Research Paper
*Impact Factor - **2.262***
Peer Reviewed Journal

IJMDRR
E- ISSN –2395-1885
ISSN -2395-1877

FACTORS AFFECTING ACCESS TO MATERNAL, NEW-BORN AND CHILD HEALTH SERVICES IN PUNE DISTRICT OF MAHARASHTRA, INDIA.

Shailly Bhatia* Dr. Deepak Phalgune Farhad Ali*****
**PhD Scholar, Symbiosis Institute of Health and Biomedical Sciences, Pune.*
***Consultant, Research & Co-ordinator, DNB teaching program, Poona Hospital & Research Centre, Pune.*
****PhD Scholar Public Health, JJTU, Rajasthan.*

Abstract
In India women of reproductive age (15-45years) and children (<15 years) constitute 60% of the total population. They comprise the vulnerable fraction of the population due to the risks connected with child-bearing in case of women, and growth, development and survival in case of infants and children. Reduction of child mortality and improvement in maternal health are the major goals in United Nations Millennium Declaration (Millennium Development Goals), to which India is a signatory. A range of factors affect the utilization of maternal and child health services in government health sector. In this study which was conducted at First Referral Units (FRUs) in Pune District of Maharashtra captures the best practices and gaps in the operationalisation of First Referral Units, and suggests measures to plug them.

The study was a cross sectional, descriptive survey through self administered questionnaire in rural areas of Pune district of Maharashtra. Out of total 9, 5 First Referral Units were selected which includes one District Hospital, two best performing and two least performing based on DHO reports. Also a Non – First Referral Unit (CHC) was selected and studied to make the comparison with. Data was collected by interviewing the beneficiaries, district officials, and by recording direct observations during the visits to health centres.

The study reveal that factors such as distance to the health facility (70 % women travelled more than 20 km), age of the clients (79 % women who delivered at health facility studied were between the age of 15 to 25 years), health human resource and their capacity (institute of with specialists shown to have better service utilisation), health infrastructure, equipment and logistic facilities were found to be linked to level of service utilisation.

The study concludes that different resources including men, material and organisation with effective management results into better care health service utilization.

Keywords: First Referral Units, Maternal and Child Health, Cross sectional, Utilization of Services.

Introduction

There are a number of factors responsible for the deaths of women. Some key factors include overall events in the life of women. Pregnancy is just one such factor that may risk women's life. The life related determinants include education of the women, sanitation condition of the place where women live, nutrition during adolescent and pregnancy and at other life stages of the women, poverty and of course access to the health services. These factors affect women negatively during the course of their pregnancy (Stokoe, 1991).

The complications during pregnancy and childbirth and their management are important determinants of maternal deaths as well as new-born deaths. Issues such as postpartum haemorrhage, sepsis, pre-eclampsia and obstructed labours are such condition that threatens women's life. Issues such as poor health and hygiene, poor living condition, under nutrition, education and social condition of women are the underlying causes of women's deaths which may be termed as social causes of deaths.

The non-medical factors that are responsible for persistently high maternal mortality in India showed that most deaths occurred at home and during the postnatal period. Most 'death cases' belonged to high-risk age groups, had high parity (3+), were socially disadvantaged, had not received prenatal care and advice to go to hospital as compared to women with no or less complications. Consequently, they either had not gone to hospital or had gone too late. Delay in care was also because of lack of transport facilities, inappropriate referrals or poor emergency preparedness of referral facilities. Data suggested that about half the deaths could have been avoided if the health system had been alerted and if it was accessible. The critical determinants of avoidable death were families' awareness about complications, emergency transport and preparedness of referral facilities. The study highlighted the need for health workers to stress on health education, care during the third trimester and postnatal period, and referral to appropriate and accessible facilities, even bypassing the hierarchical referral system if necessary (Nirmala Murthy and Alka Barua, 2004).

Factors that are related to health system and that are linked to clients affect utilisation of the services.In this study that was conducted in Pune district assesses clients' related factors and health systems related factors that affect Maternal Child Health related service utilisation by families in Pune district.

Methodology

Data was collected by interviewing the beneficiaries, district officials, and by recording direct observations during the visits to health Institute. In this study the purposive sampling was used. The data were collected from First Referral Units at Baramati, Manchar, Bhor, Ghodegaon block, Non FRU at Mulshi and District Hospital at Pune on themes including Health human resources, health infrastructure, supplies and logistics, service utilization. The predefined criteria that was used for the purpose of comparison among the health facilities included -Health Facilities with FRU status, Non-FRU status and a district hospital level health facility.

