

Trend Analysis of Maternal Complications in Supaul District of Bihar Over 8 Month (1St Oct'19 – 31st May'20)

By

Rupali Raina

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2018-2020



The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: www.iihmr.edu.in

Trend Analysis of Maternal Complications in Supaul
District of Bihar Over 8 Month (1St Oct'19 – 31st May'20)

By

Rupali Raina

*Dissertation submitted in partial fulfillment of award of
MBA Hospital and Health Management*

Academic year, 2018-2020

CARE India, Bihar



The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: www.iihmr.edu.in

**CARE INDIA**

Solution for Sustainable Development

14, Patliputra Colony

Patna 800 013, Bihar

Tel +91-612-2274957, 2274389, 2270464

Fax +91-612-2274957

www.careindia.org

CIN: U85100DL2008NPL178133

CIN:U85100UP2008NPL120088

The certificate is awarded to

Dr Rupali Raina

In recognition of having successfully completed her
Dissertation in the department of

Projects (District Technical Officer- Facility)

and has successfully completed her Project on

**Trend Analysis of Maternal Complications in Supaul district of Bihar over 8 months
(1st Oct'19 – 31st May'20)**

Date: 19 June'2020

Organization: CARE India, Bihar

She comes across as a committed, sincere & diligent person who has a strong drive and zeal for learning

We wish her all the best for future endeavors

Manu Kumari

District Team Lead (DRU-TL)

Head-Human resources

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled “Trend Analysis of Maternal Complications in Supaul district of Bihar over 8 months (1st Oct’19 – 31st May’20) ” and submitted by Dr Rupali Raina, Enrollment No: 0811, under the supervision of Dr. Anoop Khanna for award of MBA in Hospital and Health Management of the University carried out during the period from 05/02/2020 to 30/04/2020 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.

Dr Rupali Raina

Signature

Acknowledgement:

Working with people at such lower grounds or facing actual reality in terms of public health has always been an interesting concept for me and luckily I got the chance to explore more of these areas with such a prestigious institution “IIHMR University” and organization “CARE India”.

I would love to extend my heartfelt gratitude to my college mentor Dr Anoop Khanna and my industry mentor Manu Kumari (Team lead, Supaul) for helping me throughout this journey of gaining more exposure in the field of public health.

I would like to express my heartfelt gratitude to my parents Mr Sandesh Raina and Mrs Aruna Raina, my friends Dr Hemani Angurana, Dr Niharika, Tarun Panda, Vishal Bhat, Dr Surbhi Gandotra and my brother Aanshul Raina for bearing me through tough times and giving me much motivation for enduring such challenges in the field of public health.

TABLE OF CONTENTS

Trend Analysis of Maternal Complications in Supaul district of Bihar over 8 months (1st Oct'19 – 31st May'20)

CHAPTERS	PAGE NO.
1. INTRODUCTION	8
2. AIM	13
3. OBJECTIVES	14
4. LITERATURE REVIEW	14
5. METHODOLOGY	20
5.1. STUDY TYPE	20
5.2. STUDY DESIGN	20
5.3 SOURCE OF DATA	20
6. DATA ANALYSIS	20
7. DISCUSSION	23
8. CONCLUSION	24
9. RECOMMENDATION	25
10. BIBLIOGRAPHY	25

- **Study title:**

Trend analysis of maternal complications over a period of 8 months in Supaul district of Bihar (Oct'2019 – May'2020)

- **Introduction:**

WHO refers Maternal health as health of a women during pregnancy, childbirth and postnatal period? This period often serves as a blessing and a phase of happiness for some but for some this is a phase of emotional, physical turmoil even leading to complications or death.

Most of these complications can be easily diagnosed at the earliest and are preventable. Every day in 2017, approximately 810 women died from preventable causes related to pregnancy and childbirth (as per WHO).

Maternal death:

A maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

Maternal mortality is calculated in terms of Maternal mortality ratio which means number of maternal deaths by number of live births in a year per 1lakh population.

$$\text{MMR} = \frac{\text{Number of maternal deaths}}{\text{Number of live births}} * 100000$$

Scenario of maternal health and maternal mortality is different in different regions of world predisposing to end number of reasons for the same be it availability of skilled personnel for delivery or better and timely identification of complications etc.

Italy and Norway have MMR of 2 per 1lakh live births whereas India has MMR of 124 per 1lakh live births.

Focus over Maternal health:

India's focus over maternal health dates back to the launch of comprehensive RCH program I (Reproductive and child health) in 1997 and its phase II in 2005 whose main approach was to reduce maternal and Infant mortality which was then converted to RMNCH+ strategy in 2013. RCH mainly focused on reproductive health of mother and the child whereas RMNCH+A strategy gave a life cycle approach that apart from Reproductive and child health, it is essential to incorporate reproductive and adolescent health too.

Many health programmes were introduced over the years to bring improvement in maternal health. With the introduction of JSY in 2005, it was felt that monetary benefit to pregnant mother could help in improvement of maternal health but with the launch of JSSK in 2009, it was envisioned that over services imparted could help in maternal health over monetary benefits.

