ejpmr, 2022,9(2), 373-380

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

ANALYTIC CROSS-SECTIONAL STUDY TO COMARE IMPACT OF STRENGTHENING HEALTHCARE SERVICES ON ANTENATAL CARE IN SOLAN AND MANDI DISTRICTS OF HIMACHAL PRADESH

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Article Received on 30/11/2021 **Article Revised on 21/12/2021** **Article Accepted on 11/01/2022**

ABSTRACT

Aims & Objectives: to compare impact of strengthening healthcare services on antenatal care services in Solan and Mandi districts of Himachal Pradesh. ***Methods:*** cross-sectional analytic study where data of 2010-11 before introduction of newer approaches was compared with 2019-20. ***Results:*** in Himachal Pradesh the registrations of ANC in first trimester out of total registered cases jumped from 41.6% in 2010-11 to 87.5% in 2019-20. In Solan and Mandi districts the pattern is same. Corresponding figures for Solan District are 25.7% and 80.8% and in Mandi District these figures jumped from 51.1% to 93.4%. In year 2010-11 neither Glucometers were available at all Health Sub Centres nor all workers were trained about sugar testing but after subsequent years after providing Glucometers and training the health care providers figure of detection of GDM in 2019-20 in H.P was 1.3%, in Solan District 0.9% and In Mandi District 0.4% cases were detected. Iron and Folic Acid supplementation to pregnant women out of total antenatal registered which in 2010-11 was 56%, 62.1% and 77.5% in H.P, Solan and Mandi Districts respectively. The delivery of IFA prophylaxis to pregnant women got enhanced all over in H.P, Solan and Mandi Districts to 84.8%, 75.6% & 87.6% respectively during the year 2019-20. ***Conclusions:*** There have been great improvements in all the parameters of service delivery of antenatal are services. Still efforts should be continued for 100% achievement in all targets.

KEYWORDS: ANC, glucometers, GDM, IFA, prophylaxis.

INTRODUCTION

In earlier decade efforts were made to improve Maternal and Child Health (MCH) care. There were separate programmes for women, newborn, immunization and nutrition etc. There was need for universal MCH care, With help of WHO and UNICEF interventions, Government of India (GOI) focused on improving maternal and child health in the form of National Family Planning Programme (1952), Integrated Child Development Services(ICDS)(1975), Expanded Programme on Immunization(EPI) (1978), reduction of infant and childhood mortality, maternal mortality and improvement in maternal healthcare are the major goals stated in National Health Policy(NHP) (1983), Acute Respiratory Infection Control Programme (ARICP) (1990), Child Survival and Safe Motherhood Programme (CSSM) (1992), Reproductive and Child Health Programme-1 (RCH)(1997), National Population Policy (NPP)(2000), National Health Policy (2002), Reproductive and Child Health Programme-2 (2005), National Rural Health Mission (NRHM)(2005), Millennium Development Goals (MDG) framework agreed by United Nations general assembly at (2005) world summit, effective from 15th January 2008 included specific targets on reproductive health. The MCH is an overriding priority area for the policy makers and planners in India.[1] In order to strengthen the reporting of MCH and indicators of maternal and newborn care the web portal of Health Management Information System (HMIS) was launched by the Ministry of Health and Family Welfare (MOHFW), Govt. of India (GOI) in 21st Oct. 2008 to enable capturing of public health data from both public and private institutions in rural and urban areas across the country HMIS is one of the important components of National Rural Health Mission (NRHM).

There had been great transformation at community and facility based maternal and newborn care after 2010. Transportation of delivery cases in 108 ambulances

played an important role in improving institutional deliveries after its launch on 2nd October 2010 in Himachal Pradesh.[2] Government of India has launched Janani Shishu Suraksha Karyakaram (JSSK) on 1st June, 2011,[3] reproductive, maternal, newborn, child and adolescent health (RMNCH+A) is an excellent effort in this to impart antenatal care which was started in 2013,[4] Rashtriya Bal Swasthya Karyakram (RBSK) was launched in February, 2013.[5] State has started ASHA programme in 2014-15 in Himachal Pradesh.[6] All these cumulative efforts have led to great imprudent in imparting antenatal care. Our study is an effort to compare impact of strengthening healthcare services on antenatal care in Solan and Mandi districts of Himachal Pradesh

MATERIAL AND METHODS

Study Area; Secondary data of Antenatal services provided in Solan, Mandi and Himachal Pradesh of year 2010-11 was compared with 2019-20.

