenges in effective provisioning of specialist services for maternal and child healthcare. Lastly, the efforts made by the government for providing additional manpower support for these services are also not giving desired results.

Keywords: Maternal health, child health, specialist doctors, emergency obstetric care (EmOC), rural healthcare.

JEL Classification: I18 and I11

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I. Introduction

Specialist services can be defined as a service provided by a doctor holding a post-graduate degree with specialization such as gynaecology, paediatrics, surgery or anaesthesia. Such doctors generally are not the primary contact point for patients but are referred by the general doctors attending to primary ailments (NHP, 2015). The specialist medical service, in Indian public health system, finds its place at the levels of CHC (community health centre) and above. The levels below only have general medical practitioners at the PHC (primary health centre) and auxiliary nurse and midwife (ANM) at sub-centres (SC). In the primary health system of rural India the CHCs and district hospitals act as a primary referral for the facilities located at village and cluster level. The specialist services, therefore, become relevant for providing secondary healthcare services specifically in these areas.

One of the crucial aspects of healthcare system and specialist services is provisioning of services related to maternal and child care. These include the ante-natal (ANC) and post-natal care (PNC), institutional deliveries and, new-born and child care. While the lower level facilities of SCs and PHCs are expected to provide majority of these services, the higher level facilities become crucial in case of emergency obstetric care and intensive infant and child care (McCord, et al., 2001). The effective delivery of these services and its access to all including the vulnerable sections of the population would be crucial for improving health outcomes such as maternal mortality (MMR) and also neonatal mortality (NNMR) to a considerable extent (Pitchfort, et al., 2006) and (Rammohan, et al., 2013). The millennium development goals for MMR and under five mortality rate (U5MR) to be achieved by 2015 are 109 and 42 respectively (MoSPI, 2006). However, the recent national average for MMR was 178 during 2010-12 (Census of India, 2013). Achieving these MDGs through reduced maternal and child deaths would require strong and effective specialist services such as emergency obstetric care (EMoC) (Fortney, 2001) and (Rammohan, et al., 2013). The access to such services in rural areas can only be ensured through public health system as the private facilities are largely available only at urban locations[2] (Rao, 2012).

Providing quality healthcare through a public health system would essentially require a strong and effective manpower in place. This has implication on availability of medical and paramedical staff at various levels of public health facilities. The Indian public health system (IPHS) norms clearly define the types and number of these staff required at different kind of health facilities. The specialist services under the public health system face a major challenge in three aspects – (i) availability and diversity of specialist doctors at the public healthcare facilities; (ii) availability of paramedical staff; and (iii) availability of required support infrastructure and at each facility. In the context of the maternal and child care services the most crucially required specialists would be obstetricians/gynaecologist and, paediatricians (Satpati & Venkatesh, 2006). Moreover, anaesthetists, surgeons and physicians would also be relevant in providing other related specialist care at the CHC level (Satpati & Venkatesh, 2006). Considering the availability of specialists it is observed that as of March 2014 there were 5363 CHCs in the country that had a total 4091 specialists doctors

[2] The private healthcare providers available at the village level are normally the unregistered and unqualified quack practitioners. The qualified practitioners are usually unavailable in rural or semi-urban locations.

(RHS-MoHFW, 2014). These include surgeons, gynaecologist, physicians and paediatricians. Of these the number of gynaecologist and paediatricians working at CHCs were only 1263 and 961 respectively (RHS-MoHFW, 2014). These doctors were way less than the required numbers considering one specialist of each type to be available at every functioning CHC in the country as per the IPHS norms for CHCs (IPHS - MoHFW, 2012).

Data of specialist doctors available in CHCs in India show a substantial shortfall in each specialization with clearly increasing trend over time (Table 1). The number of existing CHCs reported in table 1 also indicates the required number of each specialist because, as per IPHS, every CHC should ideally have one specialist in each of the specialisation. Given the actual number of specialists in position, the shortfall is calculated. The National Rural Health Mission (NRHM) was implemented from the year 2005 to the year 2012. Therefore, we consider the situation in 2006, 2013 and 2014.

Table 1: Number of Specialists at CHC In-position and Shortfall from 2006 to 2014

S. No	Number of	2006		2013		2014	
1	CHCs	3346		5187		5363	
2	Specialists	In-Position	Shortfall	In-Position	Shortfall	In-Position	Shortfall
3	Ob-Gyns	1215	2131 (64%)	1959	3228 (62%)	1263	4100 (76%)
4	Paediatricians	678	2668 (80%)	1403	3784 (73%)	961	4402 (82%)
5	Surgeons	1201	2145 (64%)	1510	3677 (71%)	936	4427 (83%)
6	Physicians	884	2462 (74%)	933	4254 (82%)	931	4432 (83%)

Source: (RHS-MoHFW, 2006; RHS-MoHFW, 2014; RHS-MoHFW, 2014)

It is observed that the number of specialists in each discipline increased during 2006 to 2013 due to NRHM, but during 2013-14 there has been a sharp fall in the numbers of specialists implying a steep increase in the shortfall from their required number to ensure satisfactory coverage. The shortfall as a percentage of the required specialist in the country during 2006-13 is simply mind-boggling and the problem became more acute post NRHM in 2014. It reflects the extent of the dissatisfactory state and inadequacy of the public healthcare for mothers and children.

Apart from the given types of specialists as listed in table 1 the IPHS norms also require anaesthetist at the CHC level (IPHS - MoHFW, 2012). The presence of anaesthetists would be relevant for various surgical procedures including caesarean section (C-section) deliveries. However, as per the district level household and facility survey 2007-08 only about 17% (710 of 4162) of CHCs were found to have an anaesthetist (IIPS, 2010)[3].

[3] The government statistics (HMIS – NRHM: Rural Health Statistics 2014) regarding the number of specialist required, sanctioned and in position at the CHC level does not include anaesthetists. The total specialists only include obstetricians and gynaecologists, paediatricians, physicians and surgeons (RHS-MoHFW, 2014).

The specialist services also face the problem of inadequate infrastructural facilities and paramedical staff in the public health system in the country. For the maternal and child care the availability of operations theatres (OT), labour rooms and new born stabilization units or new born care corners become quite crucial especially at the CHCs. It is very often observed that many of these facilities tend to be lagging at public health facilities in remote rural areas (Sodani & Sharma, 2011). Out of the total 5363 CHCs functioning in the country as of March 2014, nearly 18% did not have functional operation theatre, about 21% did not have a new born corner and 66% did not have a new born stabilization unit (RHS-MoHFW, 2014). Among other support facilities, while about 93% of the CHCs had functional laboratories, only 50% had functional X-Ray machines. Moreover, it was also found that only 54% of CHCs had residential quarters available for specialist doctors and only 32% facilities with doctors staying in the quarters (RHS-MoHFW, 2014). Unavailability of adequate residence facility for doctors within the health facility premise could lead to their absenteeism which could be a factor resulting underutilization of public healthcare services (Goel & Khera, 2015).

Among the paramedical staff at CHCs it was found that there is a 20% shortfall in the nursing staff. A significantly large shortfall of 156% was found in case of radiographers, 38% in pharmacists and about 83% in laboratory technicians at CHCs (RHS-MoHFW, 2014). A relatively larger shortfall in the availability of technicians as compared to the infrastructure i.e., X-ray machines and laboratories, would leave the infrastructure underutilized and ineffective. Moreover, the unavailability of medical and paramedical staff at the health facilities and inadequate infrastructural facilities act as one of major reasons for a delay in providing services such as EmOC thereby increasing risk of maternal deaths (Ghebrehiwet & Morrow, 2007).

In the above context the present study attempts to examine the existing status of specialist services under public health system of India. This is done with a special focus on maternal and child health care services especially in the rural areas of the country. The study aims to primarily examine the existing level of available infrastructure and manpower required for providing specialist services at public health facilities in rural areas. Secondly, it aims to study the issues related to functioning of public health system for providing specialist services such as (i) allocation of doctors, (ii) salaries and incentives and (ii) working environment and culture. Thirdly, it aims to focus on the efforts undertaken by the government for improving specialist services through training of doctors. Lastly, it would attempt to verify the possible impact of inputs in the public health system such as infrastructure and manpower, on the outputs such as institutional deliveries and OPD (outdoor patients). This is because the health inputs are likely to have impacts on health outputs which eventually affect the health outcomes such as maternal and neo-natal mortality (Iyengar & Dholakia, 2016).

With the above objectives in mind the study begins by examining the data available through secondary sources regarding provisioning of specialist services under public health system. This is done considering four major states of the nation namely UP, MP, Bihar and Rajasthan and comparing their performance with the national average. The motivation to select these states was made on the basis of a previous study regarding specialist services

focusing on these four states (Bajpai, et al., 2013). The study attempts to examine the status of specialist services in rural public health system using primary data of health facilities from selected states. The study highlights a few selected variables regarding manpower and infrastructure of the specialist services under public health system. Moreover, on the basis of practices regarding the specialist services in some of Indian states and in selected countries of the world, it focusses on various strategies and interventions that could be made for improving specialist services. However, it does not look in to the details of the specialist services in the rural public health sector on the basis of various factors that are likely to impact these services. This would be attempted by the present study.

II. Health status and specialist services in the selected states

The four selected states have a higher proportion of rural population and are growing faster than the national average (Table 2). These states, therefore, have lower degree of urbanization and require relatively greater amount of resources and efforts to provide healthcare services in rural areas.

Table 2: Rural and Total Population in Selected States in India (in Millions)

States	2001			2011			Average Annual Growth of Rural Population (2001-11)
	Total	Rural	%Rural Population	Total	Rural	%Rural Population	
Bihar	82.9	74.3	89.5%	103.8	92.1	88.7%	2.17%
MP	60.4	44.4	73.5%	72.6	52.5	72.4%	1.70%
Rajasthan	56.5	43.3	76.6%	68.6	51.5	75.1%	1.76%
UP	166.2	131.7	79.2%	199.6	155.1	77.7%	1.65%
India	**1028.6**	**742.5**	**72.2%**	**1210.2**	**833.1**	**68.8%**	**1.16%**

Source: Census of India 2001 and 2011

Considering health outcomes in terms of the vital statistics of these states, it is observed that these states perform poorly on the whole as compared to the national average. Table 3 shows that while in terms of IMR, MMR and crude birth rate (CBR) all these states have poorer performance, Bihar and Rajasthan do better than the national average in crude death rate (CRD) and only Bihar does better in case of neonatal mortality (NN).

Table 3: Vital Statistics in selected States in India

States	CBR	CDR	IMR	MMR	NN
	2013			2010-12	2012
Bihar	27.6	6.6	42	328	28
MP	26.3	8.0	54	230	39
Raj	25.6	6.5	47	255	35
UP	27.2	7.7	50	292	37
India	**21.4**	**7.0**	**40**	**178**	**29**

Source: (SRS Bulletin, 2014), (Census of India, 2013) *and* (PHFI, 2014)

We may also consider the health input related indicators, such as physical infrastructure, manpower availability and, the facilities available at the healthcare centres in rural areas of these states. Table 4 shows the number of available health facilities per million people. It is found that number of CHCs per million people is relatively low in UP and significantly low in Bihar but is higher in MP and almost double in Rajasthan as compared to the national average. This could be due to the fact that both these states have special features of higher proportion of tribal population and/or desert areas, which require more healthcare facilities per million people as per Indian Public Health Standards (IPHS). In terms of the sub-district hospitals (SDH) only MP is at par with and, in district hospitals both MP and UP are relatively better than the national average. It may be noted that UP does not have any sub-divisional hospitals in their health system (UP - Dept. of Health, 2015). Instead, the state has two types of hospitals at the district level with one general and one female hospital (UP - Dept. of Health, 2015). Therefore, the number of district hospitals tends to be significantly larger than the number of districts in the state. Lastly, it is also observed that all these states except Rajasthan are below the national average in terms of total and rural government hospitals per million people.