With the launch of PMSMA, focus was made for early detection of reasons of maternal complications rather than such identification at the time of delivery through strengthening of Antenatal Checkup and diagnostics.

Maternal complications and its types:

Maternal complications can be further divided into two types: Direct and Indirect. The major complications that account for nearly 75% of all maternal deaths are:

- severe bleeding (mostly bleeding after childbirth)
- infections (usually after childbirth)
- high blood pressure during pregnancy (pre-eclampsia and eclampsia)
- complications from delivery
- unsafe abortion.

Rest of the maternal complications are caused by or associated with infections such as malaria or related to chronic conditions like cardiac diseases or diabetes.

Complications leading to maternal mortality are further classified as Direct causes or Indirect causes

- Direct causes include haemorrhage (PPH), hypertensive diseases (Pre-eclampsia & eclampsia), abortion, sepsis or infections, obstructed labour, ectopic pregnancy, embolism, and anaesthesia-related death (WHO)
- Indirect causes include malaria, HIV, Anaemia etc

Indian Context:

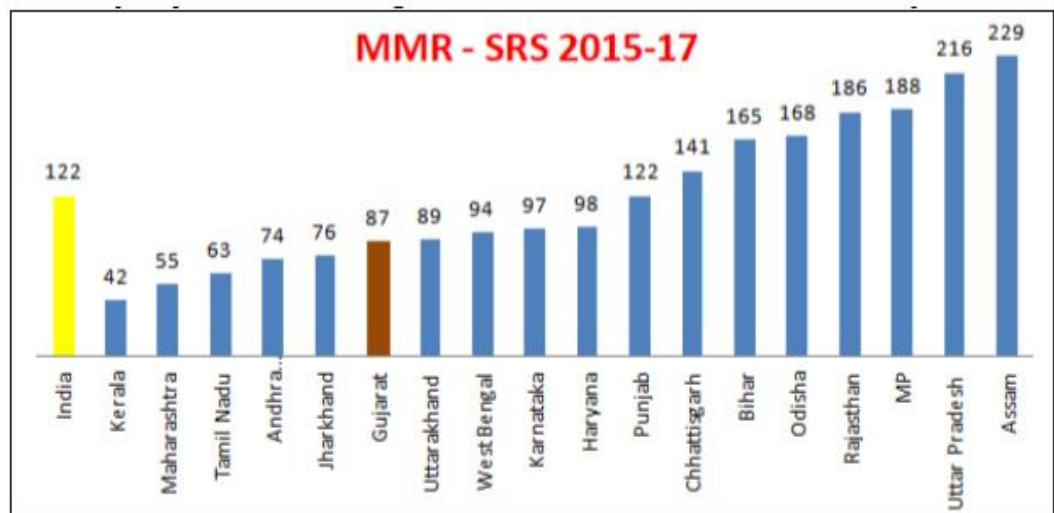
- India is a developing country with diversity in demographics, religion and ethnicity spread across 29 states and 7 union territories. Same diversity is observed in context of maternal health complications and maternal deaths across demographics of the country.
- India started a long journey from being a signatory of Alma Ata Declaration, then joining for Millennium Development Goals (2000-2015) and then for Sustainable Development Goals (2015-2030). All these goals encircled various aspects of development of a country and health being one.
- Talking on same lines, it was decided to keep maternal health as Goal 5 MDG which was “Improve maternal health” where indicator of Maternal Mortality Ratio and availability of Skilled birth attendants were taken. The goal of MDG was to reduce MMR by three quarters between 1990 and 2015 and the level of 167 per 1lakh live births (2011-2013) was reached.
- To add on more to this improvement, Goal 3 of SDG namely Good health and well-being encircles its 1st target as reduction in global maternal mortality ratio to 7 per 1 lakh live births whereby current MMR of India is 124 per 1lakh live births and progress is still going on.
- Status of maternal mortality ratio across India is different as well. Kerala being the lowest has MMR of 42 per 1lakh live births followed by Maharashtra 55 per 1Lakh live births whereas Assam having highest MMR of 229 per 1Lakh live

births followed by Uttar Pradesh which has MMR of 216 per 1 Lakh live births. Bihar stands with MMR of 165 per 1Lakh live births.

Table 1.1 shows India and its state wise distribution of MMR (Source: SRS Bulletin: 2015-2017)

India & Major States	MMR
INDIA	122
Assam	229
Bihar	165
Jharkhand	76
Madhya Pradesh	188
Chhattisgarh	141
Odisha	168
Rajasthan	186
Uttar Pradesh	216
Uttarakhand	89
EAG AND ASSAM SUBTOTAL	175
Andhra Pradesh	74
Telangana	76
Karnataka	97
Kerala	42
Tamil Nadu	63
SOUTH SUBTOTAL	72
Gujarat	87
Haryana	98
Maharashtra	55
Punjab	122
West Bengal	94
Other states	96
OTHER SUBTOTAL	90

Figure 1.1 shows graphical representation of status of MMR (Maternal Mortality Ratio) of India and its states in recent context.