Study Design: cross-sectional study.
Study Period: 1st January 2019 to 31st August 2020.
Sampling technique: Data to compare independent variables was collected from HMIS data operators posted at respective office of Medical Officer Health (MOH), Solan and Mandi Districts of Himachal Pradesh (H.P).
Study tools: Secondary data was collected from HMIS Data Operators.
Study variables: Dependent Variables included in our study were early antenatal registrations, detection of new cases of hypertension, detection of Gestational Diabetic Mellitus, Pregnant Women having severe anemia, Pregnant Women who were given complete IFA prophylaxis.
Statistical Analysis: Data collected was analyzed with the help of Statistical Methods.
Ethical consideration: After getting the approval from Institutional Ethics Committee, the research work was started.

RESULTS

Table 1: Status of ANC registered in First Trimester against total ANC.

	Before introduction of new approaches 2010-11						After introduction of new approaches in 2019-20					
Total ANC registered in given year	**H.P N = 156424**		**SOLAN N = 11225**		**MANDI N = 17968**		**H.P N=110701**		**SOLAN N = 12769**		**MANDI N = 14636**	
Parameter	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
ANC Registrations in First Trimester against Reported ANC registrations	65068	41.6	2889	25.7	9183	51.1	96865	87.5	10319	80.8	13676	93.4

Table 1/Fig. 1 indicates that in Himachal Pradesh the registrations of ANC in first trimester out of total registered cases jumped from 41.6% in 2010-11 to 87.5% in 2019-20. In Solan and Mandi districts the pattern is same. Corresponding figures for Solan District are 25.7% and 80.8% and in Mandi District these figures jumped from 51.1% to 93.4%.

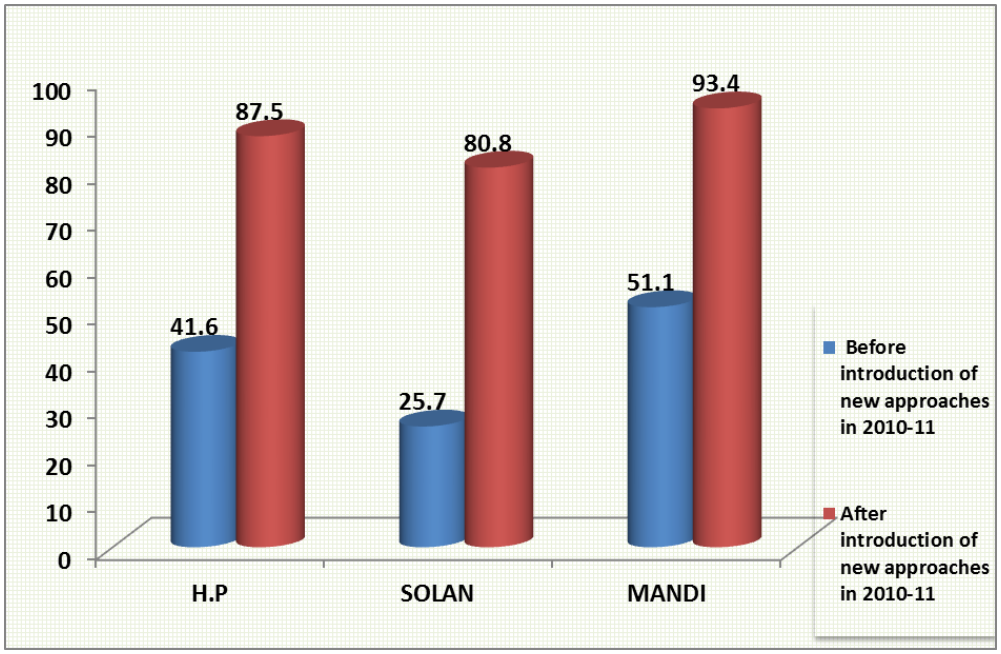

Fig. 1: Status of ANC registered in First Trimester against total ANCs.

