Management of High Risk Pregnancy (HRP)

Whereas most women enjoy healthy experience of pregnancy and childbirth, a proportion of women may experience complicated or high risk pregnancies (HRP). These HRP Conditions can occur anytime during the whole course of the pregnancy and childbirth and can contribute to deaths and adverse outcomes. A project entitled "Improving the management of high risk pregnant women in a district in Haryana, India" was undertaken in district Ambala with support from state National Health Mission and World Health Organization. The goal was timely recognition, appropriate referral, completion of appropriate treatment and resolution of high risk pregnancy to reduce adverse foeto-maternal outcomes.

Objectives of the project were:

1. Identification of appropriate pathways in management of selected high risk conditions in pregnancy that contribute to adverse foeto-maternal outcomes.
2. Recognition of modifiable barriers to implementation and how to overcome these barriers.
3. Assessment of district hospital for their readiness to provide appropriate services to the patients referred.
4. Appropriate management of high risk pregnant women through iterative engagement of NHM and district health system.

Activities done:

1. **Approval**: A meeting was held with chief medical officer of Ambala district and his concurrence was obtained to implement the project in Ambala district.
2. **Hiring and training of staff:** In February 2016, the staff for the project was hired and was trained formally for a period of five days. This was then followed by review of cases investigated and on site coaching of the staff to be able to investigate the cases in a satisfactory way.
3. **Study tools and SOPs:** The formats and protocols for investigation of HRP women were developed, pre tested, translated and finalized. Simple guidelines and SOPs were developed by SWACH that could be used by the nursing staff under the guidance of the doctor in the busy OPD setting. It was also agreed to develop guidelines for following selected conditions that required specific treatment/ advice.
1. Control of anemia of pregnancy
2. Management of pregnancy induced hypertension (PIH)
3. Control of pregnancy induced diabetes mellitus
4. Advice on malnutrition (under nutrition and obesity)

5. Management of Rh negative condition
6. Management of thyroid problems
7. Management of urinary tract infections
8. Management of genital infections
9. Care of women who have bad obstetric history
10. Care of women who have had C section

4. **Ethical clearance**: Written consent that (approved by ethics and review committee) was taken from the clients by the research staff for participation in narratives and sharing of records of investigation and treatment.

5. **Situational analysis:** A situational analysis was done to assess the readiness of the district and it was found that there was no separate system of identifying HRP women and their follow up.

Methodology: It *was* interrupted time series design (2 years). The study was carried out in 4 phases. First three months (January 16- March 16) were for preparatory work. Phase 1 (April 16- June 16) was pre intervention phase. Phase 2 (July 16- January 17) was progressive refinement of the strategy through ongoing engagement with key stakeholders. Phase 3 (February 17- July 17), was intervention phase to implement the optimized stabilized strategy and measure primary outcomes and Phase 4 (Aug 17- Dec 17) was post intervention phase to complete follow up and closure of HRP cases, analyze data and prepare a final report of the project. Initially, 4 health facilities (2 District Hospital, 2 Sub District Hospital) were visited in 2 districts of Haryana (Ambala, Yamunanagar). In both SDH, there was no available system to review HRP cases. At DH Yamunanagar, case load was very low (25 per month). Efforts were made to start HRP clinic at SDH but idea didn't succeed. After reviewing this, we came to the conclusion that only DH Ambala conformed to the requirement of study. Complete enumeration (All the HRP women enrolled for ANC coverage at District Hospital, Ambala) was done. These were the cases where follow up was done until 6 weeks after child birth. The list of HRP women were identified from ANC records from DH. A phone call was made by the investigator to all the clients whose phone number was available. A pilot tested, structured interview schedule was used for interviewing the study subjects. The interview schedule included information on socio-demographic profile, relevant obstetric & medical history, physical parameters like weight, height and blood pressure, detailed investigation and different barriers and pathways for ANC care and treatment and follow-up advice was also noted.

Results: During the study period, in phase I, a total of 4629, in phase II 13,105 and in phase III 16,730 antenatal women were registered. Average monthly attendance for antenatal care was more from January 17-July 17 (phase III) as compared to April 16–January 17 (Phases I and II). Target of investigation of HRP was 300 in phase I, 700 in phase II and 600 in phase III. Similarly, average proportion of HRP cases per month amongst ANC visits increased from 5.2% (phase I) to 9.0% (phase III) The success rate in case completion was high in all the 3 phases (about 95%) as depicted in table 1.