Table 4: Infrastructure Availability in Public Health System of Selected States, 2014

(Figures per Million of Population)

States	CHC	Sub-Divisional Hospitals	District Hospitals	Total Govt. Hospitals	Rural Govt. Hospitals
Bihar	0.67	0.43	0.35	17.30	17.83
MP	4.60	0.87	0.70	7.09	7.53
Raj	8.26	0.28	0.50	55.53	61.19
UP	3.87	0	0.80	5.18	3.91
India	**4.43**	**0.85**	**0.62**	**19.27**	**20.74**

Source: RHS Bulletin, March 2014 and MoHFW, Govt. of India.

Given the infrastructure it would also be relevant to take a look at the additional facilities at the DHs and CHCs in the selected states. The details of the same are shown in Tables 5a and 5b. It is observed that in all the selected states proportion of DHs having 24 hour water facility, three phase electricity connection (except Bihar), generator/inverter and ambulance are greater than or at par with the national average. However, the percentage of DH having HIV test facility in MP and with ultra-sound facility in Bihar and MP are relatively lower. Moreover, except Rajasthan all the three states have relatively lesser DHs with operational blood banks.

Table 5a: Percentage of District Hospitals in Selected States with Facilities, 2007-08 (in %).								
States	**24 hr. water facility**	**Three phase electricity connection**	**Standby inverter/generator in working condition**	**NIC Terminal Available**	**Ambulance**	**ELISA for HIV Test**	**Ultrasound Facility**	**Fully Operational Blood Bank**
Bihar	91.2	85.3	100	8.8	91.2	73.5	17.6	52.9
MP	93.5	93.5	95.7	54.3	95.7	60.9	56.5	39.1
Raj	100	100	90.6	15.6	90.6	78.1	87.5	84.4
UP	95.2	95.2	96.4	26.2	90.5	69	88.1	58.3
India	**91.9**	**92.1**	**61.6**	**27.2**	**91.6**	**70**	**74.7**	**68.8**
Source: (IIPS, 2010)								

It is observed that in terms of facilities like quarters for specialists at CHCs, all states except Bihar do better than the national average. However, as compared to this, the percentage of specialists staying at the quarters in CHCs was found to be relatively lower for all states. In terms of the referral transport facility, Bihar and MP do better while Rajasthan and UP perform poorly as compared to the nation as a whole. Comparing the states with the national status of the availability of other services it is observed that there are relatively lesser CHCs in Bihar and UP with functional laboratories, in Rajasthan and UP with functional O.T. and in UP with labour rooms. The percentage of CHCs with new born stabilization units are found to be significantly lower in Bihar and MP and, CHCs with new born corners were found to be significantly lower in Bihar and relatively lower in Rajasthan and UP again as compared to the national average.

One area where all the selected states lag significantly is availability of all four specialists at one place (CHC or DH). While it is observed that Bihar has a relatively greater proportion of such CHCs, all other states perform quite poor with MP having only 1% of CHCs having all four specialists present. It may be noted here that this proportion at the national level is also quite low at only 15% indicating a significant shortfall of specialist doctors available at CHCs and DHs.

Table 5b: Percentage of Community Health Centres in Selected States With Facilities, 2014 (in %).														
States	**With quarters for specialist doctors**	**With specialist doctors living in quarters**	**With referral transport available**	**Functioning as per IPHS norms**	**With all four specialists**	**With computer/ statistical asst. For MIS/ accountant**	**With functional laboratory**	**With functional O.T.**	**With functional labour room**	**With functioning stabilization Units for new born**	**With new born care corner**	**With at least 30 beds**	**Designated as FRU***	**Blood storage facility***
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
Bihar	40	34.3	100	100	34.3	100	74.3	90	100	1.43	31.4	100	88	0
MP	65.6	32.3	100	100	1.2	74.25	96.7	91.3	100	17.4	96.7	100	61	6
Raj	61.9	46.2	86.6	100	8.3	78.7	93.8	72.5	93.5	42.5	66.1	70.2	53	15
UP	76.8	43.0	77.2	100	1	100	80.6	80.6	81.2	46.3	74.3	72.1	56	1
India	**53.8**	**32.3**	**92.45**	**100**	**15.4**	**91.24**	**93.4**	**82.2**	**92.2**	**33.53**	**78.5**	**72.6**	**56**	**1**
Note: '*' – Data for 2007-08 as per DLHS 3.														
Source : Columns 1 to12 (RHS-MoHFW, 2014) *and Columns 13 and 14* (IIPS, 2010)														

It may also be relevant to take a look at the manpower availability at these facilities. Table 6 shows the number of available doctors (both general and specialists) and paramedical staff per million people at PHCs, CHCs, SDHs and DHs of the selected states. It is found that MP and Rajasthan do relatively better than or are at par with the national average in terms of the general and specialist doctors at DH, SDH and the CHCs. Bihar and UP, however, are found extremely below this level. In terms of the paramedical staff at DH and SDH both MP and Rajasthan are above the national average, while in terms of laboratory technicians and nurses (combined at PHCs and CHCs) it is only Rajasthan that is above this level. Bihar and UP, in terms of paramedical staff at all levels, and MP in laboratory technicians and nurses perform poorly as compared to the average of the nation.

Table 6: Manpower Availability at different Health Facilities per Million Population in Selected States, 2014					
States	**Doctors**	**GDMO**	**Gyneac.**	**Pedia.**	**Tot. Spec.***
	DH and SDH	*CHC*			
Bihar	12.37	3.43	0.22	0.17	0.83
MP	31.75	14.32	0.91	1.41	4.36
Raj	23.91	17.89	1.86	1.81	11.52
UP	12.68	0.00	0.69	0.93	2.91
India	**25.64**	**11.08**	**0.91**	**0.93**	**3.98**
States	**Para medics**	**Radiographers**	**Lab Tech.**	**Pharmacist**	**Nurses**
	DH and SDH	*CHC*	*PHC and CHC*		
Bihar	9.46	0.16	7.55	2.60	20.92
MP	99.29	2.80	14.78	16.95	60.13
Raj	94.91	2.41	32.39	9.03	153.71
UP	34.27	0.49	5.79	17.35	26.55
India	**78.11**	**2.13**	**16.22**	**22.06**	**62.16**
Note: ' * ' – Includes Surgeons and Physicians					
Source : (RHS-MoHFW, 2014)					

The status of the macro level indicators regarding infrastructure and manpower at various levels of public health facilities providing specialist services reflect relatively poor performance of the selected states. Moreover, for many of the indicators these states perform poorly, not only as compared to the national average but also at an absolute level. Thus it becomes relevant to examine the factors and causes related to the status of specialist services in the public health system in these four states. However, only the secondary data may not be sufficient for the purpose. We have to collect data through a primary survey. Moreover, the survey is also required to study the efforts made by governments at various levels for providing specialist services and to obtain data on health outputs to assess the impact of the health inputs provided by the specialist services.

With this perspective a direct verification of the status of specialist services was done using primary data collected though a survey of public health facilities in rural areas of the selected states. The data is collected through structured interviews of medical and paramedical staff at various public health facilities in rural areas of the selected districts of four states in the country. The next section provides details of the methodology used for data collection through sample survey of health facility staff at various levels. The fourth section summarizes the findings of the survey thereby reporting the status of the existing services. The fifth section attempts to assess the impact of health inputs on outputs of health facilities on the basis of collected data using regression analysis. The final section concludes the study.

III. Methodology

The primary survey in the four selected states – Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh (UP); was conducted during March to May 2012 as a part of a larger project[4]. The states selected were such that they were a part of the 18 high focus states selected by the Government of India under the NRHM implementation. Moreover, these states also cover a significant proportion of the population and the geographical area of the nation. UP is the most populous state in the country with 16.5% population of India and, Rajasthan and MP are first and second largest states in terms of geographical area with 10.9% and 9.7% of the total area of the nation respectively. Bihar also has a significant proportion (8.6%) of India's population and covers about 2.8% of the geographical region. Finally Bihar, MP, Rajasthan and UP are also the so-called BIMARU states indicating poor economic and policy environment.

For the purpose of the primary survey two districts from each state were selected. Considering the fact that a major concentration of specialist doctors was at the district hospitals followed by some availability at the community health centres, the districts were selected keeping in mind a minimum sample size of 15 specialist doctors from each state. All these specialist doctors were surveyed through a structured interview method using specially designed questionnaire. Moreover, a survey of nurses, i.e. auxiliary nurse and midwife (ANM) and general nurse and midwife (GNM), and medical officers (MO) was also conducted regarding availability and status of specialist services in their district. While the interviews of specialist doctors were conducted at CHCs, sub-district/sub-divisional hospitals and district hospitals, those of the nurses and medical officers were conducted at PHCs and CHCs.

The survey also included interviews of the trained medical officers (TMOs) who had received a supplementary training in the areas of paediatrics, obstetrics or anaesthesia in the context of their role in providing specialist services under the primary healthcare system. Lastly, a set of information was also collected from the office of district health administration through interview of the district medical and health officer (DMHO)/chief medical health officer (CMHO) and his team including the district program manager (DPM) of NRHM. In all, 60 specialists, 48 medical officers, 14 TMOs and 80 nurses (ANMs and GNMs) were interviewed. The details of the sample selected from the two districts of each state are given in Table 7. It may be noted here that the number of specialist doctors and TMO's surveyed constitute most or all the available specialists in the respective districts of the selected states thereby covering a major proportion of the specialist medical service providers of the three mentioned disciplines in the public health system of these districts. Moreover, the selection of PHC and CHC for the survey was done considering fair representations of all the blocks in the entire geographical spread of the district.

[4] The survey was conducted as a part of a project regarding 'Increasing the Availability of Specialist Services in Rural India' that was jointly undertaken by the Columbia Global Centres South Asia, Columbia University and the Indian Institute of Management, Ahmedabad.

Table 7: Sample size of specialists, Medical Officers, TMOs and Nurses Surveyed Across Four States and Eight Districts										
Details		**Bihar**		**MP**		**Rajasthan**		**UP**		**Total**
		Jehanabad[5]	*Samastipur*	*Dhar*	*Khandwa*	*Dausa*	*Dungarpur*	*Lalitpur*	*Unnao*	
District Administration:		1	1	1	1	1	1	1	1	**8**
Specialist Doctors	**Gynaecologist**	1	4	3	4	3	3	4	1	**23**
	Paediatricians	3	4	2	3	3	3	3	4	**25**
	Anaesthetists	1	2	2	1	1	2	1	2	**12**
Medical Officers		5	7	7	5	6	6	5	7	**48**
Trained Medical Officers	**Gynaecology**	0	1	3	0	1	1	1	1	**8**
	Paediatrics	0	0	0	1	0	0	1	0	**2**
	Anaesthesia	1	0	0	0	1	2	0	0	**4**
GNMs		7	7	6	4	8	11	1	2	**46**
ANMs		2	4	4	6	1	0	7	10	**34**
Total		**21**	**30**	**28**	**26**	**26**	**30**	**24**	**28**	**210**

IV. Findings of Health Facility Survey

As mentioned earlier, a primary survey was conducted among health facility staff including medical officers (MO), general nurses (GNM) and Auxiliary nurses (ANM) working at PHCs and CHCs. Moreover, a set of specialist doctors and trained medical officers (TMOs) in specialist services were also surveyed. We begin our discussion regarding the status of availability of specialist services at DHs, PHCs and CHCs as reported by GNMs, ANMs, MOs and specialists at these facilities. Tables 8a and 8b show the same. It was observed that on an average only 20% GNMs had any specialist working full time in their HFs. MP had only 10% GNMs reporting full time availability of any specialist. GNMs in MP (25%) and in Rajasthan (55%) had specialists visiting their HF on rotation, camps or on request. Almost 2/3rds of the HFs where GNMs were working did not have any specialist visiting even once. This incidence was very high in MP (75%). Thus availability of specialist services at lower level of HFs was abysmally poor in general in all HFs except Rajasthan. GNMs reporting availability of specialists in their HFs had more than one specialist visiting in UP, MP and Rajasthan. In Bihar only one type of specialist was available and that too for only 40% GNMs. For the ANMs, the nearest HF was PHC (53%) followed by CHC (25%) on an average.