Table 2: Status of Pregnant Women given TT2 + booster against total reported ANCs.

	Before introduction of new approaches in 2010-11						After introduction of new approaches in 2019-20					
Total ANC registered in given year	**H.P N = 156424**		**SOLAN N = 11225**		**MANDI N = 17968**		**H.P N=110701**		**SOLAN N = 12769**		**MANDI N = 14636**	
Parameter	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Pregnant Women given TT2 + booster against total Reported ANC registerations	117241	75	6987	62.2	11306	62.9	92530	83.6	9271	72.6	10458	71.5

Table 2 /Fig. 2 depicts that percentage of pregnant women given TT2+booster raised in H.P, Solan and Mandi Districts since 2010-11 to 2019-20. In H.P it raised from 75% to 83%, while increase in Solan District from 62.2% to 72.6% and in Mandi District it raised from 62.9% to 71.5% for the respective years.

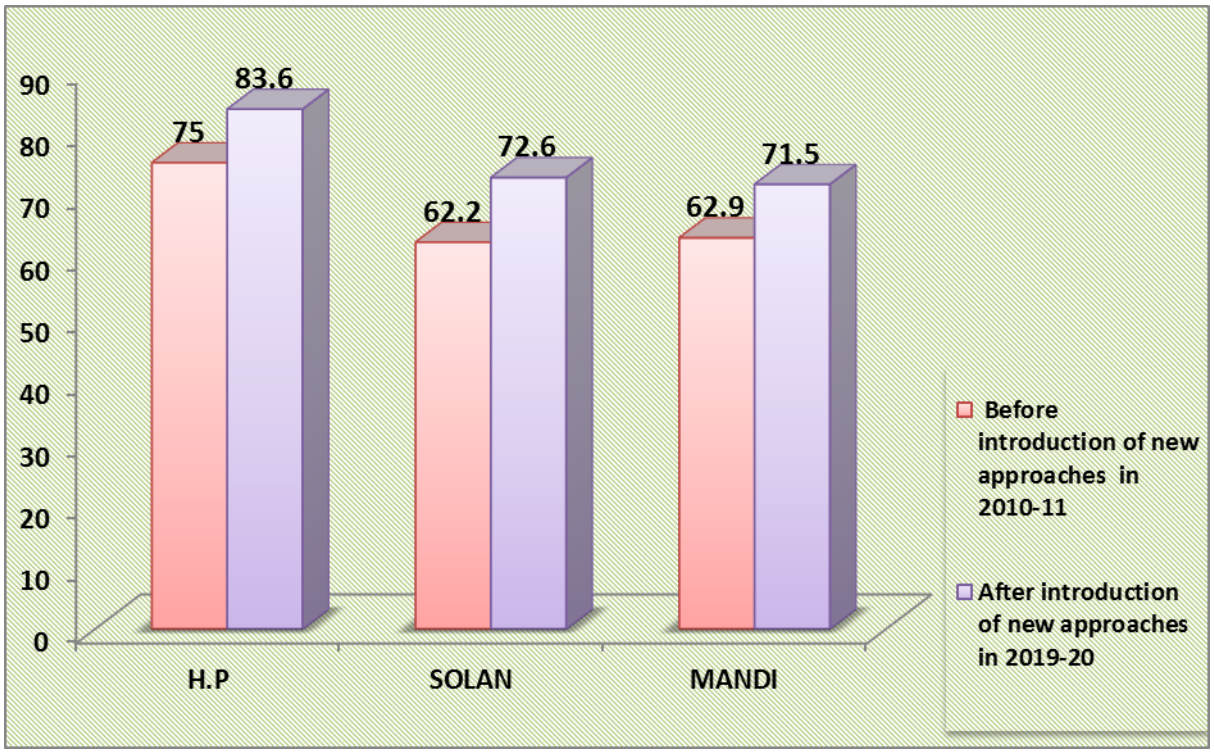

Fig.2: Status of Pregnant Women given TT2 + booster against total Reported ANCs.