Such reduction in MMR status of the country can be contributed to various factors including improvement in skills and infrastructure, increase in skilled manpower, increased awareness among masses about disadvantages of home deliveries and why to choose institutional deliveries over home deliveries. Government also introduced many initiatives over a period of years for upliftment of maternal health thereby decreasing complications and maternal deaths depending upon need and new challenges in the field of RCH (Reproductive and child health) launched in 1990, JSY (Janani Suraksha Yojana) in 2005 to JSSK (Janani Shishu Suraksha Karyakram) in 2011 to RMNCH+A in 2013 to PMSMA (Pradhan Mantri Surakshit Matritva Abhiyaan) in 2017.

Above mentioned schemes were launched at central level whereas different state governments along with the central efforts have undertaken new initiatives for improvement in maternal health.

CARE India:

CARE India is an International organization with its presence in India in 14 states over a span of last 68 years, working with Government of Bihar as technical support for strengthening of MCH (Maternal and child health) services across all 38 districts.

Bihar context:

Bihar is the 2nd most populated state in India after Uttar Pradesh with 38 districts and population of around 10 crores (census 2011). Trend of improvement of maternal health in Bihar started from MMR of 312 in 2004-06 to 165 in 2015-17.

Figure 1.2 represents reduction in MMR (Maternal Mortality Ratio) over the past 10 years across various states of India including Bihar

Maternal Mortality Ratio (MMR) (Per 100000 Live Births)

Maternal Mortality Ratio: India, EAG& Assam, Southern States and Other States (per 100000 live births)	2004-06	2007-09	2010-12	2011-13	2014-16
India Total	254	212	178	167	130
Assam	480	390	328	300	237
Bihar/Jharkhand	312	261	219	208	165
Madhya Pradesh/ Chhattisgarh	335	269	230	221	173
Odisha	303	258	235	222	180
Rajasthan	388	318	255	244	199
Uttar Pradesh/Uttarakhand	440	359	292	285	201
EAG & Assam Subtotal	375	308	257	246	188

Supaul District:

Supaul lies in the North-eastern part of Bihar with 11 blocks namely Basantpur, Nirmali, Pratapganj, Chhatapur, Sadar, Marauna, Raghapur, Kishanpur, Saraygadh, Triveniganj, Pipra covering a population of around 20 lakhs with 11 PHC, 3 SDH, 1RH, and 1DH.

District caters to around 5 thousand deliveries in a year with TFR of 3.

Need for study:

Although the data reflects that there is a significant decrease in MMR over the years in Bihar yet Bihar stands at one of the worst performing states in reduction of MMR. Reasons for the same was needed to be elicited and further investigation over same was required.

Aim:

To study the trend of maternal complications for past 8 months of Supaul district, Bihar.

Objectives:

- To study, interpret and synthesize the data collected for maternal complications in women in Supaul district in last 8 months.
- To identify linkages between opportunities and challenges identified and thus addressing them in the best possible way.
- To give suggestions to reduce maternal complications among women in Supaul district.

Literature Review:

Authors	Study Location	Sample Size	Sampling techniques	Salient Features
Suparji1, Sulikah2 (2019)	Indonesia	13	Simple random sampling	Nutritional status, health status, reproductive health history of women such as levels of anemia, parity etc impacts growth of child and maternal complications leading to indirect causes of maternal deaths

Salome Maswime, Eckhart Buchmann (2016)	Systematic review	NA	NA	Post-Partum Hemorrhage has been identified as one of the leading causes of maternal death in low and middle-income countries and atonic uterus being one of the major cause of PPH.
Ann L. Montgomery et al (2014)	Systematic review	NA	NA	Maternal mortality and access to healthcare are more predominantly higher in poor states of India that too in rural sections.
Mahesh Kumar Mummadi, Sowmya Javvaji (2019)	Tertiary care center, Hyderabad, Telangana	2276	All expecting mothers admitted in the department with pre-defined inclusion and exclusion criteria	Post-partum hemorrhage and hypertensive disorders were identified as major causes of near miss cases of maternal complications which can be addressed with

				prior monitoring and vitals.
Dr Pratibha Garg	Tertiary care center, MP	Retrospective study of data of maternal deaths within facility from January 2001 to December 2005	NA	Majority deaths were related to parity of the mother or gravida, multigravida is major cause of maternal mortality and Direct causes such as Post-partum Hemorrhage accounts for 2 nd largest number of deaths.