Inclusion criteria are as follows

1. Women having children < 6 months age who delivered between August 2014 and February 2015
2. Women who were willing to participate and willing to give written consent
3. Women who utilized those maternal and child healthcare services which are critical determinants of First Referral Unit (FRU).

Exclusion criteria are as follows

1. Women having children more than 6 months of age.
2. Women not willing to participate.

The structured interviews were conducted with 148 women which covered the themes such as Socio-economic profiling of the women, access to health facilities, cost incurred in availing services, benefits under the national programs and women experiences at the health facilities. The interviews were conducted at households of women residing in the development blocks of Manchar, Bhor, Mulshi, Baramati and Ghodegaon.

The data analysis was done using Statistical Package for Social Sciences (SPSS) and frequencies were calculated and cross tabulations were done for analysing comparative performance of various health facilities under the study. Permission was obtained from Institutional Ethics Committee (IEC) and Research Review Committee (RRC) of the institution. A written consent from Pune district Chief Medical Officer was also taken.

Results

Clients' Education and Access to Facility

The results of the study reveal that around 67 % of the women of those women who delivered their babies at the health facilities studied up to class 12^{th}. Those women who have some degree of education have better access to the health facilities for reproductive health services compared to those women who have less education. This is reflecting in the study conducted.

Distance and Access

Majority of the women (40 %) had to travel 20 to 30 km for institutional deliveries. And around 30 % women had to travel more than 30 km for institutional deliveries. The data reveals that women had to travel long distance in the rural areas for availing institutional delivery services at government health facility. This might be a discouraging factor for many women. However the data under the study shows that around 70 % women travelled more than 20 KM for institutional deliveries. It reflects the fact that women understand the importance of institutional deliveries and they are conscious about their health and wellbeing as well as the health and wellbeing of their babies including the newborns. Normally distance is one of the main physical barriers in access to health services. In the study it was found that the OPD services are not uniformly available at all the health centres whether FRUs or Non-FRU.

Age and Access to Health Facility

In the research study the data shows that majority of the women (79 %) of those who delivered at the health facility were in the age group of 15 to 25 years. So it shows that more number of young women are delivering at the health facilities compared to those women who are not so young.

Health Human Resources and Capacity Building

At District Hospital all the specialist positions are sanctioned and filled but for FRUs not all the specialists' positions are sanctioned and filled. For example at Ghodegaon FRU, Surgeon and anaesthetists were not available

It seems that the priority for the district health managers remained around delivery of key MNCH services at District Hospital hence all the sanctioned positions were filled at the district hospital. Whereas all the FRUs were not having specialist positions either sanctioned or filled. At some FRUs it was found that Surgeon and anaesthetists were available but at some places they were not available. For example they were not available at Ghodegaon but available at other FRUs. For Mulshi it could be understandable that since it is not a designated FRU so this institution was not the priority health centre from the point of view of delivering specialists services. In general there has been documented evidences that specialists are high in demand and at many places they are not available. This is particularly correct for anaesthetists and there are very few anaesthetists available. In the light these facts it seems that district health management team had tried to rationalize the allocation of the health human resources particularly those specialists whose numbers are very few in the district. (Annexure :1)

Health Infrastructure, Equipment and Logistics

In this study it was found that there is no uniform standards across the FRUs with respect to wards and number of beds available. Among the FRUs at different place different number of wards were available with different bed strength. At some places the wards and beds were more in numbers compared to rest of the health centres. It was also found that no uniform standards were followed in provisioning of paediatric beds. In one FRU (Ghodegaon) the number of beds (4) were less than the number of beds (5) available in Non-FRU (Mulshi). At the same time it was found that the number of beds available in Pune DH is equal to number of beds available in a FRU (Manchar –15 paediatric beds). (Annexure :2)

Discussion

T R Bandari conducted a study in Nepal which reveals that maternal and paternal education was helpful in increasing the uptake of the antenatal care during the pregnancy (T R Bhandari, 2012). In his study Stoke reveals that education of the women is one of the key determinant for maternal death. Those women who were less educated were more likely to die due to pregnancy related deaths (Stokoe, 1991). Pillai also studied the social causes of maternal deaths and reported the living condition, poor hygiene, nutrition and education are some of the most common underlying causes of maternal deaths (Pillai, 1993). A study conducted by Srivastava and co-workers reflects a slightly different scenario. These studies conducted at various places support the results of this study in which the education level of the women was found to be linked to maternal and child health service utilisation at various health facilities under the study.