Table 3: Status of detection of new cases of hypertension in Pregnant Women against Reported ANCs.

	Before introduction of new approaches in 2010-11						After introduction of new approaches in 2019-20					
Total ANC registered in given year	**H.P N = 156424**		**SOLAN N = 11225**		**MANDI N = 17968**		**H.P N=110701**		**SOLAN N = 12769**		**MANDI N = 14636**	
Parameter	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
New cases of Pregnant Women with hypertension detection against Reported ANCs	2816	1.8	280	2.4	340	1.89	2214	2	159	1.24	259	1.76

Table 3/Fig. 3 points towards detection of hypertensive cases in pregnant women against total reported ANCs which slightly increased in state from 1.8% in 2010-11 to 2% in 2019-20. At the same time there is decrease in its detection from 2.4% in 2010-11 in Solan District to 1.24% in 2019-20, slight decrease is also noticed in Mandi District from 1.89 to 1.76% during corresponding years.

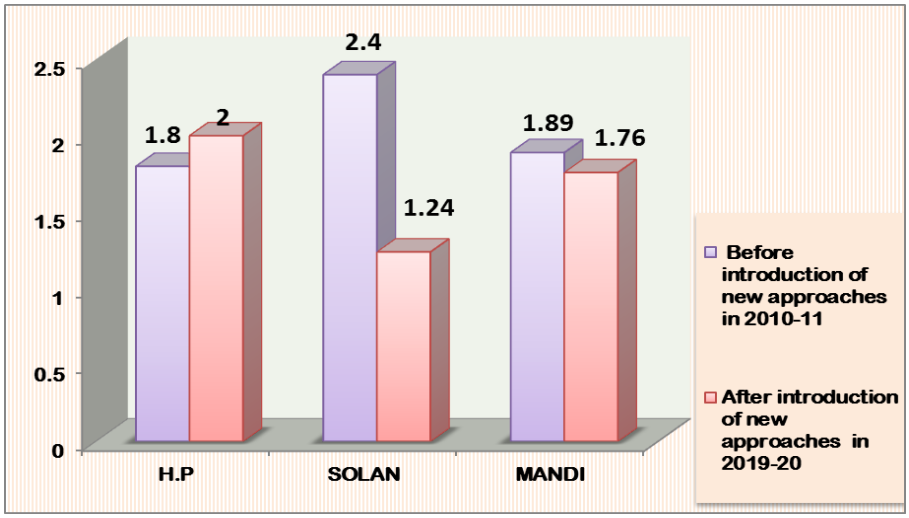

Fig. 3: Status of detection of new cases of Pregnant Women with hypertension against total Reported ANCs.

Table 4: Status of Pregnant Women having severe anemia (Hb<7gm%) & treated against Reported ANCs.

	Before introduction of new approaches in 2010-11						After introduction of new approaches in 2019-20					
Total ANC registered in given year	**H.P N = 156424**		**SOLAN N = 11225**		**MANDI N = 17968**		**H.P N=110701**		**SOLAN N = 12769**		**MANDI N = 14636**	
Parameter	N	%	N	%	N	%	N	%	N	%	N	%
Pregnant Women having severe anemia (Hb<7gm%) treated against Reported ANC registrations	936	0.6	19	0.16	41	0.22	635	0.58	88	0.68	81	0.55

Hb- Hemoglobin

Table 4: /Fig.4 describes about detection of pregnant women having severe anemia i.e Hemoglobin less than 7 grams% & treated against reported ANC registrations. A slight decrease is noticed in overall detection of cases of severe anemia in state from 0.6% in 2010-11 to 0.58 in 2019-20. At the same time detection of severe anemia in Solan and Mandi district was 0.16% and 0.22% respectively in 2010-11 which hiked to 0.68% and 0.55% respectively in corresponding districts.