<u>Ranjit Kumar</u> <u>Dehury</u> <u>Janmejaya</u> <u>Samal</u> (2016)	Comparative study over indicators of NFHS-3 and NFHS-4 of MP and Bihar	NA	NA	Antenatal checkup is an important part for early identification of possible maternal health risk factors such as anemia or hypertension. Overall, there's an improvement in ANC checkup between NFHS-3 and NFHS-4 in both states but much needs to be still done so as to limit down indirect causes of maternal complications and mortality.
Kranti S. Vora et al (2009)	Systematic review	NA	NA	Although maternal mortality has decreased over the period of years but there still remains disparity in maternal mortality trends in urban and rural India, Hemorrhage has

				been identified as one of the leading causes of maternal mortality and that too Post partum followed by eclampsia, Anemia has been identified as the major indirect cause of maternal mortality that too Iron deficiency Anemia.
Ranjana Kesarwani (2011)	Research Article			Bihar and Jharkhand have lowest rank in terms of safe delivery and lesser complications, delivering and enhancing safe motherhood and delivery becomes essential. Literacy becomes another variable in determining maternal morbidity and mortality. Literacy has direct correlation

				with maternal morbidity
--	--	--	--	-------------------------

Summary of literature Review:

1. Reasons for maternal mortality across globe are same but difference lies in the approach of management of the same. For countries like Italy and Norway, early diagnosis and prevention are the major reasons for reduction in MMR whereas for developing countries like India, skill gap and literacy status of women plays a major role in determining the outcomes of maternal health.
2. Reasons for maternal mortality are same across the globe and can be further divided in Direct causes and Indirect causes.
3. Direct causes are the reasons which are accountable for mother's death or debilitating condition at or during the time of delivery. Example: PPH, PIH, Eclampsia.
4. Indirect causes are the reasons which are accountable for mother's condition after conceiving or post-delivery. Example: Iron deficiency anemia. Such causes can worsen the condition of mother during delivery as well. That's why their addressal becomes important which is done through minimum 3 ANC checkups at health facilities or VHSND sites so that any problem can be identified and addressed at its earliest.

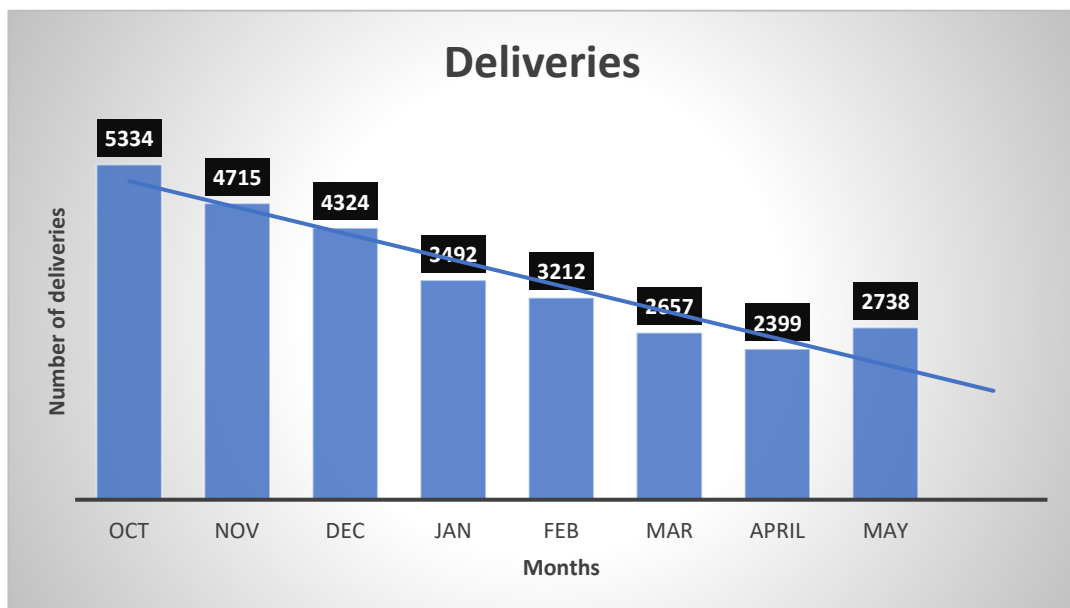
India has a higher maternal mortality rate of 122 per 1lakh live births that can be contributed to multiple reasons. Majority of reasons of maternal mortality are preventable if diagnosed and treated early.

Methodology:

- a. Type of study: Secondary
- b. Study design: Descriptive
- c. Source of data: Data taken for this thesis for analysis and interpretation is taken from the data collected by block managers in their respective blocks of Supaul over a period of 8 months
- d. Duration of Data available: 1st Oct'2019 till 31st May'2020.