It was found that at Ghodegaon and Manchar FRUs and at Pune District Hospital regular OPD for gynaecology and obstetrics services were running and for Bhor FRU, OPD was running for two fixed days in a month. At Baramati FRU and Mulshi Non-FRU, OPD was running for once a week. Under such scenario it might be difficult for the patients to come on a fixed days at Mulshi and Baramati when the services are available just two fixed days in a month. They might not be available on those specific days or there might be problems related to finding transportation on a fixed day. Two fixed days in a month also seems to be very less frequent available services for women.

Mavlankar and Co-workers studied barriers to service utilisation and they concluded that distance to health facility is one of the major barriers in improving the access to health facilities. According to them, infrastructure and supplies and other facilities become ineffective when distance to health facilities is more from the place a client lives. They reported that distance is one of the factors for low service utilisation (Mavalankar, Ramani, Patel, & Sankar, 2005). Ray and Basu also supported similar observation where they reported that distance is one of the key discouraging factor for access and service utilisation (Ray, Basu, & Basu, 2011). A very interesting study conducted by Acharya and Co-workers where they reported that distance to health facility becomes immaterial when the quality of the services offered are good. If the health facilities are good and people are satisfied with them, people can travel long distances in order to avail health care services (Acharya & Cleland, 2000). The study conducted by Acharya and co-workers supports the observation in this research study where women delivered long distance up to more than 30 KM for delivering at the government health centres. It seems that they perceive the quality of this institution as good.

Globally there are similar evidences. In India a study conducted in Rajasthan that looked in the profile of those women who chose to deliver at government health institutions reveal that median age of the women at the time of marriage was 16 years. This study also reveals that mean age of the women when they come for the institutional delivery was 25 years (Iyengar, Iyengar, Suhalka, & Agarwal, 2009). In an another study conducted in Africa reveals that majority of the women who deliver at the health institution were below the age of 29 years (Bayu, Adefris, Amano, & Abuhay, 2015).

A study was conducted at International Institute of Population Studies reveals that in India only 48 % FRUs have Obstetricians and Gynaecologists and merely 22 % of the FRUs have anaesthetists. It has concluded that there is a mismatch between health infrastructure, equipment and staff and that is one of the reasons of low utilisation of health services

(Mavalankar et al., 2005). Another problem that is often seen is the rationalized use of and placement of health human resources and in many cases the deployment of the human resources is not rationalized. At one place you find more hand and the same time at another place you find less health human resources. Mavalankar and co-workers have similar observations and in a study they found out that Effective and rationalized use of available human resources is effective management function for any referral unit to be a centre for improved service delivery. A huge discrepancy was found in the deployment of support staff in the FRUs. It was found that highest number of support staff was available at district hospital (109) followed by 45 support staff at Mulshi Non-FRU. From the point of view of delivering services in an environment of high case load as normally seen in district hospitals having more number of staff seems fine. But looking at the number of support staff in a Non-FRU seems higher if compared with functional FRUs. In this study it was found that the support staff at rest of the hospitals including FRUs was less than the number of support staff at Mulshi Non-FRU. Least number of 14 support staff was found to be at Ghodegaon. Similar was the observations for the placement of ANMs. It was found that as many as 25 ANMs were posted at Manchar FRU and at the same time at other FRUs such as Bhor and Ghodegaon, this number was surprisingly less. This looks completely irrational. Such case scenarios are not new phenomenon. These kinds of irrational deployment have been observed for long and at several places throughout India and elsewhere also. Such situation seems to hamper service delivery and creates burden for other staff which may also affect the motivation of the staff and in turns affect service delivery. Dadhich in his study also had similar observation where they found irrational deployment of health human resources and concluded that this situation results in underutilisation of health services (J P Dadhich, 2004).

The irrational deployment of the staff is also linked to the capacity of the health department at the district level. The field experiences tell that district management team do not have up to date information about the human resources available with them. In several of such cases the district does not know how many staff they have in total and in specific category and where they are working and what skill set is available with them and so rationalized deployment becomes a challenge for them. The data in this study also reveals that overall sanctioned posts are more in number at Mulshi Non-FRU than many FRUs including Baramati, Bhor and Ghodegaon FRUs. So it seems that district management team does not know the fact that at Non-FRU health facility they have higher number of staff compared to many FRUs which results in inefficiencies. A similar observation was reported by Zachariah and coworkers in their study. They reported that maldistribution and poor knowledge base of the workforce is another major challenge. In many developing countries the concentration of the workforce is seen around cities and urban areas. The health department in many cases lack the data available to know number of staff in different categories and their skills set for rationalized deployment (Zachariah et al., 2009).