[5] The total number of specialists available in the entire Jehanabad district was only 3. In order to cover the minimum sample size of specialists, the doctors working in the neighbouring districts (Vaishali and Bihar Sharif) were also considered. A minimum of 15 specialists from each state had to be surveyed in order to cover a total sample size of 60 specialists.

Table 8a: Availability of Specialist Doctors at HFs (in %)						
S. No.	**Details**	**UP**	**MP**	**Bihar**	**Raj**	**Aggregate**
As reported by GNMs						
1	**% of GNMS that reported a specialist working at their facility as:** Placed full time	30	10	25	15	20
2	Regular rotation for consultation	0	5	0	0	1.25
3	Regular rotation for camps	5	20	20	50	23.8
4	Visit on request	0	0	0	5	1.25
5	No Specialists visiting	65	75	60	30	57.5
6	**% GNM having type of specialists at their facility:** Gynaecologist	25	25	15	55	30
7	Anaesthetist	5	10	0	30	11.3
8	Paediatrician	30	15	0	40	21.3
9	Others (General Surgeon, Medicine, etc.)	0	0	25	5	7.5
10	No Specialist	65	75	60	30	57.5
As reported by ANMs						
11	**% ANMs who states the type of nearest facility to be a:** Sub Centre	5	15	5	10	8.75
12	PHC	50	45	50	50	48.8
13	CHC	35	30	15	35	28.8
14	Referral hospital	0	0	5	0	1.25
15	District hospital	10	10	25	5	12.5
16	Private hospital	0	0	0	0	0
17	**% of ANMs who reported types of staff are available at nearest facility**: MPW	5	15	0	25	11.3
18	ANM	95	90	80	100	91.3
19	GNM	50	45	90	85	67.5
20	General doctor	95	85	100	80	90
21	Specialists	30	15	40	30	28.8
22	**% ANMs who reported availability of specialist at nearest facility:** PHC	0	0	0	0	0
23	CHC	20	5	10	25	15
24	Referral hospital	0	0	5	0	1.25
25	District hospital	10	10	25	5	12.5
26	Private hospital	0	0	0	0	0
27	No Specialist in the nearest facility	70	85	60	70	71.3

None of the ANMs reported any private hospital as the nearest HF, and only 5% ANMs in Bihar reported a referral hospital as the nearest HF. According to a large proportion of the ANMs, the nearest HF had other ANMs, GNMs and general doctors, but no specialist. Thus, specialist services did not exist in nearby HFs according to 70% ANMs on an average, and more than 80% ANMs in MP. Many of these ANMs were found to be conducting deliveries at the sub-centres that were allotted to them along with their duties at the PHC/CHC where they were posted. The unavailability of a relevant specialist at a nearby facility could significantly increase the risk of maternal or infant deaths in case of a complication.

Table 8b: Availability of Specialist Doctors at HFs (in %)						
S. No.	**Details**	**UP**	**MP**	**Bihar**	**Raj**	**Aggregate**
As reported by MOs						
1	**% MO who reported facility with specialists working in it:** Placed full-time	33.3	16.7	25	8.3	20.8
2	On regular rotation for consultations	0	0	0	0	0
3	On regular rotation for health camps	0	16.7	0	41.7	14.6
4	Visit on request	0	0	0	8.3	2.1
5	No Specialist	66.7	66.7	75	58	66.6
6	**% MO who reported type of available specialist at their facility:** Gynaecologist	8.3	16.7	0	41.7	16.7
7	Anaesthetist	8.3	16.7	0	25	12.5
8	Paediatrician	16.7	25	0	25	16.7
9	Other (General Surgeon, Medicine, Orthopaedics, etc.)	16.7	8.3	25	0	12.5
10	No Specialist	66.7	66.7	75	58	66.6
As reported by Specialists						
11	**Avg. no. of other specialists in HF as per the SP:** Paediatricians	2	2	2	2	2
12	Obstetricians	3	3	3	2	3
13	Anaesthetists	1	1	1	1	1
14	**% SPs who said that these numbers are sufficient for patient load at HF**	13.3	33.3	6.7	6.7	15
15	**Avg. no. of additional specialists needed in HF to handle patient load as per the SP:** Paediatricians	2	1	3	2	2
16	Obstetricians	2	1	5	3	3
17	Anaesthetists	1	1	3	2	2
18	Other	0	0	0	1	0.3
19	**% SPs who reported that the no. of SPs available in entire district is sufficient**	0	13.3	13.3	6.7	8.3

Considering the responses of MOs it was observed that on an average 67% reported no specialists available in their HF. Only in Rajasthan and MP specialist services were available to MOs on health camps or special request. UP, MP and Rajasthan had multiple specialists in HFs where specialist service was available; otherwise these services were largely not available at all. The specialist doctors reported that for the average number of specialists in a HF of the selected states was about 6 and hardly 15% of them felt that this number is adequate. They also reported that on an average about 7 more specialists per HF were additionally required to satisfactorily handle the patient load. It was also found that only about 8% of specialist opined that the total number of specialists working in the public health facilities were enough for the entire district.

One of the serious issues related to the availability of specialist was of allocation and placement of these doctors at various health facilities since they represent a very scarce resource. The survey of specialist doctors primarily revealed that the anaesthetists were in lower proportion than gynaecologists and paediatricians (Table 9). These proportions closely represent the actual distribution of specialists as almost all the available specialist doctors were surveyed in each district. Moreover, the district hospitals had larger number of specialists than at CHCs in all states except MP. It was further observed that some of the specialist doctors were currently posted as medical officers that usually require only graduate level qualification. This proportion was the highest in Bihar followed by MP, Rajasthan and a small proportion in UP. Moreover, it was also found that except Rajasthan, where almost 13% of the specialists are at PHCs as MOs, none of the states had specialists posted at this level. The specialists working as MOs were responsible for attending the general OPD instead of the cases of their specialty only. Hence, they ended up being overburdened as they had to attend to the cases related to their specialty as well.

Table 9: Placement of Specialist Doctors (SP) Surveyed in Selected States

S. No.	Details	UP	MP	Bihar	Raj	Aggregate
1	**% of SP. Surveyed with Specialization in:** Gynaecology	33.3	46.7	33.3	40	38.3
2	Paediatrics	46.7	33.3	46.7	40	41.7
3	Anaesthesia	20	20	20	20	20
4	**% of doctors having title position of:** A specialist	93.3	66.7	40	80	70
5	MO	6.7	33.3	60	20	30
6	**% of SP. working at facility level:** PHC	0	0	0	13.3	3.33
7	CHC	40	66.7	6.7	40	38.4
8	District Hospital	60	33.3	93.3	46.7	58.3
9	**% of SP. who were placed in the visited district due to**: Govt. order	93.3	66.7	73.3	-	77.8
10	Personal choice of the district	6.7	33.3	26.7	-	22.2
11	**% of SP who chose the district through:** Applied directly to state govt.	6.7	33.3	20	-	20
12	Through some influence or reference.	0	0	6.7	-	2.23
13	Gained support from local health facility.	0	0	0	-	0
14	**% SPs who reported that they are not stationed in the appropriate facility not allowing them to use their skills**	80	66.7	73.3	-	73.3

It was also observed that the specialists were placed in the district primarily by the government order and not by personal choice of the specialists. Those who chose the districts did so by directly applying to the state government. It was also observed during the survey that facilities did not have the correct combination of specialist so as to provide emergency obstetric care or conduct surgical interventions such C-section. While some facilities in remote rural regions having gynaecologists did not have anaesthetists, there were other facilities where the latter were posted without any type of surgeries conducted. The placement of doctors created gross underutilization of the skills of the specialists

available within the system. Misallocation of the scarcest resource indicates the negligent and casual attitude of the managers of the public health system.

Support Infrastructure and Manpower

The provisioning of specialist services in the rural areas could also be further related to the availability of the infrastructure facilities and paramedical support staff. It was observed that nearly half of the doctors in UP and Rajasthan, more than half in MP and about three fourth in Bihar said that the HFs they worked with did not have enough equipment required for providing effective services (Table 10). Many of the specialists in UP, MP and Bihar reported unavailability of neonatal resuscitation equipment, functioning new-born unit and equipment to manage neonatal jaundice and hypothermia. Moreover, a significant proportion of specialists in MP and Bihar and, all of them in UP indicated lack of qualified support staff for a new-born care unit in their HFs and a shortfall in the availability of such a staff for functioning of such a unit round the clock. Lastly, most of the specialists in these states also reported a lack of number of beds for the new born care units in their HFs. The candid opinions of specialists in all the HFs regarding the inadequacy of the infrastructure, equipment, trained staff, and insufficient number of beds for providing effective services for the new born and neo-natal care indicate serious lacuna and raise concerns about the quality of the healthcare services.

Table 10: Availability of Specialist Doctors and Required infrastructure at Health Facilities

S. No.	Details	UP	MP	Bihar	Raj	Aggregate
1	**% SPs who reported missing equipment or infrastructure for providing effective services.**	46.7	60	73.3	46.7	56.7
2	**% SPs who reported HF with equipment for neonatal resuscitation**	26.7	33.3	33.3	-	31.1
3	**% SPs who reported HF with a new-born unit functioning with equipment**	20	40	53.3	-	37.8
4	**% SPs who reported HF with facilities to manage neonatal Hypothermia and Jaundice**	26.7	40	26.7	-	31.1
5	**% SPs who reported HF with qualified support staff for new-born care unit**	0	20	26.7	-	15.6
6	**% SPs who reported enough staff to keep the new-born care unit functioning 24x7**	0	20	26.7	-	15.6
7	**% SPs who reported enough beds in new-born care unit**	13.3	26.7	6.7	-	15.6

It was also further observed during the survey that many of health facilities lacked basic infrastructural facilities such as electricity even at the district hospital level. For instance, the neonatal intensive care unit in one of the districts (Vaishali) in Bihar was operating without regular electricity supply despite availability of the required manpower. Gynaecologists in UP and Bihar reported that the OT in the health centres did not have the air conditioners and also round the clock laboratory facility making it difficult for them to conduct surgeries. The

anaesthetist at many health centres reported lack of basic equipment for safer surgeries and even supply of oxygen cylinders. Moreover, absence of support from paramedical staff and their insufficient training was also reported as a factor preventing the doctors from providing effective services in the government health facilities. Thus, serious shortage in the number of specialist is like the top of the iceberg easily visible. The real problems not easily visible at macro-level are the misallocation of available manpower, lack of required infrastructure and inappropriate support staff.