Data Analysis:

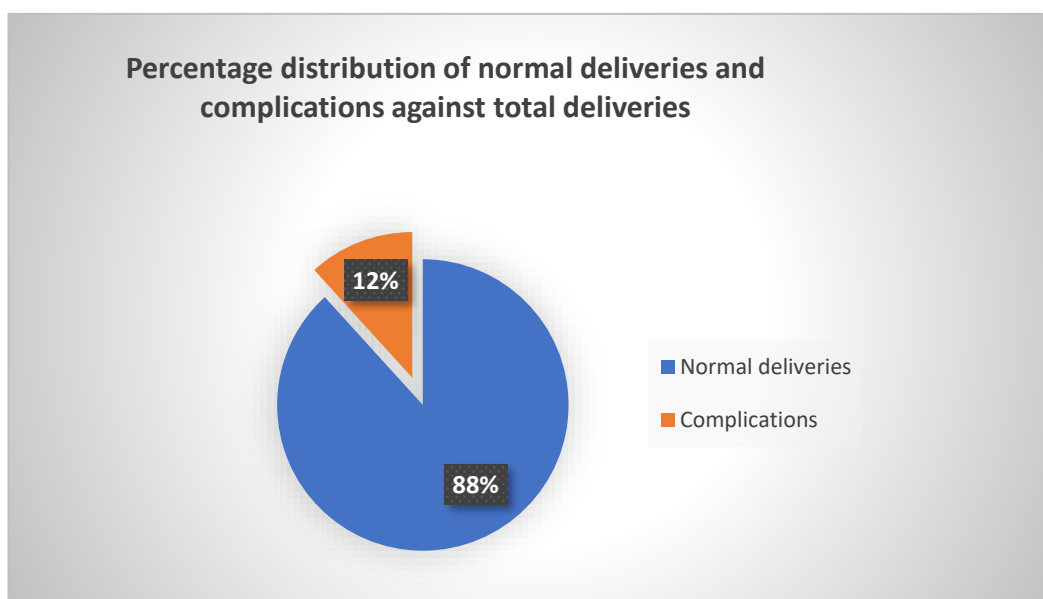
1. Total deliveries occurred in 11 facilities over period of 8 months (oct'2019 – May'2020), District profile.



Interpretation:

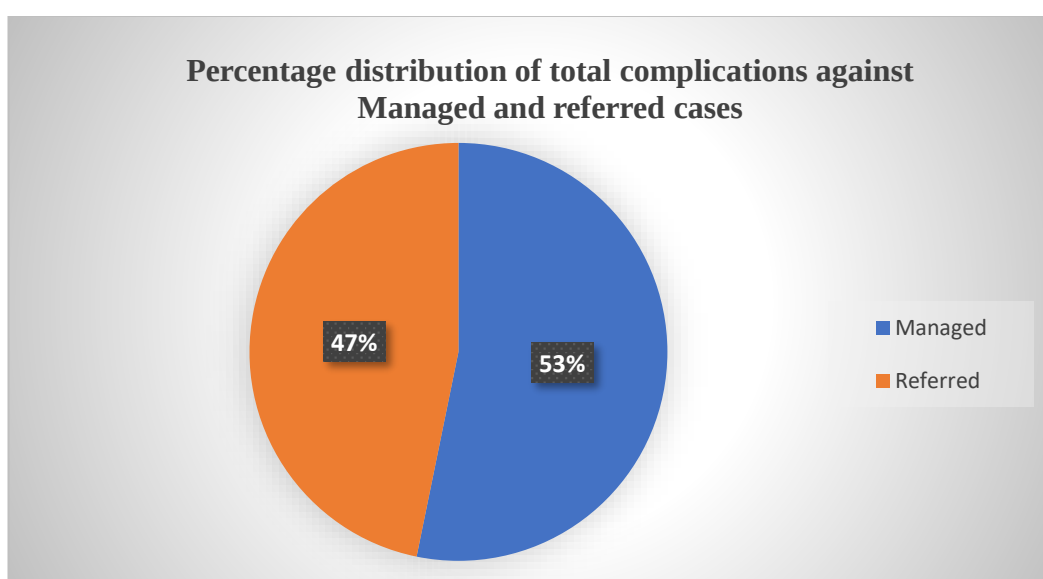
This graph depicts a downward trend in overall institutional deliveries across the district due to multiple contributing factors.

2. Total number of complications against total deliveries over period of 8 months (oct'2019 – May'2020)



Interpretation:

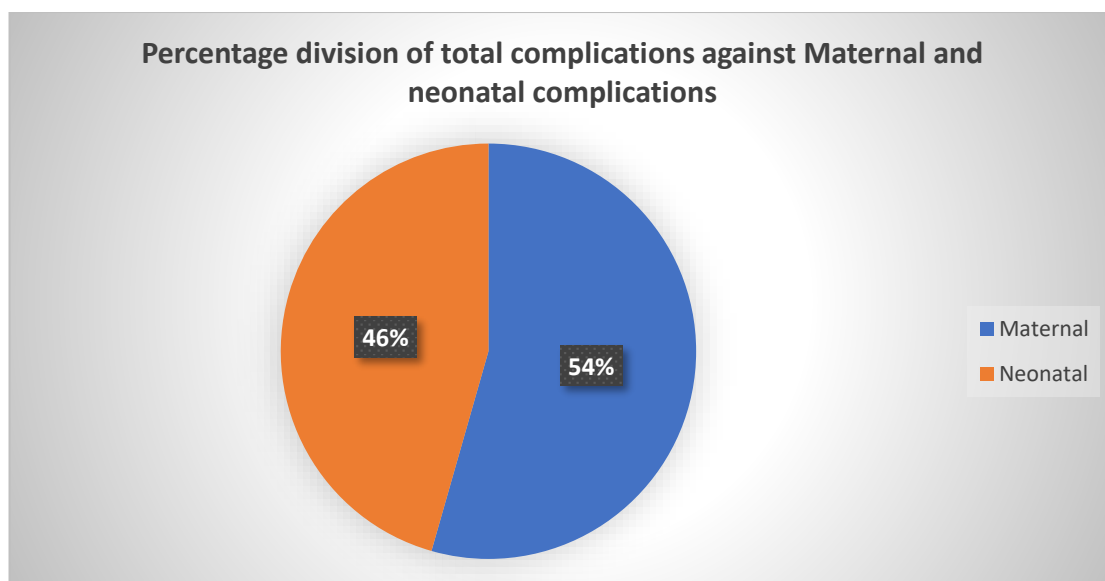
This pie chart represents that out of total institutional deliveries, 88% ended up normal deliveries whereas 18% deliveries resulted in complications.



Interpretation:

The above pie chart depicts that out of total complications occurred in the district in the last 8 months, around 53% of cases were managed and 47% were referred to some other facility for management.

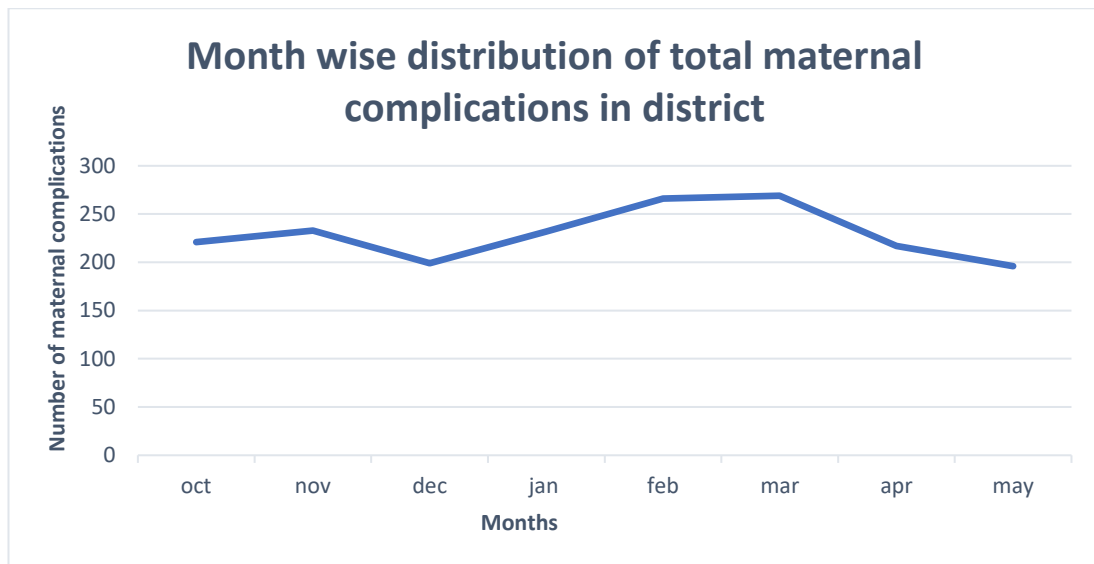
3. Distribution of total complications against Maternal and neonatal complications over period of 8 months (oct'2019 – May'2020)



Interpretation:

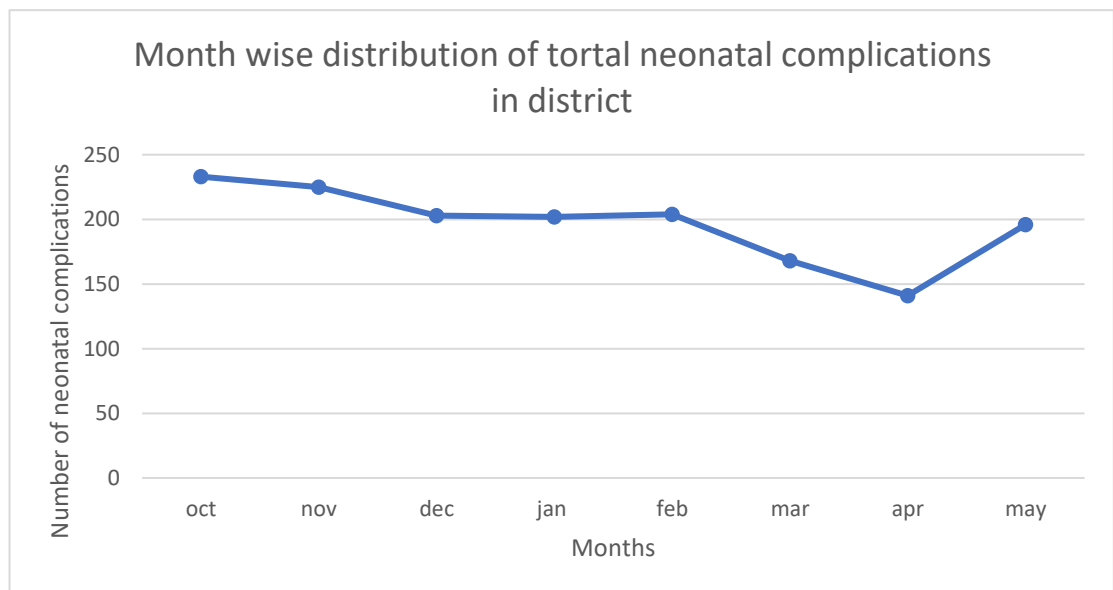
The above pie chart represents that out of total complications that occurred, 54% were maternal complications and 46% were neonatal complications.