The district management at the same time looks vigilant in ensuring that the services are available at different health facilities and to ensure that they have been ensuring that human resources are available especially in the category of specialized doctors. For Comprehensive Emergency Medical Obstetric Care, obstetrician and anaesthetists were appointed on contractual basis where fulltime staff was not available. So it means that district management is aware of the requirements of the staff at different places but irrational deployment was observed. So it means that there are other factors also that are affecting the rationalisation of human resources other than scarcity and information about the staff strength. It has been observed that the staff want to live and work near to the urban areas and at places where the quality of life is better and where there are more opportunities for schooling of the staff children and where there are means of entertainment. So staff have preferences to live and work in specified area where they found such opportunities and as a result one finds concentration of staff in some areas compared to other areas. This might be a reasons why we observe maldistribution of staff in different categories of the staff despite the efforts of the district management to hire contractual staff and place them in areas where there is less number of specialized doctors and support staff. Gupta and co-workers also have similar observation in their study. In their research they found a challenge in distribution of health workers in many countries including Africa and Asia. They found that the number of staff is below the standard, their distribution and their functioning across geography and sectors remains a problem. Majority of the countries shows that the workforce distribution favour the urban population. This can be correlated to several factors. One such strong reason for many health professionals is to stay and work in the urban areas compared to choice of work in rural area because of obvious reasons of quality of life. But at the same time there are other factors also that affect this distribution (Gupta et al., 2011).

Availability and deployment of health human resource is just a single factor which affects service delivery but at the same time there are other factors also that affect service delivery and one such strong factor was found in this study related to capacity of the human resource and capacity building initiatives. It was found in this study that more number of doctors was trained on one single topic than on different topics. So it creates a scenario where more number of trained staffs was available on fewer skill sets than number of trained staff on many different skill sets. This scenario was seen for Bhor and Ghodegaon unlike Baramati and Manchar. In Pune District Hospital all the skill sets were available and interestingly similar was the scenario at Mulshi Non-FRU. In Mulshi Non-FRU, two doctors were trained on new-born care whereas only one doctor was trained on this topic at FRUs except Bhor FRU. This seems a poor management of capacity building efforts. Most of the

deliveries have been happening at FRUs compared to Non-FRU and FRUs are also the centres where referred cases from Non-FRU centres are sent for treatment hence it will be more appropriate to have more number of trained hands in new-born care than a Non-FRU facility. Such irrational decision creates inefficiencies in the management of cases and overall poor functioning of the staff. This also affects the service utilisation in long term. There are documented evidences highlighting irrational training both in terms of numbers and training topics. Gupta and Co-workers reported that there are mismatched in education of staff, their training and the actual work they do in the health facilities (Gupta et al., 2011). NRHM identifies the importance of staff training and in a study the mission in India identified that other than the regular challenges of infrastructure and supplies, the major structural issues remains of appropriate training of staff and their skills. The mission identified that appropriate training of staff is critical from the point of view of delivery of the health services from government health facilities (Gill, 2009).

The district management at the same time looks vigilant in ensuring that the services are available at different health facilities and to ensure that they have been ensuring that human resources are available especially in the category of specialized doctors. For Comprehensive Emergency Medical Obstetric Care, obstetrician and anaesthetists were appointed on contractual basis where fulltime staff was not available. So it means that district management is aware of the requirements of the staff at different places but irrational deployment was observed. So it means that there are other factors also that are affecting the rationalisation of human resources other than scarcity and information about the staff strength. It has been observed that the staff want to live and work near to the urban areas and at places where the quality of life is better and where there are more opportunities for schooling of the staff children and where there are means of entertainment. So staff have preferences to live and work in specified area where they found such opportunities and as a result one finds concentration of staff in some areas compared to other areas. This might be reasons why we observe maldistribution of staff in different categories of the staff despite the efforts of the district management to hire contractual staff and place them in areas where there is less number of specialized doctors and support staff. Gupta and co-workers also have similar observation in their study. In their research they found a challenge in distribution of health workers in many countries including Africa and Asia. They found that the number of staff is below the standard, their distribution and their functioning across geography and sectors remains a problem. Majority of the countries shows that the workforce distribution favour the urban population. This can be correlated to several factors. One such strong reason for many health professionals is to stay and work in the urban areas compared to choice of work in rural area because of obvious reasons of quality of life. But at the same time there are other factors also that affect this distribution. These factors are related to poor working condition and living condition at the work place/hospitals. The hospital related factors are poor facilities, lack of supplies, including personal and protective equipment. Some more issues identified are related to limited opportunities for professional development, and limited educational opportunities for the children of staff (Gupta et al., 2011).