Table 1: ANC visit attendance and HRP women reporting to DH January 16- July 17

Criteria	Phase 1	Phase 2	Phase 3
Number of ANCs	4629	13,105	16,730
Average monthly ANC attendance	1543	1872	2788
Number of HRPs	241	1361	1498
Average number of HRP reporting per month	80	194	250
Average proportion of HRP cases per month amongst ANC cases	5.2%	10.4%	9.0%
HRP cases investigated	164	724	644
Percentage of HRP cases investigated	68%	53.2%	43%
HRP case investigation completed	152 (92.7%)	696 (96.1%)	609 (94.5%)

Socio demographic comparisons of HRP women in 3 phases showed that majority of the women had an education level up to primary (Phase I 34.9%; Phase II 36.8%; Phase III 33.4%). Approximately 10% of the women were found to be illiterate in all three phases. For education level the chi-square statistic was 5.4957. (p-value 0.48) showing no difference in education level of women in all three phases. Very few women were classified as very poor (Phase I 2.0%; Phase II 2.6%; Phase III 0.8%). Nearly 40% of HRP women were classified as below poverty line (Phase I 40.8%; Phase II 41.4%; Phase III 37.4%) whereas majority (50%) was classified as above poverty line. Very few (1%) of men were unemployed in all three phases; majority of the men in all three phases were working on daily wages. (Phase I 67.8%; Phase II 72.1%; Phase III 70.1%). Majority (90%) of HRP women belonged to age group of 20-34 years in all the three phases. Only 4 % of women in all three phases were ≥35 years of age.

Table 2 represents the High risk conditions recognized by Government hospital (GH) and SWACH as per NHM norms. Total HRP conditions (NHM+Others) identified by GH were 172, 752 and 1495 in all three phases respectively. Total HRP conditions (NHM+Others) identified by SWACH were 434, 2046, 1939 in all three phases respectively. In all three phases more HRP conditions were identified by SWACH as compared to GH. However, gap in identification of HRP reduced from phase I to Phase III. Average number of HRP conditions improved from phase I (1.13) to phase III (2.45).

Conditions	Phase 1 (n=152) (%)			Phase 2 (n=696) (%)			Phase 3 (n=609) (%)		
	GH	SWACH	Gap	GH	SWACH	Gap	GH	SWACH	Gap
As per NHM guidelines	143 (83.13)	247 (56.9)	262	560 (74.5)	1164 (56.9)	1294	736 (49.2)	954 (49.2)	444
Others	29 (16.87)	187 (43.1)		192 (25.5)	882 (43.1)		759 (50.8)	985 (50.8)	
Total	172	434		752	2046		1495	1939	
Average	1.13	2.80	1.72	1.08	2.93	1.85	2.45	3.1	0.65

Table 2: High risk conditions recognized by GH and SWACH as per NHM norms

Figure 1 represents the trend in identification of HRP cases over the three phases. A steady increase was seen in HRP case identification by GH from phase l to phase lll (172 to 1495). Identification by SWACH also increased from phase l to phase ll (434 to 2046); however a stabilized trend was observed by SWACH investigators from phase ll to phase lll (2046 to 1939).
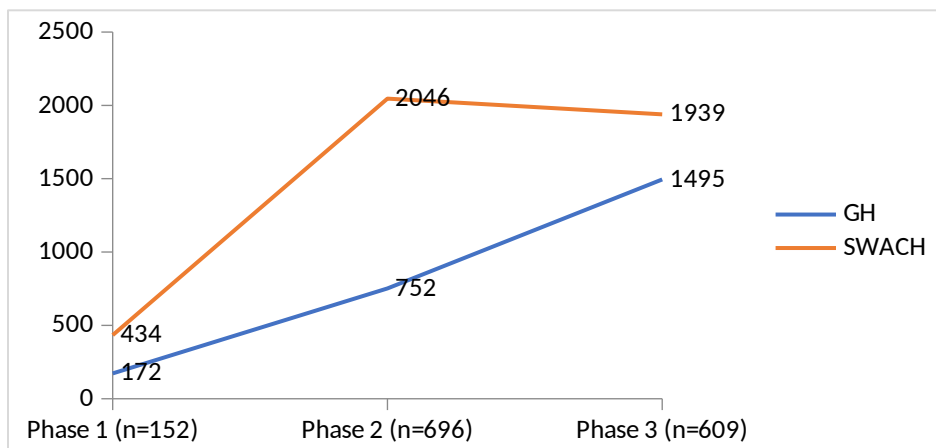
Figure 1: Trend in identification of Total HRP conditions from Phase I to Phase III

When individual HRP conditions identified by District hospital and SWACH as per NHM norms (28 High risk conditions) were compared; during all the three phases a better identification of HRP conditions were done by SWACH for maximum conditions which were Previous Lower segment Caesarean section (LSCS), bad obstetric history (BOH), severe anaemia, RH negative status, obesity, etc. In two conditions Short stature and Malpresentation, better identification was done at GH.