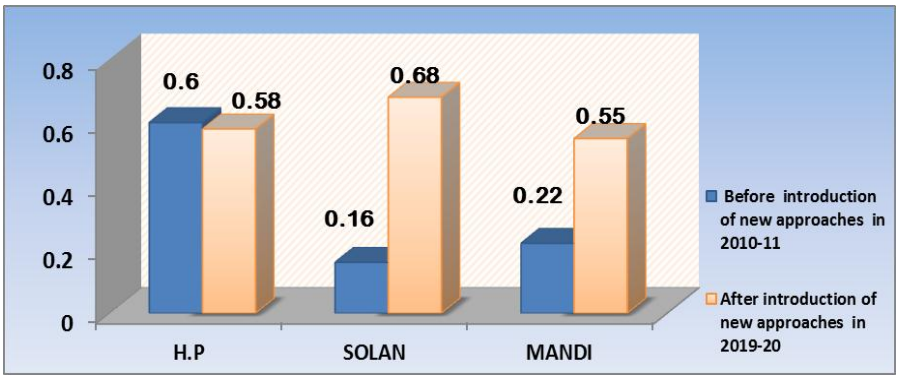

Fig. 4: Status of Pregnant Women having severe anemia (Hb<7gm%) & treated against Reported ANC registrations.

Table 5: Status of Pregnant Women tested positive for GDM against Reported ANCs.

	Before introduction of new approaches in 2010-11						After introduction of new approaches in 2019-20					
Total ANC registered in given year	**H.P N = 156424**		**SOLAN N = 11225**		**MANDI N = 17968**		**H.P N = 110701**		**SOLAN N = 12769**		**MANDI N = 14636**	
Parameter	N	%	N	%	N	%	N	%	N	%	N	%
Number of PW tested positive for GDM	0	0	0	0	0	0	1490	1.3	109	0.9	63	0.4

 # Gestational Diabetic Mellitus (GDM)

Table 5/Fig. 5 represents the detection of Gestational Diabetic Mellitus (GDM) among pregnant women out of total registered Antenatal cases. In year 2010-11 neither Glucometers were available at all Health Sub Centres nor all workers were trained about sugar testing but after subsequent years after providing Glucometers and training the health care providers figure of detection of GDM in 2019-20 in H.P was 1.3%, in Solan District 0.9% and In Mandi District 0.4% cases were detected.

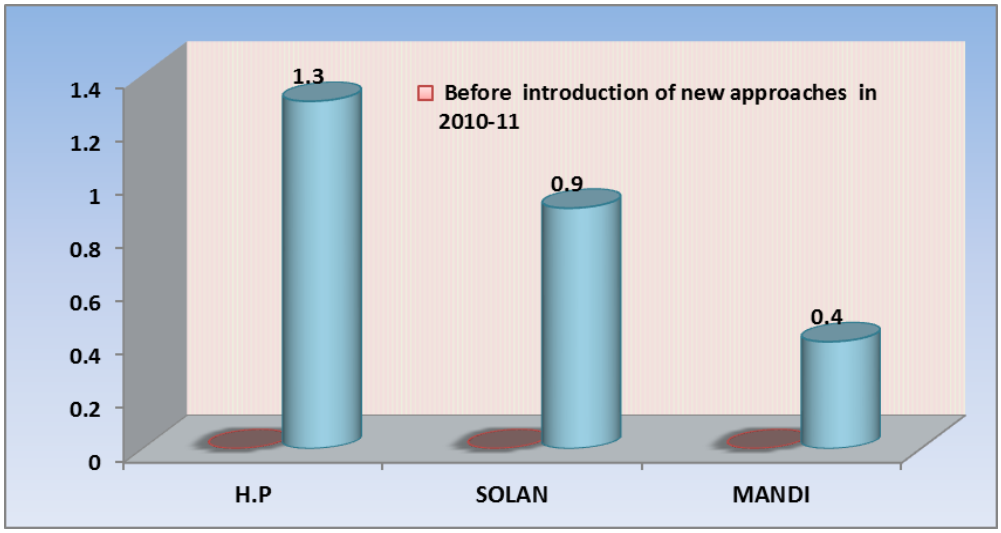

Fig. 5: Status of Pregnant Women tested positive for GDM against Reported ANCs.

Table 6: Status of Pregnant Women given complete IFA prophylaxis against Reported ANCs.