4. Month wise trend of total maternal and neonatal complications in District (oct'2019 – May'2020)



Interpretation:

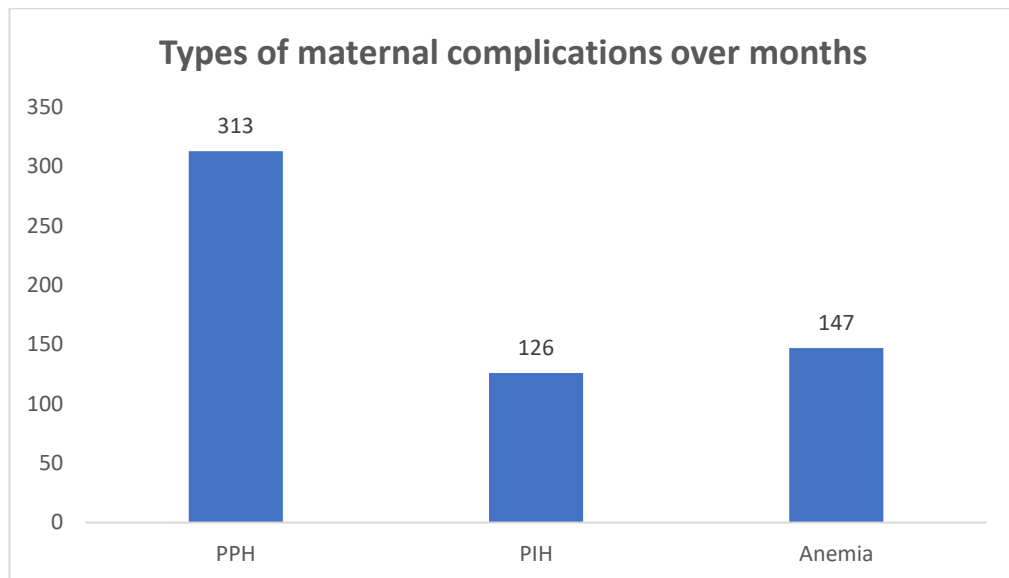
The above line chart represents that although delivery load has decreased in the district, but maternal complications has increased in the district.



Interpretation:

The above line chart represents that neonatal complications has decreased in the district overall.

5. Total PPH, PIH and anemia identified in district (oct'2019 – May'2020)



Interpretation:

The above line chart represents the total number of PPH, PIH and anemia identified in district against total maternal complications of 1863.

Discussion:

1. Regarding continuous decline in overall delivery load of health facilities in Supaul, this can be attributed to certain factors which are as follows:
 - a. Usually peak in delivery load is observed in the months of November and December (as major population of Bihar is migrant and people travel from different places to their home towns in March and April) but November'20 and December'20 witnessed less delivery because of lower mobilization of field workers in creating awareness among masses about institutional delivery.
 - b. Majority of 102 (dedicated ambulance for delivery) were off road because of payment issues or technical issues.
 - c. Month March'20 till May'20 mid witnessed nationwide lockdown because of global pandemic Coronavirus because of which more difficulties were faced by expecting mother in reaching the specific institutions for institutional delivery thereby resulting in more home deliveries.
2. Out of total deliveries conducted, around 88% were normal deliveries and 12% deliveries landed up in complications. Such features can be attributed to lesser skill of nurses in identification of possible complications.

In order to bridge the gap between current knowledge and required technical expertise, continuous technical sessions and hands-on sessions are being conducted in the district and state as well.

3. Total number of managed and referred cases against total complications have almost same predisposition of around 50%. This can be attributed to less technical expertise over management of complications of manpower involved in the labor room.
4. Identification and occurrence of maternal complications has increased over the past 8 months, possible reasons for that could be Covid-19. Because of covid-19 nurses want to conduct delivery as early as possible in order to reduce contact time with patient to minimum so as to protect herself from contracting possible disease.

Example: Pulling of placenta forcefully post-delivery will lead to retained placenta or non-checking of vitals in ANC will lead to eclampsia on labor table.