In all three phases majority (apprx. 80%) of the women reported to DH in first trimester; whereas only 1-2% reported in third trimester. There was a progressive improvement in receipt of complete (18 components) ANC package as per the norms of the government. It was received by a very low proportion of women in phase I and phase II, but the coverage was 59.4% in phase III. In 17.8 % modifiable HRP conditions were recognized by DH in

phase I (Table 3). It increased to 25.4% in phase II and further increased to 37.5% in phase III. There was a good match between the modifiable conditions recognized by district hospital staff and SWACH investigators in all the three phases. However SWACH investigators identified additional cases that were not entered by the district staff in their register.

	Phase 1 (n=152) (%)			Phase 2 (n=696) (%)			Phase 3 (n=609) (%)		
	DH	SWACH	Match	DH	SWACH	Match	DH	SWACH	Match
Severe Anemia	2	19	2	37	67	35	27	47	26
Rh negative	18	27	18	80	103	78	70	79	68
Hypertension	5	7	4	30	37	20	49	47	40
Diabetes	1	0	0	4	7	3	8	8	7
Thyroid	1	9	1	15	43	13	60	74	59
Systemic(fits/ asthma/HIV/Tb)	0	0	0	8	14	8	15	16	14
Total	27 (17.8)	62 (40.8)	25	174 (25.4)	271 (39.5)	157	229 (37.7)	271(44.5)	214

Table 3: Modifiable conditions recognized by District hospital

For purposes of initiation of treatment completion or continuation of treatment and for resolution of the condition DH data has been included. In phase I treatment was initiated for 74.1% of conditions and these got resolved in 70.4%. In phase II treatment was initiated for 71.8% of conditions and conditions resolved for 63.8% whereas in phase III it was initiated for 76% and conditions resolved in 68.9%. (Table 4)

	Phase 1 (n=152) (%)	Phase 2 (n=696) (%)	Phase 3 (n=609) (%)
Rx initiated	20 (74.1)	125 (71.8)	174 (76.0)
Rx completed	20 (74.1)	117 (67.2)	163 (71.2)
Resolution	19 (70.4)	111 (63.8)	158 (68.9)

Table 4: Treatment completion and resolution

From phase I to phase II the % age of normal delivery was found to reduce from 52% to 42.8%; whereas the Cessarean section increased from 43.4% to 50.7% (previous history of CS). From phase 2 to phase 3 %age of normal delivery got increased (42.8% to 58%) and cesarean section decreased (from 50.7% to 36%). Same trend was seen in %age of abortion. It got increased from 4.6% (phase I) to 6.5% (phase II) and then again got slightly reduced to 6.0% (phase III). For maximum deliveries (approx. 75%) the Place of delivery was DH and above district hospital. (Phase I - 75.48, phase II- 71.13 and phase III- 77.37%). Among 149 live births in phase I, 135 were single births and 7 multiple births. In phase II, out of 653 live births, 621 were single births and 16 were multiple births. In phase III, there were

570 live births. Out of 570 live births in phase III, 542 were single births and 14 were multiple births. In phase I, congenital birth defect was present in 4 cases, in phase II it was present in 15 cases and in phase III it was seen in 11 cases. There were 5 neonatal deaths in phase I, 12 in phase II and eighteen in phase III (Table 5).