Salaries, Incentives and Working Environment for Specialists

Serious shortage of specialists in the public HFs would obviously prompt one to inquire about their salaries, incentives and working conditions. It was found that in all states more than half the doctors had come to work in the district from other districts and cities (Table 11a). In terms of the facilities and incentives offered it was found that hardly 25% of the doctors received housing quarter. Most of the doctors did not receive any vehicle facility. None of the doctors in any of the states received a higher income or cash bonus as an incentive for working in the district.

The average salaries of these specialist doctors appeared to be quite consistent in three of the four states of MP, Bihar and Rajasthan and the difference in in UP is explain by a non-practicing allowance (NPA) that they receive as they are not officially allowed to practice at home or a clinic. However, these numbers had significant variations among the doctors and it varied from about monthly Rs. 17000 to Rs. 100000. These variations were due to the nature of appointment, i.e. full time and contractual and type of posts held such as MO and specialist. It may be noted that in most states the appointment of doctors only happen as a medical officer (MO) and they receive the same salary irrespective of the qualification or specialisation. It was also further found that about 70% to 80% of them were unsatisfied with their salaries, but this proportion was the least in UP at only about 67%. The low satisfaction for salaries among specialists could be related to the amount of earnings that doctors outside public health system are able to make. As per the specialists surveyed, their counterparts in the private practice earned nearly 2 to 3 times more than them. This was despite the fact that in MP and Bihar the doctors did have an opportunity to earn over and above their salaries. While in MP the specialists in public health facilities only practiced from home, in Bihar most of the specialist, mainly gynaecologists and paediatricians had their private clinics and nursing homes.

Considering the status of promotions it was found that more than half of the specialist in UP and a little less than half in MP had received higher level positions since the beginning of their career. However, this proportion in Bihar was quite low. All those who had been promoted said that it was on the basis of their experience. Moreover, it could be noted that majority of the specialist believed that they are not likely to get any promotions in future. The salary, incentives and the system of promotion of doctors could probably be related to their satisfaction and hence the willingness to work.

Table 11a: Details of Working, Salaries and Incentives of Specialist Doctors (SP) Surveyed						
S. No.	**Details**	**UP**	**MP**	**Bihar**	**Raj**	**Aggregate**
1	**% SP. Who worked elsewhere before**	73.3	46.7	60	66.7	61.7
2	**% SP. Working earlier:** In a city	20	6.7	6.7	26.7	15
3	In an urban area of a district	6.7	6.7	33.3	6.7	13.3
4	In a rural area of a district	46.7	33.3	20	33.3	33.3
5	**% SP who received incentives after being deployed to this district:** Housing quarters for you	46.7	40	0	13.3	25
6	Vehicle	6.7	6.7	0	0	3.3
7	Higher monthly salary	0	0	0	0	0
8	One-time cash bonus	0	0	0	0	0
9	Other	13.3	6.7	0	6.7	6.7
10	**Avg. monthly income of SP: *(in Rs.)***	65769	52538	51333	54138	55945
11	**% SP who reported that they were satisfied with monthly income**	33.3	26.7	20	20	25
12	**Avg. income of specialists in private practice or jobs as per SPs (In Rs.)**	116667	132857	118571	200000	142024
13	**% SP who have any other sources of income i.e., private practice**	0	26.7	53.3	-	26.7
14	**Avg. additional earnings per month as reported by SP (Aprox. In Rs.)**	-	21250	117143	-	69196
15	**SP who see patients at home**	0	26.7	13.3	-	13.3
16	**Avg. consultation fees charged by SP per case**	-	83	150	-	116.7
17	**% SP who have been promoted to a higher position since the beginning**	60	46.7	20	-	42.2
18	**% SP given promotion on basis:** Experience	60	46.7	20	-	42.2
19	Incentive for transfer	0	0	0	-	0
20	Incentive for retention	0	0	0	-	0
21	No Idea	0	0	0	-	0
22	Other	0	0	0	-	0
23	**% SP who think they will be promoted in the future**	6.7	13.3	6.7	-	8.9
24	**% SP who have received rewards as recognition of good work:** Monetary	26.7	20	20	26.7	23.3
25	Non-monetary	0	0	0	13.3	3.3
26	**% SP reporting willingness to leave Govt. job or the district due to :** Very low monetary returns from the job	0	0	6.7	-	2.2
27	No proper promotions	0	6.7	26.7	-	11.1
28	Would like to move to urban area	13.3	20	13.3	-	15.6
29	Family stays elsewhere	20	13.3	13.3	-	15.6
30	Would get into private practice	0	0	20	-	6.7
31	Others (Overload of work / Not satisfied)	0	13.3	13.3	-	8.9
Note: For rows 13 to 23 and 26 to 31, data was not collected in Rajasthan.						

It was found that a relatively better salary, incentive and promotion system in UP as compared to other states corroborates the relatively higher proportion of doctors satisfied by their salaries. Moreover, it was also observed that a very small proportion of the doctors in all the states received some kind of monetary or non-monetary (only in Rajasthan) rewards as recognition of good work being given to the specialists.

In the above context it was also found that a significant proportion of specialists were willing to leave their government job. This proportion was found to be the least in UP at 33% as compared to MP at 53% and Bihar where it was as high as 87%. However, the main reasons stated by the specialist were to move of out these rural areas or district places to larger cities so that they can live with their families. Some doctors in Bihar and MP also stated low monetary returns, uncertain promotions and overload of work as the other reasons for leaving. In fact the average workload of these specialists was also found to be heavy with 9 hours per day for 6 days per week (Table 11b).

Table 11b: Details Regarding Workload of Specialists

S. No.	Details	UP	MP	Bihar	Raj	Aggregate
1	**Avg. no. of days the SPs work per week**	6	6	6	-	6
2	**Avg. working hours per day as per SP**	9	10	10	6	9
3	**% of SP who are able to take leave**	93.3	100	86.7	86.7	91.7
4	**% SPs who find it difficult to take leave**	13.3	26.7	53.3	-	31.1
5	**% SPs who reported that during their leave patients are seen by:** Another specialist in the facility	80	80	53.3	66.7	70
6	An MO in the facility	6.7	6.7	20	0	8.4
7	Patients are referred to a nearby hospital	6.7	13.3	13.3	20	13.3
18	**% SPs who refer a case because they are too busy with other patients**	13.3	13.3	40	26.7	23.3
19	**% SP reported that patients are referred due to business of the SPs:** Daily	0	0	6.7	0	1.7
20	Once a week	13.3	6.7	13.3	6.7	10.0
21	Once a month	0	0	13.3	6.7	5.0
22	Less than a month	0	6.7	6.7	13.3	6.7

Moreover, it was also observed that while most of the specialists are able to take leave, many of them had reported difficulties in doing so. In all the states except MP about 8% specialists could not take leaves whenever they wanted. However, in Bihar and MP also, the specialists found it difficult to take leaves when required. About 70% of these specialists reported that the patients were seen by another specialist in the same HF when they went on leave. Moreover, about 8% said that the patients were seen by MOs, and 13% said that they are referred to other facilities. Out of the total specialists, hardly 13% in UP and MP,

about 26% in Rajasthan and, about 40% in Bihar opined that patients were referred due to the overload of work on the specialists.

Specialist training and efforts by the government

In order to find out the efforts made by the government the specialist were asked about any continued medical opportunities being offered to them. This is because it was also found that majority of these specialists had begun working in the visited public health facilities either 2 to 5 years or 5 years preceding the survey (Table 12). There were only a few who had begun 1 or 2 years preceding the survey.

Table 12: Continued Medical Education Opportunities Offered to Specialist Doctors

S. No.	Details	UP	MP	Bihar	Raj	Aggregate
1	**SP. Who completed MBBS:** During last 5 years	6.7	13.3	0	-	6.7
2	Between last 5 to 10 years	13.3	6.7	0	-	6.7
3	Between last 10 to 20 years	13.3	26.7	33.3	-	24.4
4	Before 20 years	66.7	53.3	66.7	-	62.2
5	**SP Who completed PG:** During last 5 years	20	20	6.7	-	15.6
6	Between last 5 to 10 years	0	20	6.7	-	8.9
7	Between last 10 to 20 years	46.7	40	53.3	-	46.7
8	Before 20 years	33.3	20	33.3	-	28.9
9	**SP. Who began working as a specialist in the district:** During last 1 year	6.7	13.3	6.7	20	11.7
10	Between last 1 to 2 years	0	13.3	13.3	13.3	10
11	Between 2 to 5 years	40	26.7	53.3	0	30
12	More than 5 years back	53.3	46.7	26.7	66.7	48.3
13	**SP who have been offered continued medical education opportunities**	40	40	60	40	45
14	**% of SP that reported kind of continued education opportunities:** Further specialization opportunities	13.3	6.7	26.7	6.7	13.4
15	Short-term training courses	26.7	33.3	33.3	33.3	31.7

Note: '-' in the Rajasthan column are for those data that were not collected.

Hence, not many specialists were recently recruited in the public health facilities of these states. This also corroborated the fact that more than 3/4th of the surveyed doctors had completed their education at least before 10 years preceding the survey. Since there is no formal mechanism to ensure that they attend regular professional conferences or refresher courses, etc., they are not likely to be abreast with advances in knowledge and technology. It was found that only about half of the specialists got continued medical education opportunity

and a large proportion of them got to attend only short-term training courses. On an average, only one out of seven specialists gets the opportunity for further specialization.

Among the other efforts of the government included the short term trainings (16 to 18 weeks) given to MOs in emergency obstetric care (BEmOC and CEmOC) for handling delivery complications at lower level facilities, life-saving anaesthetic skills (LSAS) for providing support for obstetric care and, paediatrics. The study of specialist services in the rural public health system also included a survey of these trained medical offices (TMOs). The responses of TMOs regarding the process of selection for training and the methods of the same are summarized in Tables 13a and 13b. In our sample, there were not any MOs who received training in paediatrics in UP, Bihar and Rajasthan. Similarly, our sample may not be representative of the state situation in terms of where the TMOs are working – PHC, CHC and DH.

The survey of TMOs primarily revealed that average number of training days differed significantly from only 95 days in Rajasthan to 189 days in MP. These trainings were held at the state level or at the district level. The perceptions about the eligibility and selection procedures for such specialist training among MOs are surprisingly different in different states. These are usually very objective matters and should not vary from case to case. It implies that clarity in communication about such training opportunities to the potential beneficiaries from the state authorities is lacking creating confusion and speculations leading to uncertainty among the potential trainees. In UP, any choice for training in different subject areas is not given to the trainees. In other states, such free choice is given in differing proportions. In UP accommodation is provided to the trainees, but in other states, not all trainees are provided the accommodation. In all states except Rajasthan, the TMOs are paid for their time in the training course. In none of the states, refresher training is offered to the TMOs. Thus, there is no continuity of upgrading their skills. None of the states have TMO training at their home health facility. The training pedagogy and content differ across states. TMOs are tested after undergoing the training in UP and Bihar, but not in MP and Rajasthan. The feedback on the training received by the TMOs is by and large satisfactory with exception for medical procedures for which the TMOs do not feel confident and comfortable.