5. Regarding complication identification, PPH, PIH and anemia: District is showing very low complication identification as compared to total maternal complications occurring in the district. This focuses light over skill or practice gap of staff working in supaul

Example: PIH identification is very low in the district and this can be attributed to either availability or usage issues of the same. Maybe the apparatus is not available or if available, it is not being used either out of choice or skill gap in using same.

Conclusion:

District is facing more issues in improving institutional delivery as a whole. Even if an expecting mother comes for institutional delivery, chances of getting complications are higher because of phobia associated with covid-19. In case of any possible complication occurring, staff of one facility is willing to send the patient to other facility for treatment thereby contributing to higher referral rates than management.

Recommendations:

1. Major focus over strengthening of skill needs to be done in order to decrease complication rate at the time of delivery and increase management at the earliest.
2. Covid has created an emergency type situation across the globe but much focus is to be given appropriate IEC dissemination thereby reducing havoc and perceptions amongst people and healthcare workers.
3. Although there has been increase in institutional deliveries across state and districts, but more streamlined approach is required for promoting institutional deliveries thereby reducing threat of maternal complications and death at home.
4. One of major reason in reduction of institutional delivery can be attributed to absence of ambulance services. Streamlining them along with other services in hospital will increase institutional deliveries.
5. Skill gap is to be addressed so as to increase identification rate of complications within district as early identification will lead to reduced number of indirect maternal complications thereby improving indicators of maternal health.

Bibliography:

1. Vora KS, Mavalankar DV, Ramani KV, Upadhyaya M, Sharma B, Iyengar S, Gupta V, Iyengar K. Maternal health situation in India: a case study. Journal of health, population, and nutrition. 2009 Apr;27(2):184.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2761784/>
2. Montgomery AL, Ram U, Kumar R, Jha P, Million Death Study Collaborators. Maternal mortality in India: causes and healthcare service use based on a nationally representative survey. PloS one. 2014;9(1).
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3893075/>
3. Dehury RK, Samal J. Maternal health situation in bihar and madhya pradesh: a comparative analysis of state fact sheets of National Family Health Survey (NFHS)-3 and 4. Journal of clinical and diagnostic research: JCDR. 2016 Sep;10(9):IE01.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5071966/>

4. Mummadi MK, Javvaji S. A cross sectional study on severe acute maternal morbidity near-miss at tertiary care centre in Hyderabad, Telangana, India. International Journal of Reproduction, Contraception, Obstetrics and Gynecology.;8(5):1762.
<https://www.semanticscholar.org/paper/A-cross-sectional-study-on-severe-acute-maternal-at-Mummadi-Javvaji/9059fdf51685c97699d6fa819f913a957d687da5>
5. Petersen EE, Davis NL, Goodman D, Cox S, Mayes N, Johnston E, Syverson C, Seed K, Shapiro-Mendoza CK, Callaghan WM, Barfield W. Vital signs: pregnancy-related deaths, United States, 2011–2015, and strategies for prevention, 13 states, 2013–2017. Morbidity and Mortality Weekly Report. 2019 May 10;68(18):423.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6542194/>
6. Singh R, Sinha N, Bhattacharyya K, Ram R. Pattern of maternal mortality in a tertiary care hospital of Patna, Bihar. Indian Journal of Community Medicine. 2009;34(1):73.
<https://search.proquest.com/openview/80bdba55a6fbb230d99b06341786e7f9/1?pq-origsite=gscholar&cbl=226516>
7. To study maternal mortality and complications leading to maternal death in the tertiary care centre.
<https://ijmrr.medresearch.in/index.php/ijmrr/article/view/482>
8. Tanuja D, Karmakar V, Sampathkumar S, Jeyalakshmi S, Abel R. Nutritional status of tribal women in Bihar. Man in India. 1995;75(2):209-14
http://womenstudies.in/elib/tribals/tr_nutritional_status_of_tribal.pdf
9. Bhat PM. Maternal mortality in India: an update. Studies in Family Planning. 2002 Sep;33(3):227-36.
<https://europepmc.org/article/med/11478759>

10. Suparji S, Sulikah S. Study of Risk Factors for Complications and Maternal Mortality in Magetan Regency. Aloha International Journal of Health Advancement (AIJHA). 2019 Jun 30;2(6):126-30.
https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Study+of+Risk+Factors+for+Complications+and+Maternal+Mortality+in+Magetan+Regency+&btnG=
11. Sample Registration System (SRS) Bulletins. Available from https://censusindia.gov.in/vital_statistics/SRS_Bulletins/Bulletins.html
12. Niti Aayog. Available from: <https://niti.gov.in/>
13. Lata S. Study of Institutional Delivery Outcome, Maternal Complications, Child Complications and Service Quality in Kochas PHC, District Rohtas, Bihar. Studies in Indian Place Names. 2020 Mar 26;40(60):2188-94.
<https://archives.tpnsindia.org/index.php/sipn/article/view/5570>