	Phase 1 (n=152) (%)		Phase 2 (n=696) (%)		Phase 3 (n=609) (%)		Total (%)	
Abortion	7	5%	46	7%	38	6%	91	6%
Still birth	3	2%	18	3%	15	2%	36	2%
Neonatal deaths	5	3%	12	2%	18	3%	35	2%
BD	4	3%	15	2%	11	2%	30	2%
LBW<2.5	22	14%	137	20%	120	20%	279	19%
POG <37	37	24%	181	26%	155	25%	373	26%
SGA (live births)	29	19%	114	16%	98	16%	241	17%

Table 5: Adverse outcome of pregnancy

As ANC coverage and identification of HRP cases increased; Overcrowding was also experienced by a large proportion of HRP women in all the 3 phases. In phase III, clients faced overcrowding but stated that they were not stressed since they had a place to sit and were able to get consultation and tests done in reasonable time. This is despite the fact that the DH had a substantial increase in the footfall for antenatal and HRP consultation without any increase in the staff deployed. A very high proportion of HRP women were given counselling on diet rest and about the treatment/care. Similarly, follow up advice was given in substantially larger proportion in phase III. The proportion of women who expressed desire to have their child birth in the DH or a higher facility increased in phase III (Table 6)

Criteria	Phase 1 (n=152) (%)			Phase 2 (n=696) (%)			Phase 3 (n=609) (%)		
	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
Overcrowded	9 (6.0)	36 (23.9)	106 (70.2)	44 (6.3)	139 (20.0)	499 (71.7)	29 (4.7)	179 (29.4)	394 (64.7)
Staff behavior	44 (29.1)	23 (15.2)	84 (55.6)	259 (37.2)	89 (12.8)	331 (47.5)	461 (75.7)	31 (5.1)	110 (18.1)
Counselling	28 (18.5)	21 (14.0)	102 (67.5)	171 (24.7%)	78 (11.2)	431 (62)	431 (70.7)	36 (5.9)	135 (22.2)
Follow up advice	14 (9.3)	2 (1.3)	135 (89.4)	78 (11.21)	3 (0.4)	596 (85.5)	425 (69.8)	5 (0.8)	170 (27.9)
Would like to deliver in district hospital or above that level	96 (63.6)	3 (2.0)	50 (33.1)	462 (66.4)	6 (0.9)	209 (30.0)	461 (75.7)	0	139 (22.8)

Table 6: Client experience compared in three phases

Dengue, chikungunya outbreak which resulted in staff dislocation (shifting of staff duties in September 2016, NHM Staff strike in October 2016 and demonetization by the Government in November 2016 were the main barriers due to which number of ANC and HRP cases may have reduced. Whereas due to National program Pradhan Mantri Surakshit Matritva Yojna

(free checkups once in a month in public and private facilities) in June 16-July 16 and after announcement of Rs 6000 support to pregnant women for one child in November 2016 reporting of ANC and HRP cases was good. HRP identification by red colour stamp was started in phase II. Earlier tests were done at different windows, but in phase II tests were started the knowledge of staff about HRP conditions increased from 40% in phase I to more than 90% in phase III.

	Gaps identified	Phase I	Phase II	Phase III
1	HRP identification by red colour stamp	No	Yes	Yes
2	Maternal child protection card at GH	No	Yes (supplied by the state)	Not sustained
3	Registration number (computerized)	No	Yes	Yes
4	Token system and digital electronic system	No	No	Introduced not sustained
5	Proper maintenance of HRP register and Follow up records	NO	Some Improvement	Improved
6	No priority to HRP women	No priority	No priority	No priority
7	Overcrowding	Yes	Yes	Management improved
8	Shortage of staff	Yes	Yes	One dedicated GNM appointed
9	Availability of SOP's and job aids	No	Yes	yes
10	Long waiting at multiple places	Yes	Yes	Improvement (did not increase despite a major increase in attendance)
11	Seating arrangements	Poor	Improvement (25%)	Improvement (40-50%)
12	Ultrasound test difficulty at DH	Yes	Yes	Yes
13	Medicines free of cost	Yes	Yes	Yes
14	Tests free of cost	Yes	Yes	Yes
15	Tests at one place	No	Yes (Some seating space)	Yes (almost all) reasonable seating space
16	Follow up advice	No	No	Yes (70%)
17	Advice about specific treatment	No	No (started in some cases)	Yes
18	Assessment of physical parameters of the client	not correctly interpreted	Improvement in height and weight	Done (some mistakes continue to occur)
19	Assessment of FHS	Unsatisfactory	Some	Yes
20	Abdominal palpation	Unsatisfactory	Yes	Yes
21	Explanation about tests done	No	No	No
22	Repeated visits for unfinished work	Yes	Yes(some improvement)	No (sometimes)
23	Supportive behaviour of the staff	Few (30%)	Improvement (37%)	Good (75%)
24	Tests done at one place	No	Yes	Yes
25	Accurate Knowledge of staff about HRP conditions (GNM)	Poor (40%)	poor	Good (> 90%)