Table 13a: Details Regarding Trained Medical Officers (TMO)						
S. No.	**Details**	**UP**	**MP**	**Bihar**	**Raj**	**Aggregate**
1	**% TMO having specialization in:** Gynaec. (Emergency Obstetric Care)	66.7	75	50	40	57.9
2	Paediatrics	0	25	0	0	6.3
3	Anaesthesia (LSAS)	33.3	0	50	60	35.8
4	**% TMO working at facility**: PHC	33.3	0	0	0	8.3
5	CHC	66.7	25	0	80	42.9
6	District Hospital	0	75	100	20	48.8
7	**% TMO who took the training**: During the last 1 year	0	25	50	20	23.8
8	Between 1 to 2 years ago	66.7	50	50	20	46.7
9	More than 2 years ago	33.3	25	0	60	29.6
10	**Avg. no. of days of training as per doctors**	140	189	130	95	139
11	**% TMO who said training was held at**: CHC	0	0	0	0	0.0
12	District level	33.3	75	0	60	42.1
13	State level	66.7	0	100	40	51.7
14	Other (Medical Colleges)	0	25	0	0	6.3
16	**% TMO who said all MBBS doctors in the district allowed to apply for this training**	33.3	25	0	40	24.6
17	**% TMO who said the training open to**: All those who applied	0	25	50	0	18.8
18	Only those who were ordered	66.7	50	0	0	29.2
19	Only new joiners	0	0	0	0	0
20	Others (those selected or recommended by seniors)	33.3	25	50	100	23.8
21	**% TMO who said they were selected by**: Application only	33.3	25	0	0	14.6
22	Interview	0	0	100	0	25
23	Direct selection by seniors in HF	33.3	25	0	0	14.6
24	Direct selection by district officials	33.3	25	0	100	39.6
25	Training was compulsory for all MOs	0	0	0	0	0
26	Other, please specify:	0	25	0	0	6.3
27	**% TMO who were given**: Choice of trainings in different subject areas	0	50	50	20	30
28	Opportunity to only be a part of a specific training	100	50	50	80	70
15	**% TMO who said accommodation provided during training**	100	75	50	40	66.3
29	**% TMO who were paid for their time in the training course**	100	100	100	40	85
30	**Avg. payment to doctors? *(Rs.)***	25333	127250	91000	21000	66146
31	**% TMO who said there has been a refresher training on the material taught**	0	0	0	0	0

Table 13b: Short Term Supplementary Training Taken by TMOs						
S. No.	**Details**	**UP**	**MP**	**Bihar**	**Raj**	**Aggregate**
1	**% TMO who said training included**: Lecture	100	75	100	40	78.8
2	Reading material	66.7	75	50	0	47.9
3	Visual aids (video, demonstrations)	100	75	50	20	61.3
4	Live demonstrations	100	75	100	20	73.8
5	Clinical training	100	100	100	60	90.0
6	Training at my home facility	0	0	0	0	0.0
7	**% TMO who were tested on knowledge gained upon completion of the training**	100	75	100	40	78.8
8	**% TMO that were tested by**: Written examination	100	75	100	40	78.8
9	Oral examination	100	25	100	0	56.3
10	Clinical practical	100	0	50	20	42.5
11	**% TMO who like best about the training program**: The training methods and systems followed	100	100	50	20	67.5
12	Increase in your knowledge and capabilities	33.3	100	100	40	68.3
13	Incentives and facilities provided during training	0	0	100	0	25.0
14	Hands on experience of cases	33.3	100	100	0	58.3
15	**% TMO who would like changes in the training program:** Better training methods and paters	0	50	50	20	30.0
16	Duration of training to be increased	66.7	25	100	0	47.9
17	Exclusive training for MOs to be held	0	0	0	0	0.0
18	Better access to practical cases	33.3	50	0	20	25.8
19	Others (Refresher training and regular up-gradation of knowledge)	33.3	0	0	0	8.3
20	**% TMO who reported specific areas or specific services that they were not sufficiently prepared for by the supplementary training:** Handling delivery complications	0	50	0	0	12.5
21	OPD for children presenting with complications	0	0	0	20	5.0
22	Procedures	33.3	25	50	60	42.1
23	**% TMO who reported areas or specific services that you would like more training on:** Normal deliveries	0	0	0	0	0.0
24	Handling delivery complications	33.3	25	0	20	19.6
25	OPD for pregnant women and children	0	0	0	0	0.0
26	Other (Family Planning Operations)	0	25	0	0	6.3

In terms of the working of these TMOs after the training, it was observed that except in Rajasthan, the day-to-day job of most of the TMOs underwent changes in terms of their ability to handle more cases in their specialty (Table 14). However, in Rajasthan, they did not feel more confident in handling emergency cases, providing greater support to other doctors and reducing the load of specialists in the district. Very small proportions of the TMOs were able to handle additional case load perhaps because there is no commensurate monetary incentive for them to do so. Moreover, many of the TMOs revealed during the survey that after training they were not effectively utilised in proving specialist services. They were either given rotation duties at different health facilities, where they ended up attending OPD only or in some cases they were posted at health centres not capable of providing specialist services. For instance, at two PHCs in the Dhar (MP) two MOs trained in gynaecology were posted on rotation basis. However, both of them could not stay at these PHCs regularly for supervising or conducting deliveries that were handled by the paramedical staff. One of them had a parallel posting in the district hospital and the other commuted from another town. So at both these places the skills of these trained MOs were not utilized at all. Moreover, in Dungarpur (Rajasthan) and Lalitpur (UP) the MOs trained in anaesthesia were placed at the PHC level where their skills were totally unutilized. This was despite the fact the districts had serious lack of the anaesthetists.

Table 14: Working of TMOs After Short Term Supplementary Training

S. No.	Details	UP	MP	Bihar	Raj	Aggregate
1	**% Doctors who receive a higher salary now after completing the training**	0	0	0	0	0
2	**% Doctors who would advise your MBBS colleagues to enrol in the training program**	100	100	100	80	95
3	**% Doctors who reported that the additional training has changed their day-to-day job at the health facility as they are:** Able to handle more cases in your specialty now.	66.7	100	100	40	76.7
4	More confident in providing emergency care than before	66.7	100	100	40	76.7
5	Able to provide greater support to other doctors	66.7	75	100	0	60.4
6	Able to reduce the load of specialists in your area in the district	33.3	100	100	0	58.3
7	**% Doctors who said they are able to handle the additional case load**	0	25	0	20	11.3

The discussions with the specialists about their opinions regarding supplementary trainings to selected MOs revealed that about half of the specialists were not aware of any specialist training given in the district, though this problem is more acute in Rajasthan and UP (Table 15).

Table 15: Specialist Opinion Regarding Supplementary Training of MOs						
S. No.	**Details**	**UP**	**MP**	**Bihar**	**Raj**	**Aggregate**
4	**% SPs that are aware of supplementary technical (4-6 months) training courses being offered in the district to MOs in:** Gynaecology	33.3	40	53.3	6.7	33.3
5	Paediatrics	0	13.3	13.3	6.7	8.33
6	Anaesthesia	13.3	40	60	20	33.3
7	Not aware of any trainings being offered	53.3	33.3	33.3	73.3	48.3
8	**% SPs who reported TMOs working in their facility**	33.3	33.3	53.3	6.7	31.7
9	**% SPs who believe that the training is sufficient for the TMOs to be competent in providing specialist services**	40	40	40	20	35
10	**% SPs who think trainings can be improved by changing:** Training duration	26.7	26.7	20	-	24.5
11	Methods in terms of practical training	0	6.7	20	-	8.9
12	Should be exclusive and systematic	0	0	6.7	-	2.23
13	Should be regularly revised	13.3	13.3	13.3	-	13.3
14	Others (Frequency of Training and No. of doctors trained should be increased)	6.7	6.7	0	-	4.47
15	**SPs who think these trainings have helped improve maternal and child health services in the district**	26.7	26.7	20	13.3	21.7
16	**% SPs that reported additional services that MOs are able to provide after the supplementary training:** Handling complicated deliveries	26.7	40	20	-	28.9
17	Handling C-section	26.7	40	20	-	28.9
18	Handling paediatric OPD	6.7	26.7	13.3	-	15.6
19	Anaesthesia support for surgeries	0	20	40	-	20
20	**% SPs who think that trained MOs have lightened the patient load for specialist doctors**	13.3	26.7	20	13.3	18.3
21	**% SPs (unaware of trainings in their district) who think a 4-6 months training is sufficient to provide general MOs with necessary skills for specific specialist services**	33.3	20	26.7	40	30
22	**%SPs who reported that the training should focus on:** Handling complicated deliveries	6.7	13.3	13.3	-	11.1
23	Handling C-section	0	0	6.7	-	2.23
24	Handling paediatric OPD	20	13.3	26.7	-	20
25	Anaesthesia support for surgeries	13.3	13.3	13.3	-	13.3
Note: '-' in the Rajasthan column are for those data that were not collected.						

On an average, about a fourth of the specialists had a trained medical officer (TMO) working in their HF. Less than 40% of the specialists believed that the TMOs were competent in providing specialist services in the district. About 24% believed that such training can be improved by increasing the duration of the training and about 12% believed that it can be improved by more regularly revising the training material. Only 31% specialists believed that such trainings have improved the maternal and child care in the district. According to less than half the specialists who are aware about the specialist training, the trained MOs are able to handle complicated deliveries, C-section, paediatric OPD, and provide anaesthesia support for surgeries and reduce the patient load for the specialist doctors. Out of those specialists who are not aware about such training of MOs, only about a fourth believed that training of 4 to 6 months could be sufficient to provide the necessary skills to MOs for specific specialist services.

Discussions with district administrations regarding the supplementary training of general MOs revealed that only one district each in Bihar and Rajashtan had conducted training in paediatrics. However, all other visited districts had conducted emergency obstetric care and anaesthesia trainings. The average number of TMOs at the district level in all specialties was one, at CHC level it was two, and at PHC level it was again one. On an average, once in the previous year (2011-12) such training was provided in each of the three specialties. About 40% of the districts reported improvement in the quality of health care after the supplementary training of MOs, though the tangible outcomes reflecting the quality of healthcare in the district do not show any substantial improvement. According to 40% districts, not enough number of MOs is provided with such a supplementary training. About 50% districts expressed interest in additional supplementary training in the areas of paediatrics and anaesthesia, and 70% districts in C-section training. Among the reasons for the lack of supplementary training in the district, 30% mentioned administrative decision at the state level and 20% stated the funding decision at the state level. Generally there is apathy for even providing any plausible reasons for such a state of affairs.

Other Efforts for Improving Specialist Services

The district administration also made some other efforts in the direction of provisioning of specialist services specifically in the rural areas. It was found that while none of the districts in UP and Rajasthan hired specialists during the last one year, MP and Bihar did hire about 7 to 8 specialists in their districts. However, this information did not corroborate the findings of the specialist survey implying serious communication gap somewhere in the system. Furthermore, among the visited states Rajasthan had a system whereby a specialist doctor from outside the district visits on a regular rotational basis during health camps. The other states did not report any such arrangements. In MP and Rajasthan, specialists from a higher HF within the district visit the lower HFs on rotational basis. In Rajasthan it is regularly on a weekly basis, but in MP it is based on requirements and on periodic health camps. Such visits moreover are not for OPD but for scheduled procedures or health camp. In MP the community is informed about such visits by specialists by notices and through ASHA (accredited social health activist) or ANM, whereas in Rajasthan it is through notices and word of mouth. Districts in Rajasthan find this system beneficial for faster diagnosis and treatment.