Availability and deployment of health human resource is just a single factor which affects service delivery but at the same time there are other factors also that affect service delivery and one such strong factor was found in this study related to capacity of the human resource and capacity building initiatives. It was found in this study that more number of doctors was trained on one single topic than on different topics. So it creates a scenario were more number of trained staffs was available on fewer skill sets than number of trained staff on many different skill sets. This scenario was seen for Bhor and Ghodegaon unlike Baramati and Manchar. In Pune District Hospital all the skill sets were available and interestingly similar was the scenario at Mulshi Non-FRU. In Mulshi Non-FRU, two doctors were trained on new-born care whereas only one doctor was trained on this topic at FRUs except Bhor FRU. This seems a poor management of capacity building efforts. Most of the deliveries have been happening at FRUs compared to Non-FRU and FRUs are also the centres where referred cases from Non-FRU centres are sent for treatment hence it will be more appropriate to have more number of trained hands in new-born care than a Non-FRU facility. Such irrational decision creates inefficiencies in the management of cases and overall poor functioning of the staff. This also affects the service utilisation in long term. There are documented evidences highlighting irrational training both in terms of numbers and training topics. Gupta and Co-workers reported that there are mismatched in education of staff, their training and the actual work they do in the health facilities (Gupta et al., 2011). NRHM identifies the importance of staff training and in a study the mission in India identified that other than the regular challenges of infrastructure and supplies, the major structural issues remains of appropriate training of staff and their skills. The mission identified that appropriate training of staff is critical from the point of view of delivery of the health services from government health facilities (Gill, 2009).

The infrastructure creation leads to improvement in service utilisation and there have been some good documented evidences but at the same time there are evidences also when the infrastructure is created which remains largely under or unutilized. Such infrastructure creation is linked to wrong planning and other factors such as inappropriate location of the infrastructure created. Evidences from other parts of the world reveal that if the investments are made in improving infrastructure they directly give returns in the form of reduced MMR. Countries like Sri Lanka and Malaysia have actually improved their

number of institutional deliveries and reduced MMR by investing in improving their public health (Pathmanathan, Indra; Liljestrand, Jerker; Martins, Jo. M.; Rajapaksa, Lalini C.; Lissner, Craig; de Silva, Amala; Selvaraju, Swarna; Singh, 2003). Similar to the experiences in Sri Lanka and Malaysia, in India, in the state of Kerala, after repaid expansion in the public health infrastructure, a high uptake of institutional services was observed. However, there are experiences from other states of India that reveals that creation of infrastructure does not necessarily increases the institutional deliveries. There are some other conditions as well that need to be ensured if on a sustainable basis institutional deliveries are to be increased and maternal mortality ratio is to be reduced. The cumulative experience helps in concluding that infrastructure is definitely an important condition in increasing service utilisation but certainly not the only condition necessary to improve service utilisation for women, mothers and under five children (Mavalankar et al., 2005).

Another aspect of the problem is the location and access of the facility. Even if a good infrastructure is created but if the location of the facility is not good or if there are some other issues such as supplies and availability of health human resources the available infrastructure remains under on unutilized. Evidence suggests that location of Health Facility if often a problem as it has been noticed that many facilities are poorly located and hence their accessibility remains an issue especially for the poor and disadvantaged people. This clearly reflects in the utilisation of the facilities which are in many cases remain underutilized (James A. Fitzsimmons, 1994).

Number of paediatric cases handled varied widely. District hospital handled fewer cases than one of the FRU (Baramati) and at the same time the number of cases handled by other FRUs was very less compared to this FRU. If we look at the availability of the Paediatricians at these hospitals we find that there were three paediatricians in Pune District Hospital followed by 2 Paediatricians at Manchar FRU and rest of the FRUs were having 1 Paediatrician. Since Pune District Hospital was having maximum number of Paediatricians (3) and also the fact that it is a district hospital and serves as a referral centre for all the FRUs in the district, it should have handled maximum number of cases. But the fact remains that a FRU (Baramati) handled higher number of cases. So this means that the availability of a Paediatrician is not linked to number of paediatric cases handled. There are strong evidence from across the globe that for delivering the services availability of human resource is not sufficient alone. It also takes ensuring other stuff as well including drugs and supplies, infrastructure and equipment and trained persons with lot of motivation to deliver services. There are strong evidence available that support that increase in the availability of trained health human resources are directly and positively linked to improved service uptake and improved health outcomes for mother, pregnant women and children but alone they not sufficient to deliver the services (Anand & Bärnighausen, 2007).