	Before introduction of new approaches in 2010-11						After introduction of new approaches in 2019-20					
Total ANC registered in given year	**H.P N = 156424**		**SOLAN N = 11225**		**MANDI N = 17968**		**H.P N=110701**		**SOLAN N = 12769**		**MANDI N = 14636**	
Parameter	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Number of PW given complete IFA prophylaxis	87663	56	6973	62.1	13918	77.5	93915	84.8	7887	75.6	12826	87.6

 # PW-Pregnant Women, IFA- Iron and Folic Acid.

Table 6Fig. 6 speculates about provision of Iron and Folic Acid supplementation to pregnant women out of total antenatal registered which in 2010-11 was 56%, 62.1% and 77.5% in H.P, Solan and Mandi Districts respectively. The delivery of IFA prophylaxis to pregnant women got enhanced all over in H.P, Solan and Mandi Districts to 84.8%, 75.6% & 87.6% respectively during the year 2019-20.

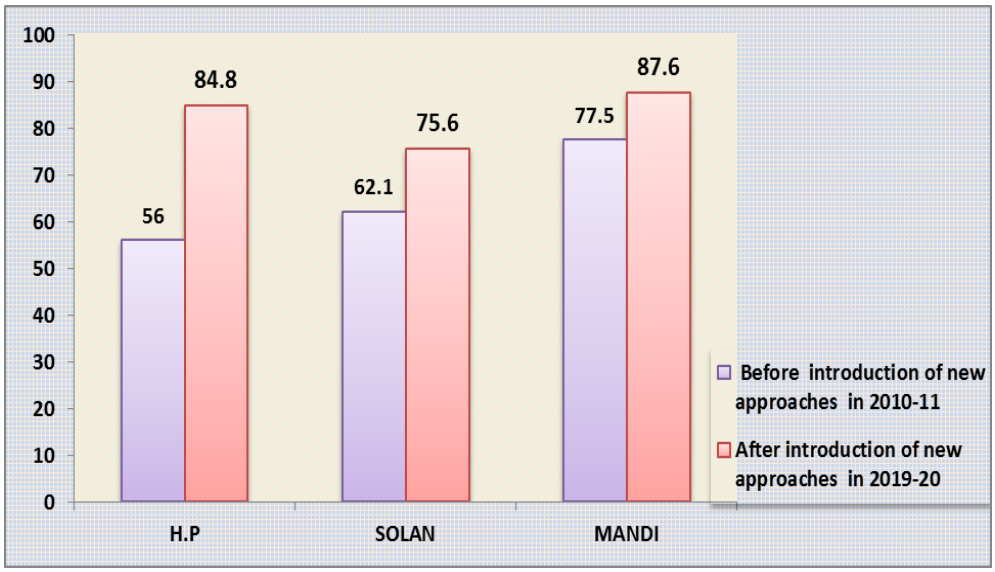

Fig. 6: Status of Pregnant Women given complete IFA prophylaxis against Reported ANCs.

DISCUSSION

The study was done to compare impact of strengthening healthcare services and interventions of newer approaches on maternal and newborn care. After 2010-11 there have been dramatic improvements in Maternal and Newborn Care in Himachal Pradesh. Our study is data driven comparative study to assess impact by measuring improvements of various parameters and health indicators of maternal and newborn care MCH indicators before introduction of new approaches in 2010-11 were compared with 2019-20.

ANC registration at its earliest has a significant role in detecting high risk pregnancy and take preventive and curative measures. In early registration of Antenatal cases in first trimester in H.P rise of 110.3% was observed. In District Solan the rise was 214.3 % and in Mandi district hike was 82.8%. Comparing Solan and Mandi districts, hike was more in Solan which could be explained that baseline values of comparison of Solan were lower as compared to Mandi District. In a similar pattern, Rekha Shekhawat, *et al,* conducted a community based study in rural field practice areas of Jaipur and found total ANC registrations were 97.2%, whereas 72.0% were registered in first trimester. Factors like educational status, type of family and socio-economic status had a significant association with full Antenatal services utilization. Further, better enhancement of these factors may be useful for improving the maternal health practices and thus improving the health status of the women[7] . Prakash B Patel M, *et al,* in their study conducted in 2008 by personal interviews of pregnant women attending antenatal clinic at Chandkheda Health Centre (CHC), located in a rural area of Gujarat found that among the participants, (19.6%) registered within 12 weeks of gestation, while the majority, (80.4%), registered after that time. According to their study better education and employment opportunities for women can contribute considerably to the need for early antenatal registration.[8] In our present study ANC Registration figure of first trimester are 87.5%, 80.8 & 93.4%.in H.P, Solan & Mandi district respectively which is better than this study. Better figures can be explained because of in position ANMs, ASHAs and AWWs functioning in the area.