It was also found that all the visited states attempting the use of technology to connect rural patients with specialist doctors in urban areas. At present it is largely through telephone or mobiles. Only in Rajasthan, e-mails and video conferences are used. During the discussions with doctors and paramedical staff it was found that while the specialists used mobile phones for communicating with colleagues and other doctors in private sector for consultations, this practice was not very common among MOs or ANMs/GNMs. The district administration in all states indicated a lack of telephone and internet connectivity as a reason for poor utilisation of information technology in healthcare. In MP and Rajasthan, some of the officials and patients are also not interested in using ICT in health, because patients prefer to see the doctor in person rather than through impersonal communication channels.

In terms of any strategies employed by districts to attract specialist doctors only 50% of them have made any attempts. This strategy is mostly to offer higher salary but most of the districts confirm that their efforts have not succeeded to attract specialists. Only 20% districts are planning to offer any incentives in future to attract specialists. In the past about 40% of the districts requested to provide specific incentives to attract specialists but in none of them they were provided. Thus, the hypothesis of general despair, discouragement and disbelief prevails at the district level. Still however, there are efforts made by the district to deal with the problem of shortage of specialists through various methods. 30% districts mention hiring of contractual specialist doctors, 20% suggest incentivizing doctors to take up specialization, 30% argue for supplementary training to existing MBBS doctors, 20% plead for outsourcing the services to private sector, and 20% feel that proper facilities and better salaries to specialists need to be provided.

V. Health inputs and outputs

The findings of the survey of doctors and paramedical staff at health facility and also the district administrations bring out various aspects of specialist services including unavailability of doctors and lack of support infrastructure and manpower in the public health system of selected states. The poor state of specialist services in the rural areas are likely to impact negatively the health output indicators such as institutional deliveries, neo-natal care and care of paediatric patients. It would, therefore, be relevant to examine the impact of the identified factors on these outputs of the public health system. In order to do this we first consider the status of health outputs of institutional delivery, and paediatric patient care services as reported by the GNMs and MOs during the survey. Tables 16a, 16b and 17 summarise their responses regarding the same.

It is observed that Bihar had significantly higher number of delivery cases in the HF per month and also handled personally as reported by the GNMs than in other HFs. Percentage of total deliveries attended by GNMs varied from state to state, but was not even 33% in any of the HFs. Percentage of deliveries referred due to complications was only about 6% on an average as reported by GNMs. These complicated cases were largely referred to the district hospitals (82%), CHCs (17%) and hardly to PHCs (1%) and never to the private hospitals as reported by GNMs. The MOs have reported that on an average there were about 3 deliveries

taking place per day in their HFs, and only about one complicated case is referred per five days out of the HF.

The main reasons for referring the cases outside were reported by MOs as complications in the deliveries that cannot be handled without a specialist and, the other as insufficient infrastructure availability in the HFs (Table 16a). The overriding reasons for referring the complicated delivery cases to higher HFs given by the GNMs are also the same (Table 16b). It was also further observed that the average distances to the nearest government and private safe delivery facilities as reported by GNMs were 14.1 kms and 16.8 kms respectively.

Table 16a: Details Regarding Institutional Deliveries as given by GNM

S. No.	Details	UP	MP	Bihar	Raj	Aggregate
1	**Average No. of delivery cases per month in facility as reported by GNMs**	99	75	247	49	118
2	**Avg. Deliveries handled by GNMs personally (per month)**	22	23	35	15	24
3	**Avg. no. of complicated deliveries referred each month**	5	7	4	4	5
4	**% deliveries attended by GNMs out of total at facility**	22.2	30	14.3	31.2	24.4
5	**% deliveries referred due to complication from the HF as per GNM**	4.9	8.8	1.7	9.2	6.2
6	**% GNM who refer cases of women experiencing complications during delivery:** Refer to PHC	5	0	0	0	1.3
7	Refer to CHC	5	20	20	25	17.5
8	Refer to district hospital	90	80	80	75	81.3
9	Refer to private hospital	0	0	0	0	0
10	**% GNMs who stated primary reasons to refer a delivery case*:** Insufficient infrastructure	95	65	70	60	73
11	Insufficient staff numbers	5	0	0	20	6.3
12	Staff not trained	0	0	0	15	3.8
13	Overload of patients	0	0	0	0	0
14	Specialists not available	85	90	75	80	83
15	**Avg. dist. to nearest govt. facility with safe delivery facility (Kms.)**	14	16	9	17	14.1
16	**Avg. dist. to nearest private facility with safe delivery facility (Kms.)**	18	24	8	18	16.8

Note: * Percentages may not add to 100 because of multiple options exercised by GNMs.

The same distances as reported by MOs were 18.8 kms for government and 21 kms for private safe delivery facilities. This could be probably due to the fact that the MOs surveyed were at the PHCs that were located at a relatively greater distance from other government and private health facilities in urban or semi urban centres as compared to the GNMs who were surveyed at the both CHCs and PHCs.

Table 16b: Details Regarding Institutional Deliveries as given by MO						
S. No.	**Details**	**UP**	**MP**	**Bihar**	**Raj**	**Aggregate**
1	**Avg. deliveries each month at the facility**	138	45	189	43	89
2	**Avg. no. of complicated deliveries referred each month**	14	6	4	4	7
3	**% Deliveries referred out of the facility as per MO**	10	13.8	2	8.7	7.9
4	**% MO who reported the primary reasons to refer a woman for delivery**: Insufficient infrastructure	16.7	8.3	41.7	33.3	40.6
5	Insufficient staff numbers	8.3	0	8.3	0	9.4
6	Staff not trained in required skills	8.3	8.3	8.3	16.7	21.9
7	Overload of patients	0	0	8.3	0	1.6
8	Complication in delivery	91.7	91.7	83.3	75	68.8
9	**% MO that reported type of complications during pregnancy for most frequently referrals:** Severe anaemia	66.7	41.7	41.7	66.7	45.3
10	Foetal distress	16.7	16.7	33.3	41.7	29.7
11	Hypertension	25	41.7	25	33.3	29.7
12	Past complications/C-section	25	16.7	33.3	25	20.3
13	Post-Partum Haemorrhage	16.7	41.7	33.3	41.7	25
14	Other (Obstructed Labour, Antepartum haemorrhage (APH))	33.3	33.3	16.7	0	17.2
15	**Avg. dist. to nearest govt. facility with safe delivery facility (Kms.)**	17.8	28.3	13.4	13.6	18.8
16	**Avg. dist. to nearest private facility with safe delivery facility (Kms.)**	22	26.2	14	23.7	21

Considering the fact that the deliveries were referred in case of complications requiring specialist attentions, these distances are significant in making the access to safe delivery facility not satisfactory on an average for large rural population. Moreover, as given above, majority of these referred deliveries were sent to the district hospital indicating that the reliable specialist care is largely available only at the district level thereby creating a pressure on the district level hospitals. It is interesting to note that none of the GNMs and MOs (except a small percentage in Bihar) have reported overload of patients as a reason for

referring patients to higher facilities. Therefore, if these facilities are equipped with the required infrastructure and skilled manpower they would be in a position to provide effective specialist services at their level.

The specialist services required at the PHC/CHC level also included child care. In fact the MOs at these facilities played a significant role in providing these services due to absence of relevant specialists.

Table 17: Paediatric OPD Handled by MO (in %)

S. No.	Details	UP	MP	Bihar	Raj	Aggregate
1	**% MO who see paediatric OPD cases regularly**	100	100	100	91.7	97.9
2	**Avg. no. of paediatric cases in a day**	27.7	10.6	41.7	10.8	22.7
3	**% MO who feel comfortable and confident in treating paediatric patients**	75	100	100	91.7	91.7
4	**% MO who refer paediatric patients**	100	91.7	100	100	97.9
5	**% MO who states reasons for referring paediatric patients as**: Do not have necessary skills	83.3	58.3	58.3	58.3	64.6
6	Other facilities have equipment & infrastructure	58.3	75	75	75	70.8

Almost all MOs saw paediatric OPD cases regularly at an average rate of about 23 per day. While most of them felt quite comfortable about it, almost 98% of the MOs have reported that they have to refer certain paediatric cases to higher HFs. This was either because they did not have necessary skills to treat the case or because other facilities had necessary equipment and infrastructure.

Given the status of the health outputs in the selected districts, we may now assess the impacts of selected health inputs such as manpower and infrastructure on these outputs. With this objective an attempt is made to analyse the data using regression analysis. Using the data collected from the primary survey across the four states, the hypothesises were tested regarding impact of available type of specialists, type of equipment, facilities and infrastructure, and distances to other health facilities on deliveries conducted at HFs with GNM or MO. Moreover, the impact of these variables was also tested on deliveries being referred from lower to higher level HFs. Lastly, the impact of availability of specialist on the paediatric OPD were also tested in the context of the child care services at the MO HFs.

The regression analysis was done using the ordinary least squares method. Moreover, the stepwise regression analysis was also performed in order to improve goodness of fit and explanatory power of the regression model by eliminating the insignificant variables one by one. The details of the models tested and the respective results are given as follows:

i. GNM Regression I

$$y_1 = b_0 + b_1d_1 + b_2d_2 + b_3d_3 + b_4d_4 + b_5d_5 + b_6d_6 + b_7d_7 + b_9d_9 + b_{10}d_{10} + b_{11}d_{11} + b_{12}d_{12} + b_{13}d_{13} + b_{14}d_{14} + b_{15}x_1 + b_{16}x_2 + b_{17}x_3 + b_{18}x_4 + e$$

y_1 = Total number of deliveries at the health facility of the general nurse and midwife (GNM)

d_1	Dummy for a gynaecologist available in the health facility
d_2	Dummy for anaesthetist available in the health facility
d_3	Dummy for paediatrician available in the health facility
d_4	Dummy for specialist doctors conducting delivery
d_5	Dummy for suction equipment available in the health facility
d_6	Dummy for *ambu* bag available in the health facility
d_7	Dummy for disposable delivery kit available in the health facility
d_8	Dummy for food facility available in the health facility
d_9	Dummy for day guard available in the health facility
d_{10}	Dummy for night guard available in the health facility
d_{11}	Dummy for equipment neonatal resuscitation available in the health facility
d_{12}	Dummy for facility for managing neonatal hypothermia and jaundice available in the health facility
d_{13}	Dummy for functioning new born unit available in the health facility
d_{14}	Dummy for a full time specialist available in the health facility
x_1	No. of function labour tables in the health facility
x_2	No. of postpartum beds in the health facility
x_3	Distance to nearest govt. HF
x_4	Distance to nearest pvt. HF

ii. GNM Regression II

$$y_1 = b_0 + b_1d_1 + b_2d_2 + b_3d_3 + b_4d_4 + b_5d_5 + b_6d_6 + b_7d_7 + b_9d_9 + b_{10}d_{10} + b_{11}d_{11} + b_{12}d_{12} + b_{13}d_{13} + b_{14}x_1 + b_{15}x_2 + b_{16}x_3 + b_{17}x_4 + b_{18}x_5 + e$$

y_1 = Total number of deliveries referred from the health facility of the GNM

d_1	Dummy for a gynaecologist available in the health facility
d_2	Dummy for anaesthetist available in the health facility
d_3	Dummy for paediatrician available in the health facility
d_4	Dummy for specialist doctors conducting delivery
d_5	Dummy for suction equipment available in the health facility
d_6	Dummy for *ambu* bag available in the health facility
d_7	Dummy for disposable delivery kit available in the health facility
d_8	Dummy for food facility available in the health facility
d_9	Dummy for equipment neonatal resuscitation available in the health facility
d_{10}	Dummy for facility for managing neonatal hypothermia and jaundice available in the health facility

d_{11}	Dummy for functioning new born unit available in the health facility
d_{12}	Dummy for a full time specialist available in the health facility
d_{13}	Dummy for ambulance facility available at the health facility
x_1	No. of function labour tables in the health facility
x_2	No. of postpartum beds in the health facility
x_3	Distance to nearest govt. HF
x_4	Distance to nearest pvt. HF
x_5	Number of deliveries conducted at health facility of the GNM

The results of the regressions i and ii are given in tables 18a and 18b. The regression of the number of deliveries conducted by the HFs of GNM on the set of explanatory variables indicates that there is a significant impact of availability of a gynaecologist and a full time specialist in the facility on the number of deliveries. Moreover, after dropping the statistically insignificant variables from the model through step-wise regression method, it is found that the distance of the HF to the nearest government health facility also tends to have a significant impact on the deliveries. All these variables also carry expected signs and are statistically significant. The adjusted R-square values of these regressions are highly significant and improve after eliminating the insignificant variables.