The data in this research study reveals that new-born care room and ORT corners in paediatric ward were available in almost all the FRUs and DH. Only In Ghodegaon, ORT corner in paediatric ward was not available. In Mulshi Non-FRU separate aseptic labour room and ORT corner in paediatric wards were not available. It was also found that diagnostic tests facility is available at almost all the health centres under the study including reagents, equipment and staff however, number of diagnostics tests performed vary widely from around 900 tests to more than 2100 tests in the past three months. OT was available at all the health facilities but not used exclusively for the purpose of Obstetric/Gynaecological services except Mulshi Non-FRU and Baramati FRU. Except Mulshi Non-FRU, the OT in in all the FRUs and Pune District Hospital looks in perfect condition. In Mulshi Generator was not available for OT. In rest all the health facilities under the study including FRUs and Pune District Hospital, OT had enough space, it was fitted with air conditioner and the air conditioner was found working. The generator was available for OT and it was working. The fumigation was done regularly in the OT at the facilities studied. Overall the data gives the impression that most of the infrastructure is available at the health facilities but concerns remains about the uniformity and standardization. At some place some facility is available but at the same time some other facility is not available such as ORT corners. Facilities for diagnostics tests were found to be available at every hospital under the study but there were huge variations in their performance. Such as at Manchar more than 2000 tests were performed which were around two fold more than the district hospital and at the same time number of tests performed at Non-FRU were more than the tests performed at Baramati and Bhor FRUs. This again hints towards the fact that infrastructure alone does not work. It is the combination of resources with management that results into service delivery. A quick look at the data collected in this research study shows that in FRUs and DH, most of the equipment were available and in working condition. It was found that in Bhor FRU, Defibrillator and Ventilator were not available at the time of data collection. In Bhor FRU ultrasound machine was also not available. In Mulshi which is a Non-FRU, it was found that equipment such as Defibrillator, Shadow less Lamp, O.T. Care / fumigation apparatus, oxygen cylinder, nitrogen cylinder and Ultrasound machines were not available.

Overall it is found that there are gaps in terms of human resource availability in different categories including, doctors, specialists and support staff. There also gaps in the rationalized deployment of the staff. At one place it was found that there are more human resources available and at the same time at other places there are less number of human resource available.

Infrastructure gaps were also found in the gaps. The issues were mainly related to standardisation and uniformity and also rationalisation of infrastructure development. Places human resource are more infrastructure was found to be deficient compared to other health centres. From the data it looks that optimisation of the resources was a problem and complementarity was a challenge. Ideally human resources should match with the patients' requirements and in line with the available infrastructure. The staff should be adequately trained and equipment should be functioning. It is the combination of men, material and organisation with effective management that work in total to deliver these services. It was found that there was an overall adequacy of resource with minor issues and gaps and irrational planning. Other studies conducted in India support this observation in this research study. A study in Gujarat reveals that there are multiple factors that affect operationalization of the FRUs. There are several management related issues and also policy related issues that affect functioning and service delivery from the FRUs for mothers and children. The availability of emergency obstetric care and its access to the people those who are more in need has been a major constraint. It was found that infrastructure, Human resources, drug facility, management and administrative procedures pose challenges in running these FRUs effectively. In several cases the health infrastructure was found poor with inadequate maintenance and in many cases it was found that civil engineers decided the location without having necessary skills and knowledge of the factors of accessibility resulting in poorly located health facilities with low utilisation. At several health facilities under this study there was a lack of blood transfusion facility. At several of these FRUs, there was no facility of blood supply, blood storage and blood transfusion. In contrast to this there were health facilities with poor infrastructure but with higher maternal service utilisation as a result of availability of human resources for obstetric care. Administrative and management systems were found poor at many places under this study. This study reveals that records of births and deaths were not maintained properly and not updated regularly. The records of drugs were poorly maintained and there was no standard system of record maintenance. The system of supervision and monitoring of staff was very poorly executed and at several places no standard system of supervision and monitoring was followed (Sankar Parvathy Raman, Bharati Sharma Dileep V Mavalankar, 2009).

The national guidelines for functional FRUs suggests that at the FRUs MBBS Doctors male and female, Surgeons, OBG specialist, Anaesthetist, Paediatrician, Lab technician and staff Nurses should be available. The guidelines also suggest to maintain functional operation theatre, Labour Rooms, Facility based New born care and 24-hour Water Supply with availability of Emergency Drugs, Blood Supply and Storage Facility ("Guidelines For Operationalising First Referral Units," 2004). In contrast to this it was found that there were irrational human resource in terms of their number and their deployment, Equipment and supplies were available but there were variations in outputs. Infrastructure was available but uniformity was missing in terms number of wards and beds in different FRUs and there was discordance in number of doctors working at the facilities and support staff available and also the number of beds and wards at each FRU facility.