It's further indicated that there is decrease in total number of ANC registration in first trimester from 2010-11 to 2019-20 which clearly corresponds to Estimates of fertility indicators by Census of India. Decline by 22% in birth rate of Himachal Pradesh was observed from the period in between 2000-02 to 2010-12. Shiva S. Halli, *et al,* analyzed fertility and family planning trends in India and UP. It included differences in methods mix. As interpreted by data of SRS (1971–2016) and NFHS (1992–2016) The fertility decline in UP was slower than India during earlier decades until 2000 but exceeded the national pace of decline during 2000–2009 and 2010–2016 (0.6% per year faster decline), resulting in a narrowing of the gap between India and UP The TFR in UP was 2.7 in the NFHS 2015–16, however, was much higher and above the Government of India's target of 2.1 by 2012 and national average of 2.18 in 2015–16.[9] Estimated Birth rate of Himachal Pradesh is 15.7 for reference year 2018 according to SRS which have been dropping persistently as per decadal trends which is in accordance with our present study.

In our study there is 11.4% gain in status of pregnant women receiving TT2+ booster in entire state where as this gain is 16.7% & 13.7% in Solan and Mandi District respectively during past 10 years. Entire state is lagging behind national average by 1.6 % while Solan and Mandi are lagging behind by 12.6% & 13.2% respectively for these values in the year 2019-20. WHO considers neonatal tetanus as eliminated from a country when its incidence becomes below one case per 1000 live births per year in every district of that country. Rekha Shekhawat, *et al,* observed 98.19% of antenatal mothers were immunized with adequate dose of tetanus toxoid.[7]

In our study it's clear that there is improvement in detection of Pregnancy Induced Hypertension (PIH) which was neglected earlier. There is slightly increased detection in entire state, while comparing data of 2010-11 with 2019-20. There is detection of 2 % cases of PIH of all ANC registered in the year 2019-20 in Himachal Pradesh. Prevalence of pregnancy related disorders are more than 10% worldwide (2020). In a study Aravinthkumar A, *et al,* found Keerapalayam Block of Cuddalore district, Tamilnadu the prevalence of Gestational Hypertension was 9% among the study population which corresponds with national and global values.[10] Detection rate in our study is of PIH is 2%, 1.24% and 1.76 % in H.P, Solan and Mandi District respectively which is far less as compared to the above mentioned study. This fact can be attributed to the fact that in a hilly region because of healthy lifestyle and physical activities the situation is better.

In our study it was noticed that detection of pregnant women with Hemoglobin (Hb) levels less than 7gm% and treated against all ANC registered has been found to be increased by 11.1% in H.P during 2019-20 as compared with 2010-11. Comparing the figures of 2019-20 of Himachal Pradesh with national values, it has been observed that detection and treatment of cases of very severe anemia is 258% less in state. Sarala V, *et al,* in their cross-sectional study which was conducted in the department of obstetrics and gynecology in a tertiary care teaching institution in their study on pregnant women attending the antenatal checkups from nearby villages in Kanchipuram district the prevalence of very severe anemia was 5% (Hb-less than 7 gm%) according to WHO classification.[11] In our study detection of very severe anemia in pregnant women who were treated was 0.58 %, 0.68% and 0.55% in H.P, Solan and Mandi district respectively in the year 2019-20 which is quite less as compared to above study. We can explain that in

the higher altitude the Hb Concentration is more in blood to compensate the low atmospheric PO_2. Also in the Tertiary Health Facility the cases with bad Obstetrical history reports, which means such cases are more likely to have Anemia.