Apart from these two, three other variables, viz. food facility, night guard availability and distance to nearest private HF, also tend to have a significant impact on the number of deliveries. However, they carry a perverse sign requiring some explanation. This could probably be related to quality and reliability of those services available in the rural areas compared to the extra costs involved particularly in the case of food facility and night guard. Considering the negative impact of distance to private facility it could be argued that a nearby private facility in rural area is likely to be less equipped and provide poorer quality of service per rupee cost as compared to the government HF. Thus, the nearby private facility is not perceived to provide satisfactory value for money by the patients. Hence, there is a likely preference of users towards a public health facility with doctors and even a specialist over a probably unqualified private practitioner providing delivery services nearby.

The second GNM regression was on number of deliveries referred by GNM HF on the set of explanatory variables. The results indicated that the number of referrals made by these facilities was significantly explained by the total number of deliveries conducted and the availability of anaesthetist at the facility, particularly when insignificant variables are dropped through the step-wise regression. The signs of the coefficients are also found to be expected for all the explanatory variables.

Table 18a: GNM Regression I (Deliveries Handled)								
Variables	**Unit**	**Slope-b**	**t Stat**	**P-value**	**R Square**	**Adjusted R Square**	**F - Signi.**	**Observations**
No. of Deliveries at GNM Facility on All Variables								
Gynec.	Dummy	54.9	2.373	**0.022**	0.624	0.463	0.000	61
Aneasth.	Dummy	-9.318	-0.311	0.757				
Pedia.	Dummy	13.90	0.586	0.561				
SP Cond. Del.	Dummy	-40.8	-1.249	0.219				
Suction Equipment	Dummy	-15.07	-0.538	0.593				
Ambubag	Dummy	14.66	0.547	0.587				
Disposable Delivery Kit	Dummy	4.508	0.252	0.803				
Food-Fac.	Dummy	-36.1	-2.038	**0.048**				
Day Guard	Dummy	-1.168	-0.031	0.976				
Night Guard	Dummy	-29.6	-0.824	0.414				
Equip. NN Resuscitation	Dummy	24.1	1.038	0.305				
Facc. NN-Hypothermia-Jaundice	Dummy	5.94	0.230	0.820				
New Born Unit-Functioning	Dummy	-23.90	-0.956	0.345				
Full Time SP	Dummy	70.96	2.793	**0.008**				
Labour Table	Number	11.47	0.878	0.385				
PP Beds	Number	1.574	1.286	0.205				
Dist. near Govt. fac.	Number	1.314	1.524	0.135				
Dist. near Pvt. fac.	Number	-1.298	-2.196	**0.034**				
No. of Deliveries at GNM Facility on Selected Variables								
Gynec.	Dummy	55.342	3.533	**0.001**	0.604	0.535	0.000	61
SP Conducting Delivery	Dummy	-29.246	-1.060	0.294				
Food-Facc.	Dummy	-34.981	-2.415	**0.019**				
Night Guard	Dummy	-32.903	-2.243	**0.029**				
Equip. NN Resuscitation	Dummy	25.262	1.502	0.139				
Full Time SP	Dummy	69.343	3.127	**0.003**				
PP Beds	Number	1.465	1.378	0.174				
Dist. near Govt. fac.	Number	1.589	2.155	**0.036**				
Dist. near Pvt fac.	Number	-1.157	-2.355	**0.022**				

Table 18b: GNM – Regression II (Deliveries Referred)								
Variables	**Unit**	**Slope-b**	**t Stat**	**P-value**	**R Square**	**Adjusted R Square**	**F - Signi.**	**Observations**
No. of Deliveries Referred by GNM Facility on All Variables								
Gynec	Dummy	0.862	0.506	0.615	0.335	0.050	0.323	61
Aeasth	Dummy	-4.599	-2.199	**0.033**				
Pedia	Dummy	0.342	0.204	0.840				
SP Conducting Delivery	Dummy	0.379	0.155	0.877				
Suction	Dummy	1.696	0.861	0.394				
Ambubag	Dummy	-0.057	-0.030	0.976				
Disp. Del-Kit	Dummy	0.256	0.198	0.844				
Food-Fac	Dummy	0.127	0.097	0.923				
Equip. NN- Resuscitation	Dummy	0.329	0.191	0.849				
Facc. NN-Hypothermia &Jaundice	Dummy	-0.950	-0.495	0.623				
New Born Unit-Functioning	Dummy	1.746	0.955	0.345				
Full Time SP	Dummy	-2.701	-1.300	0.201				
Ambulance	Dummy	-0.283	-0.181	0.857				
Labor Table	Number	-0.498	-0.541	0.591				
PP Beds	Number	0.045	0.465	0.645				
Dist. near Govt. fac.	Number	0.054	0.814	0.420				
Dist. near Pvt fac	Number	0.026	0.574	0.569				
Deliveries at GNM Facility	Number	0.029	2.628	**0.012**				
No. of Deliveries Referred by GNM Facility on Selected Variables								
Aeasth	Dummy	-3.904	-2.455	**0.017**	0.256	0.217	0.0007	61
Full Time SP	Dummy	-1.712	-1.295	0.201				
Deliveries at GNM Facility	Number	0.032	3.971	**0.000**				

The second set of regressions for models iii and iv were of the deliveries conducted and referred by the MO HFs on the set of explanatory variables.

iii. MO Regression I

$$y_1 = b_0 + b_1d_1 + b_2d_2 + b_3d_3 + b_4d_4 + b_5d_5 + b_6d_6 + b_7d_7 + b_8d_8 + b_9d_9 + b_{10}d_{10} + b_{11}x_1 + b_{12}x_2 + b_{13}x_3 + b_{14}x_4 + e$$

y_1 = Total number of deliveries at the health facility of the medical officer (MO)

d_1	Dummy for a gynaecologist available in the health facility
d_2	Dummy for anaesthetist available in the health facility
d_3	Dummy for paediatrician available in the health facility
d_4	Dummy for a full time specialist available in the health facility
d_5	Dummy for delivery equipment to be replaced in the health facility
d_6	Dummy for equipment for neonatal resuscitation available in the health facility
d_7	Dummy for functioning new born unit available in the health facility
d_8	Dummy for food facility available in the health facility

d_9	Dummy for day guard available in the health facility
d_{10}	Dummy for night guard available in the health facility
x_1	No. of function labour tables in the health facility
x_2	No. of postpartum beds in the health facility
x_3	Distance to nearest govt. HF
x_4	Distance to nearest pvt. HF

iv. MO Regression II

$$y_1 = b_0 + b_1d_1 + b_2d_2 + b_3d_3 + b_4d_4 + b_5d_5 + b_6d_6 + b_7d_7 + b_8d_8 + b_9d_9 + b_{10}d_{10} + b_{11}x_1 + b_{12}x_2 + b_{13}x_3 + b_{14}x_4 + e$$

y_1 = Total number of deliveries referred by the health facility of the MO

d_1	Dummy for a gynaecologist available in the health facility
d_2	Dummy for anaesthetist available in the health facility
d_3	Dummy for paediatrician available in the health facility
d_4	Dummy for a full time specialist available in the health facility
d_5	Dummy for delivery equipment to be replaced in the health facility
d_6	Dummy for equipment for neonatal resuscitation available in the health facility
d_7	Dummy for functioning new born unit available in the health facility
d_8	Dummy for food facility available in the health facility
d_9	Dummy for ambulance facility available at the health facility
x_1	No. of function labour tables in the health facility
x_2	No. of postpartum beds in the health facility
x_3	Distance to nearest govt. HF
x_4	Distance to nearest pvt. HF
x_5	Number of deliveries conducted at health facility of the MO

The results of the MO regressions are given in Tables 19a and 19b. The results show a satisfactory fit of the model to the data. The number of deliveries conducted at the MO facility is explained by the availability of a full time specialist and the number of labour tables available. Moreover, after eliminating the insignificant variables the availability of a functioning new-born unit and the need to replace the delivery equipment also significantly explain the deliveries. The signs of the coefficients for all these variables are also the expected ones. However, the coefficient of gynaecologist available (significant at 10% level) has a perverse sign, which is possibly explained by the availability of gynaecologist at the facility not being utilized as a specialist due to misallocation of skilled manpower discussed earlier.

The regression of number of deliveries referred by MO facility on the set of explanatory variables shows that these referrals are explained significantly by the availability of gynaecologist, equipment for neonatal resuscitation, food facility, ambulance, and the total number of deliveries conducted. The significantly large R-square and the adjusted R-square

also show high explanatory power of the model. Moreover, while the coefficients of most of these variables have the expected signs, the variable of ambulance facility shows a perverse sign indicating lower referrals in facilities having ambulance. This could probably be explained by the fact that the very existence of an ambulance is indicative of better infrastructure available in the HF and hence a greater possibility of handling some complications rather than referring to higher level facility. Among the coefficients of other variables showing perverse sign include the availability of anaesthetist, functioning new born unit, and number of labour tables. While the first two of the three variables come out significant at 10% level, the last one is insignificant and can be ignored. The perverse sign for the availability of anaesthetist could again be due to the sub-optimal allocation of specialists discussed earlier. Similarly, although the new born unit at the MO facility may be working, the trained MOs may not feel confident of handling complicated delivery cases or because they may lack other essential infrastructure in their HFs.