Conclusion

There are many factors which together decide the utilization of healthcare services. They range from patient related variables to provider related variables. The study reveals that education has an important role to play in determining if a woman decides to go institutional delivery. The data indicates that as many as 67% of the women who studied up to class 12^{th} had institutional deliveries. Separate studies conducted all over the world also support this observation. The study also shows that women are well aware of their well being and have faith in the services of government institutions. They even travelled long distances in rural areas to avail the services of Government institutions. This further supports the above argument. It was also found that there was no uniformity in OPD services offered by different FRUs. It was observed that some facilities were running two days a week while some other ran just a day in a week. The rational deployment of man power is another major problem seen in the surveyed FRUs. Mulshi despite being a Non FRU has much more number of support staff when compared to some of the FRUs. The misdistribution of healthcare human resource and poor knowledge base of the workforce is another major challenge. Concentration of the workforce is seen around cities as people are more interested to work near the cities. This results in shortage of specialists particularly in areas where FRUs are remotely located. However, any shortage in primary full time staff is addressed by hiring contractual staff. Also, like any other health facility specialist like Anaesthetics usually are in shortage. Capacity building of human resource is another strong factor which affects service delivery. The study highlights the irrational training of heath human resources both in terms of number and topics covered in those trainings. Infrastructure is another important criterion. The data reveals that all the health facilities have good infrastructure but the difference lies in uniformity. Some highly busy FRUs have more patient/bed ratio as compared to less busy FRUs. Accessibility is also a big problem if the health facility is poorly located. So in summary, the difference lies in uniformity and standardization of Human resource deployment, infrastructure and logistics planned. Also, it seems that effective management of men, material and organisation was key differentiator when comparing service utilisation across FRUs.

References

1. Acharya, L. B., & Cleland, J. (2000). Maternal and child health services in rural Nepal: does access or quality matter more? *Health Policy and Planning*, *15*(2), 223–229. http://doi.org/10.1093/heapol/15.2.223
2. Anand, S., & Bärnighausen, T. (2007). Health workers and vaccination coverage in developing countries: an econometric analysis. *Lancet*, *369*(9569), 1277–1285. http://doi.org/10.1016/S0140-6736(07)60599-6
3. Bayu, H., Adefris, M., Amano, A., & Abuhay, M. (2015). Pregnant women's preference and factors associated with institutional delivery service utilization in Debra Markos Town, North West Ethiopia: a community based follow up study. *BMC Pregnancy and Childbirth*, *15*(1), 15. http://doi.org/10.1186/s12884-015-0437-z
4. Gill, K. (2009). *A Primary Evaluation of Service Delivery under the National Rural Health Mission (NRHM): Findings from a Study in Andhra Pradesh, Uttar Pradesh, Bihar and Rajasthan*. New Delhi. Retrieved from http://planningcommission.gov.in /reports/wrkpapers/wrkp_1_09.pdf
5. Guidelines For Operationalising First Referral Units. (2004). New Delhi: Maternal Health Division Department of Family Welfare Ministry of Health & Family Welfare Government of India. Retrieved from http://nrhm.gov.in/images/pdf/programmes /maternal-health/guidelines/fru_amp_nbsp_guidelines_2004.pdf
6. Gupta, N., Maliqi, B., França, A., Nyonator, F., Pate, M. A., Sanders, D., … Daelmans, B. (2011). Human resources for maternal, newborn and child health: from measurement and planning to performance for improved health outcomes. *Human Resources for Health*, *9*(1), 16. http://doi.org/10.1186/1478-4491-9-16
7. Iyengar, S. D., Iyengar, K., Suhalka, V., & Agarwal, K. (2009). Comparison of Domiciliary and institutional delivery-care practices in Rural Rajasthan, India. *Journal of Health, Population and Nutrition*, *27*(2), 303–312. .http://doi.org/10.3329/ jhpn.v27i2.3371
8. J P Dadhich, V. P. (Ed.). (2004). National Neonatology Forum and Save the Children US. In *State of India's Newborn*. New Delhi.
9. James A. Fitzsimmons, M. J. F. (1994). *Service Management for Competitive Advantage* (Old Editio). McGraw-Hill Companies.
10. Mavalankar, D., Ramani, K. V., Patel, A., & Sankar, P. (2005). *Building Infrastructure to reach and care for the poor*. Ahamadabad.
11. Mavalankar, D., & Sriram, V. (2009). Provision of anaesthesia services for emergency obstetric care through task shifting in South Asia. *Reproductive Health Matters*, *17*(33), 21–31. http://doi.org/10.1016/S0968-8080(09)33433-3
12. Nirmala Murthy and Alka Barua. (2004). Non-medical Determinants of Maternal Death in India. *Journal of Health Management*, *6*(1), 1–14.
13. Pathmanathan, Indra; Liljestrand, Jerker; Martins, Jo. M.; Rajapaksa, Lalini C.; Lissner, Craig; de Silva, Amala; Selvaraju, Swarna; Singh, P. (2003). *Investing in maternal health : learning from Malaysia and Sri Lanka*. World Bank. http://doi.org/0-8213-5362-4
14. Pillai, G. (1993). Reducing deaths from pregnancy and childbirth. Asia. *Links (New York, N.Y.)*, *9*(5), 11–13.
15. Ray, S., Basu, A., & Basu, S. (2011). An assessment of rural health care delivery system in some areas of West Bengal-An overview. *Indian Journal of Public Health*. http://doi.org/10.4103/0019-557X.85235
16. Sankar Parvathy Raman, Bharati Sharma Dileep V Mavalankar, M. U. (2009). *Assessing the Regional and District Capacity for Operationalizing Emergency Obstetric Care through First Referral Units in Gujarat* (No. Working Paper No. 2009-04-01). Ahamadabad.
17. Srivastava, R. K., Kansal, S., Tiwari, V. K., Piang, L., Chand, R., & Nandan, D. (2009). Assessment of utilization of RCH services and client satisfaction at different level of health facilities in Varanasi District. *Indian Journal of Public Health*, *53*(3), 183–189.
18. Stokoe, U. (1991). Determinants of Maternal Mortality in the Developing World. *The Australian and New Zealand Journal of Obstetrics and Gynaecology*, *31*(1), 8–16. http://doi.org/10.1111/j.1479-828X.1991.tb02754.x
19. T R Bhandari. (2012). Maternal and Child Health Situation in South East Asia. *NLOG*, *7*(13), 5–10.
20. Zachariah, R., Ford, N., Philips, M., S.Lynch, Massaquoi, M., Janssens, V., & Harries, A. D. (2009). Task shifting in HIV/AIDS: opportunities, challenges and proposed actions for sub-Saharan Africa. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. http://doi.org/10.1016/j.trstmh.2008.09.019.