Gestational diabetes mellitus (GDM) is a severe and neglected threat to maternal and child health .According to International Diabetic Federation, many women with GDM experience pregnancy-related complications like high blood pressure**,** large birth weight babies and obstructed labor 1 out of 6 births.[12] In Himachal Pradesh glucometers were neither available in all HSC nor reporting was done in 2010-11. After training of health care workers and provision of glucometers, detection and reporting of cases of GDM improved. Detection rate of entire state is 144% more than District Solan and 325% more than that of District Mandi in 2019-20. Comparing same figure of Himachal Pradesh detection at national level is 260% less than that of H.P for the year 2019-20. A study was conducted by Smriti Agrawal, *et al*, in antenatal clinic at Department of Obstetrics and Gynecology KGMU, Lucknow, The tests were done as per Government of India guidelines . Prevalence of GDM (blood sugar ≥140 mg/dL) was 13.9%. Detection rate of GDM found in our study of Himachal Pradesh is 1.3 % which is quite less as comparing to the above study. The probable reason of this type of situation could be KGMU is a tertiary health facility, where cases with DM might be coming more as compared to our study, which represents the community.[13] The other pliable factor can be a healthy lifestyle in Himachal Pradesh as compared to Uttar Pradesh, since we are to do more manual work in hills.

To prevent anemia, supplementation of Iron and folic acid has been of great help. Comparing values of 2010-11 with 2019-20 there is gain of 51.4 %, 21.7% &13% in H.P, Solan and Mandi District respectively. Gain in Mandi district is less but overall values are more than entire state and Solan district. Figures of IFA supplementations in Himachal Pradesh are 5% less than national percentage. In a study done by Jithin Sam VargheseI, *et al***,** where data was collected from survey conducted in pregnant women in Sirohi District in Rajasthan. In their study they found that majority of those who didn't consume IFA (88%) were the ones who has not received it. According to NFHS-4 reports only 25.9% of pregnant women in rural areas consume 100 IFA tablets during pregnancy.[14] Singh, *et al*, in a field survey of rural UP found that consumption of 100 or more IFA tablets and was reported by 8%,[15] which is far less in comparison to our study where IFA supplementation is 84.8 % (2019-20) in Himachal Pradesh.

CONCLUSION

Early antenatal registrations have one of the greatest advantages in order to detect high risk cases and plan early preventive measures. In this direction pre conceptional counselling will prove a blessing not only to prevent neural tube defect but also aid in early registrations. In this present study we analyzed that in Himachal Pradesh the registrations of ANC in first trimester out of total registered cases jumped from 41.6% in 2010-11 to 87.5% in 2019-20. Corresponding figures for Solan District are 25.7% and 80.8% and in Mandi District these figures jumped from 51.1% to 93.4%. This incredible improvement in ANC registrations in first trimester has been an outcome of introduction of ASHA programme. In present study knowledge of ASHA workers about regular weight checkup during pregnancy was 98% in ASHA workers of Solan District and 100% of ASHA workers Mandi District. We found that 91.4% of ASHAs Solan District and 94.1% of Mandi District were able to do nutritional counselling and detect high risk pregnancy. At the same time 92.1% of ASHAs of District Solan and 96.5% of District Mandi were aware of symptoms of high risk pregnancy and counsel pregnant women where to get treated. In present study we found that there is 11.4% gain in status of pregnant women receiving TT2+ booster in entire state, this hike is 16.7% & 13.7% in Solan and Mandi District respectively during past 10 years. In this study it came to notice that PIH has been kept neglected in entire state during entire decade. Similarly there has not been much progress in detection of pregnant women with severe anemia and got treated during their antenatal period. In this study it was observed that after providing glucometers in HSCs, detection of GDM has started but still it is far too less than average detection at national level. The delivery of IFA prophylaxis in 2010-11 was 56%, 62.1% and 77.5% in H.P, Solan and Mandi Districts respectively which enhanced in H.P, Solan and Mandi Districts to 84.8%, 75.6% & 87.6% respectively during the year 2019-20. There have been great improvements in all the parameters of service delivery of antenatal are services. Still efforts should be continued for 100% achievement in all targets.

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