Table 19a: MO-Regression I (Deliveries Handled)

Variables	Unit	Slope-b	t-Stat	P-value	R Square	Adjusted R Square	F - Signi.	Observations
No. of Deliveries at MO Facility on All Variables								
Gyneac.	Dummy	-76.50	-1.191	0.246	0.626	0.398	0.015	38
Aneasth.	Dummy	39.18	0.575	0.571				
Pedia.	Dummy	11.43	0.168	0.868				
Full Time SP	Dummy	131.12	2.775	**0.011**				
Replace_Del_Equip.	Dummy	82.31	1.798	0.085				
Equip. NN Resuscitation	Dummy	11.57	0.235	0.817				
New Born Unit-Functioning	Dummy	54.03	1.306	0.204				
Food-Fac.	Dummy	20.45	0.563	0.579				
Day Guard	Dummy	-32.12	-0.396	0.696				
Night Guard	Dummy	57.73	0.652	0.521				
Labour Table	Number	59.91	2.971	**0.007**				
PP Beds	Number	-1.74	-0.336	0.740				
Dist. near Govt. fac.	Number	0.50	0.408	0.687				
Dist. near Pvt fac.	Number	0.10	0.064	0.950				
No. of Deliveries at MO Facility on Selected Variables								
Gyneac.	Dummy	-68.59	-1.781	0.084	0.604	0.542	0.000	38
Full Time SP	Dummy	128.22	3.609	**0.001**				
Replace Del. Equip.	Dummy	70.67	2.139	**0.040**				
New Born Unit-Functioning	Dummy	65.28	2.078	**0.046**				
Labour Table	Number	62.99	3.928	**0.000**				

Table 19b: MO – Regression II (Deliveries Referred)								
Variables	**Unit**	**Slope-b**	**t Stat**	**P-value**	**R Square**	**Adjusted R Square**	**F - Signi.**	**Observations**
No. of Deliveries Referred by MO Facility on All Variables								
Gynec.	Dummy	-7.993	-2.247	**0.037**	0.788	0.632	0.001	34
Aesth.	Dummy	7.399	1.901	0.073				
Pedia.	Dummy	1.819	0.427	0.675				
Full Time SP	Dummy	-1.519	-0.497	0.625				
Replace_Del_Equip.	Dummy	2.860	1.065	0.300				
Equip. NN resuscitation	Dummy	-5.070	-2.020	**0.058**				
New Born Unit-Functioning	Dummy	3.623	1.580	0.131				
Food-Fac.	Dummy	-5.426	-2.588	**0.018**				
Ambulance	Dummy	-5.669	-2.344	**0.030**				
Labour Table	Number	1.451	1.169	0.257				
PP Beds	Number	-0.268	-0.967	0.346				
Dist. near Govt. fac.	Number	0.042	0.653	0.521				
Dist. near Pvt. fac.	Number	0.065	0.740	0.468				
Deliveries at MO Facility	Number	0.039	2.446	**0.024**				
No. of Deliveries Referred by MO Facility on Selected Variables								
Gynec.	Dummy	-7.240	-2.668	**0.013**	0.760	0.670	0.000	34
Aesth.	Dummy	5.950	1.841	0.078				
Replace Del. Equip.	Dummy	2.293	1.102	0.281				
Equip. NN resuscitation	Dummy	-4.498	-2.044	**0.052**				
New Born Unit-Functioning	Dummy	4.113	2.004	**0.056**				
Food-Fac.	Dummy	-5.588	-3.133	**0.005**				
Ambulance	Dummy	-6.134	-2.970	**0.007**				
Labour Table	Number	1.323	1.153	0.260				
Deliveries at MO Facility	Number	0.038	2.917	**0.008**				

The third and final regression analysis is of number of paediatric patients regressed on selected variables as shown in the model below:

v. MO Regression III

$y_1 = b_0 + b_1d_1 + b_2d_2 + b_3x_1 + b_4x_2 + b_5x_3 + e$

y_1 = Average number paediatric cases per day received by the health facility of MO

d_1	Dummy for the medical officer comfortable in handling paediatric cases in OPD
d_2	Dummy for paediatrician available in the health facility
x_1	No. of OPD cases received per day by the health facility
x_2	Distance to nearest govt. HF
x_3	Distance to nearest pvt. HF

The result of the above regression is given in Table 20.

Table 20: MO – Regression III (Paediatric OPD)								
Variables	**Unit**	**Slope-b**	**t Stat**	**P-value**	**R Square**	**Adjusted R Square**	**F - Signi.**	**Observations**
No. of Paediatric OPD cases received at MO Facility on All Variables								
MO-Comfort	Dummy	12.95	2.03	**0.05**	0.769	0.736	0.000	41
Paedia.	Dummy	14.52	2.85	**0.007**				
No. OPD per day	Number	0.221	10.37	**0.00**				
Dist. near Govt. fac.	Number	0.12	1.009	0.32				
Dist. near Pvt. fac.	Number	0.082	0.717	0.478				

To begin with it is found that the R-square and adjusted R-square values are highly significant. It further shows that the number of paediatric patients coming to the MO's HF is primarily determined by the number of total OPD received by the facility. Moreover, the availability of a paediatrician in the MO facility and the comfort of the medical officer in handling the paediatric cases are also significantly impacting the number. However, the distances from the nearest government or private health facilities do not have any effect on the paediatric patients received by the HF.

Based on all of the above regression results, we find that the number of deliveries in both MO and GNM facilities are significantly determined by the availability of a full time specialist in the facility. This is true irrespective of the fact that a specialist conducting delivery does not turn out to be having a significant impact on deliveries in at GNM facilities. Moreover, the availability of a gynaecologist in a MO facility tends to reduce the number of referrals from MO facilities. Finally, it is also observed that the number of paediatric patients visiting the MO facility is also significantly determined by the availability of a paediatrician at the HF. Hence, it could be argued that placing the specialists at the health facilities could act as a major step in terms of improving the health output by providing the access to the specialist services for the maternal and child health. Since, the number of deliveries (mainly at GNM facility) is also significantly explained by the distance to other government health facilities, the availability of specialist could further strengthen the HFs in the remote rural regions.

VI. Summary and Recommendations

The specialist services in the rural areas of the four selected states faced serious limitations primarily in terms of the availability of specialist doctors at the rural health facilities including the PHCs and CHCs. The concentration of the specialist was mainly at the district centre and at some places at the sub-district hospitals. This was true not only because these hospitals acted as a referral point for the rural health facilities, but also because the total numbers of specialists working in the public health system of the visited districts were extremely low. This created a compulsion for the healthcare providers at PHCs and CHCs to refer all cases requiring specialist attention to the district centre despite having low patient load at their facilities. Also the patients were compelled to travel relatively large distances

during the critical situations for availing specialist services. Moreover, the inappropriate placements (allocations) and irregular presence of specialists at different health facilities caused underutilization of the highly scarce skills of these doctors working under the public health system. For instance, while some of the remote rural CHCs having gynaecologist could provide emergency obstetric care (EMoC) services, they could not do so due unavailability of an anaesthetist. Secondly, a paediatrician who could have been more effective in focusing on child care only was in many cases attending to general OPD which a medical officer (MBBS) could have easily handled. There was a lack of clearly defined roles for different doctors based on their qualifications and expertise.

The findings of the survey also further suggest that the salary and incentive structure of the specialists is not at all conducive and attractive to retain them. While there are significantly large differences in their salaries, not only across states but also within the states, their appointments are hardly done considering their qualification and specialisation. In fact these doctors have said that their counterparts have much greater earnings in private practice as compared to their salaries. Moreover, they also do not receive any incentives in terms of housing or transport allowances or any kind of rewards in cash or kind for their performance. This is causing dissatisfaction among the specialist resulting in expressed willingness to leave the government jobs to do private practice and move to urban areas for better earnings opportunities. Furthermore, the working environment for the specialists was also observed to be poor. While most of these doctors had to be on duty for longer hours and for about 6 days in a week, most of them also could not take leaves easily. Moreover, in case specialists would be on leave the patients had to be handled by the MOs and paramedics or had to be referred to other facilities. Finally, the specialists also reported insufficient support staff, equipment and other infrastructure for providing adequate services in the area of their specialization.

The efforts of the public health system for improving the access of people to specialist services also do not appear to be effective. One of the major efforts was of providing short term trainings to MOs in the areas of gynaecology, paediatrics or anaesthesia for enhancing specialist services at the rural facilities. However, it was found that while some of these TMOs (trained MOs) did attend to speciality cases and were confident in doing so, there were many who continued to work on general cases and could not get involved in specialist care. Moreover, many of these MOs were either recommended by seniors or were ordered by the district officials to take up the training and in most cases they were not given any choice for the type of the specialisation they wanted to go for. Many of the TMOs also felt a need of trainings for longer duration and regular refresher courses in order to strengthen and upgrade their skills. The specialist doctors who supported this effort suggested that these types of training should be conducted independently for the MOs (not along with PG students as it is done now) for better results. The district officials in this regard felt that there is a need for more number of such trainings required with more MOs covered under the training as the current level is not able to bring about expected changes in the quality specialist care in the public health facilities. However, they are unable to do the same due to the centralization of the decision making process existing at the state level administration.

Use of ICT for consulting specialists is not found very popular with majority of the medical officers and paramedical staff at lower level facilities in case of difficulty in treating the patients. Moreover, the use of SMS, email and internet among the MOs was also found to be non-existent. However, the use of ICT among specialists was found to be relatively better with greater proportions of these doctors using mobiles phones for consultation and internet for medical information. A number of specialists in all states also advocated the idea of teleconferencing and services like call centres for specialist consultations, though these services are currently not available. In fact the district officials indicated that the poor level of ICT infrastructure is preventing them from an extensive use of modern communication techniques.

Providing effective specialist care service for maternal and child care through public health system would require major changes to be brought about at all levels starting from district hospitals to PHCs. Some of these changes could be as follows:

1. While the recruitment of the required specialists would be one of the primary efforts, a more systematic and logical placement of these doctors is also called for. Moreover, the designations, incentive structure and salaries given to the specialists will have to be exclusively considered rather than merging them with the general MBBS doctors. While the hiring of doctors could be done on a contractual basis, the emoluments paid to them will have to be competitive for them to stay and work.

2. The placement of the doctors will have to be made on the basis of the needs of the locality of health facilities and to ensure optimum utilization of their skills. For instance, a gynaecologist placed in more than one facility on part time basis would cause underutilization of his/her skills. Moreover, they have to be placed along with an anaesthetist so that they are able to conduct surgical procedures at their facility itself.

3. The specialists will have to be provided with basic facilities such as residential quarters and non-practicing allowances to ensure their continuous availability in the health facilities. Moreover, the availability of the support infrastructure and manpower for each type of specialist will have to be ensured. For instance, a gynaecologist will have to be compulsorily provided trained nurses along with a functioning OT and laboratory for effectively providing emergency obstetric care. The paediatricians posted at the neo-natal care units would require trained round clock paramedical staff and also services like 24-hours uninterrupted electricity supply.

4. It should be ensured that the specialist doctors' time is dedicatedly allocated only to complicated cases requiring their attention. Some of the specialist doctors, specifically paediatricians and gynaecologists, indicated that under the public health system there was no process of screening of cases that require specialist's consultation. This could be easily done by a medical officer and only specific cases with complications could sent to specialists. Such a process would not only save the time of the specialist but they could also concentrate better on the specific cases to

provide better and effective specialty care. Hence such a process should be systematically introduced.

5. The effort on training of the MOs for providing support to the existing specialists will have to be significantly revised particularly for longer duration trainings and also providing refresher programs. Moreover, the TMOs should be allowed to choose the area of specialisation and it should be ensured that after such trainings they are utilized only for providing support to the existing specialist at CHCs, DH and SDH. Putting TMOs to attend to general OPD along with other MBBS would waste the time and resources spent on them. In fact, a set of TMOs could be identified for training so as to provide consultation only at PHCs or CHCs on rotation basis for cases requiring specialist attention mainly in the areas of gynaecology and paediatrics. It could also be decided to compulsorily give trainings to all MOs in the area of their choice so as to develop a confidence among them to handle critical maternal and child health situations even before referring to higher level.

One of the obvious ways of increasing the number of specialists would be through expansion of the post-graduate medical seats. However, this is a long-run process requiring policy decisions at various levels of government departments at the centre and the state. To begin with it would be crucial not to lose the existing specialist doctors available in the public health system and utilise their skills through proper planning and strategic interventions. As observed from the survey, the number of patients requiring critical specialist care forms a relatively small proportion. Hence, certain critical interventions could rule out the probability of requiring a referral or at least reduce the risk factor involved. Improving maternal and child health care scenario in rural India so as to reduce mortality is a comprehensive process with specialist service being a part of the same. If the required care is made accessible at the right time it could effectively bring positive outcomes on health indicators.

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