Annexure : 1

Table 1: Availability of staff for conducting 'C' Section in 4 FRUs, 1 Non FRU and 1 DH in Pune district.

Staff for OT	Health Facility					
	Mulshi (Non FRU)	**Baramati (FRU)**	**Ghodegaon (FRU)**	**Manchar (FRU)**	**Bhor (FRU)**	**Pune (DH)**
Anesthetist						
Full Time	0	0	1	1	0	1
Part Time	1	0	0	0	1	0
Contractual	0	1	0	1	0	1
Total	***1***	***1***	***1***	***2***	***1***	***2***

Gynecologist						
Full Time	1	1	1	1	0	2
Part Time	0	0	0	0	1	0
Contractual	0	1	0	1	0	1
Total	***1***	***2***	***1***	***2***	***1***	***3***
O.T. Nurses	1	1	1	1	1	1
O. T. Attendants	1	1	1	1	1	1

Table 2: Availability of general physicians and specialists in 4 FRUs, 1 Non FRU and 1 DH in Pune district.

General Physicians and Specialist	Health Facility					
	Mulshi (Non FRU)	Baramati (FRU)	Ghodegaon (FRU)	Manchar (FRU)	Bhor (FRU)	Pune (DH)
Doctor in charge	1	1	1	1	1	2
Gynecologist & Obstetrician	1	2	1	2	2	7
Pediatrician	0	1	1	2	1	3
Anesthetist	0	0	0	1	1	3
Specialist in RTI/STI	0	2	0	0	0	0
Pathologist	0	0	0	0	0	3
Surgeon	0	1	0	0	1	4
General Duty Doctors - Male	2	4	1	2	4	18
General Duty Doctors - Female	1	3	1	2	2	-
Total staff	5	14	5	10	12	40
	Sanctioned and filled		*Note: Gender information of general duty doctors is not available for Pune*			
	Not Sanctioned					

Annexure :2

Table 3: Number of Pediatrics beds available and cases handled in 4 FRUs, 1 Non FRU and 1 DH in Pune district.

Beds/Cases	Health Facility					
	Mulshi (Non FRU)	Baramati (FRU)	Ghodegaon (FRU)	Manchar (FRU)	Bhor (FRU)	Pune (DH)
Total number of Pediatric Beds	5	7	4	15	10	15
Number of children admitted in pediatric beds during the last three months	15	39	90	8	16	21
Number of cases referred to higher facilities during the last three months	60	6	70	6	18	28
Number of referral cases handled during the last three months	0	62	10	8	3	60