Table 7: Phase wise closure of gaps

Discussion and conclusion: In our study, as average ANC women number increased, %age of HRP women also increased. It was 5.2% in phase I that increased to 10.4% in phase II and was nearly same (9.0%) in phase III. Increase in average monthly attendance for antenatal care was more from January 17-July 17 (phase III) as compared to April 16–January 17 (Phases I and II). This is attributed to the national program Pradhan Mantri Surakshit Matritva Yojna (free checkups once in a month in public and private facilities) in

June 16-July 16. As people got more and more aware the number of ANC as well as HRP Women increased. After announcement of Rs 6000 support to pregnant women for one child in November 2016, People got more excited and hence this may be the reason that the number of women reporting to health facility increased more. During the same period, the attendance of HRP increased. Another reason was possibly attributed to deployment of dedicated staff (GNM) who was able to identify more HRP cases, improvement in the organization services and better quality of care that was rendered to HRP women in the district hospital. . There was a difference between poverty identified by the government for entitlements and poverty identified by SWACH investigators. The reason for this was the investigators used to note about conditions of the household and then identify very poor families as per their living conditions. Nearly 48% of HRP women were from scheduled or backward class. Average number of days of employment was around 50% or less per month amongst the daily wage workers. This further supports that a large proportion of HRP women (50% APL) were from low SE status.

Inspite of repeated reminders and providing SOP, NHM guidelines, monthly meetings, observational notes, people persisted with same behaviour in phase ll; as in phase l, until a dedicated person was appointed. After that improvement occurred from phase ll to phase lll.

Overall, GH capacity to identify HRP conditions more accurately increased. The reporting to DH hospital in the third trimester was low this enabled us to have a reasonably long follow up of the vast majority of pregnant women and understand the development of high risk conditions and other severe and life threatening complications. There was a decline in ANC Package coverage from phase l to phase ll; however it improved from phase ll to phase lll. The reason for this was as earlier (phase l) women had to go to different sections in GH for tests but later on a single window test facility was provided. In the district hospital, there was an improvement in compliance with iron and folic acid consumption from phase l to phase lll.

There were no significant differences in the outcomes of pregnancy during the three phases. The sample size is small and duration of exposure to interventions was also short. However, overall the occurrence of abortion (miscarriages and terminations), still births, neonatal deaths and congenital malformations was about 25% - 30% higher than in a population based surveillance of adverse outcomes in the same district. The proportion of women who expressed desire to have their child birth in the DH or a higher facility increased in phase III, which indicates that they were more aware of their high risk condition(s) in this phase. The circumstances at the time of child birth are the reason why there was no increase in the proportion of child birth at district hospital or a higher level facility in phase III. Their good

response indicates further recommendation by them to their near ones for institutional delivery.

Achievements made through this intervention study are listed here:

- Updated SOPs for HRP women by Review of NHM , GOI and WHO guidelines
- Summarization of key action points for selected HRP conditions, distribution to concerned staff and orientation to use SOPs , preparation of job aids and display in the antenatal and HRP clinic
- Improved skills of staff responsible for management of HRP women with SOPs and job aids , Discussion in meetings with district staff on gaps identified in management of HRP women , Supervision by RMO
- Improved record keeping of HRP women on Computer based electronic registration, HRP Stamp on ANC as well as other child protections card in HRP women, dedicated staff for HRP clinic, addition of HRP follow ups in a separate register, more complete entry of HRP conditions in the register.
- Client satisfaction through Capacity development of the staff to include advice on treatment compliance, diet and rest and follow up, Group counselling in the waiting area by a counselor.
- More efficient organization and management at the facility by construction of shed at the registration area , increasing the space in waiting area (two separate waiting areas provision), Display of IEC material in the waiting area, Increasing the facility of ultrasound, Single window laboratory tests and reporting on the same day, Improved civic amenities, Deployment of security guard for crowd management and more efficient management of crowd by support staff, Procurement of audio visual aids for presentation to the staff in the hospital.
- Improved coverage of antenatal care indicators by Improved and sustained supply of medicines provision of IFA and calcium for 1 month in place of 5 days, greater attention to performance of lab oratory tests at DH, Use of anthropometry for assessment of height, Use of digital BP apparatus and digital weighing balance.