

Impact of Pandemic on Women Health Indicators in a Tertiary Health Centre of Bihar

Punit Hans¹, Anjana Sinha², Uday Kumar³

^{1,2} Department of Obstetrics and Gynaecology, Patna Medical College and Hospital, Patna, Bihar, India.

³ Department of Gastroenterology, Consultant Ford Hospital, Patna, Bihar, India.

ABSTRACT

BACKGROUND

This study was conducted to analyse the impact of pandemic on healthcare, evaluate the negative psychological behaviour towards health professionals and study the effect of Covid-19 infection on hospital avoiding attitude of female patients.

METHODS

This was a case-control study conducted in Department of Obstetrics and Gynaecology at Patna Medical College and Hospital, Patna, Bihar. Study period was from 01st April 2020 to 30th September 2020. All the patients except Covid-19 positive cases, coming to Gynaecology Outpatient Department (GOPD), antenatal care (ANC) and labour room emergency (LRE) were included in the study. Patients who were seen from April 2019 to September 2019, total of 20,961 were in "pre Covid-19" control group, while patients seen from April 2020 to September 2020, a total of 8,859 were in "during Covid-19" case group. Records of all health parameters for patients were reviewed, and then divided into two groups as patient input indicators and healthcare efficiency indicators. Number of patients visiting GOPD, ANC and admitted in LRE comprised patient input indicators (implying hospital avoiding attitude) while delivery rate, dilation and evacuation (D & E) rate, stillbirth rate and mortality rate comprised healthcare efficiency indicators.

RESULTS

Overall patients visiting the hospital dropped down from 21,361 to 8859 (by 58.5 %); GOPD patients reduced by 74 % while total ANC patients reduced by 44 %; and total LRE admissions reduced by 35.3 %.

CONCLUSIONS

Despite increased health professionals (workdays) per patient in LRE, mortality rate and still birth rate increased by 60.2 % and 23 % respectively indicating worsening of efficiency which is direct hidden negative psychological impact of pandemic immediately calling for the need of positive counselling and proper psychiatric care of both the health professionals and patients.

KEY WORDS

Covid-19, Pandemic, Still Birth Rate

Corresponding Author:

*Dr. Punit Hans,
C/O Sri Paramhans Kumar,
Hans Niketan, Mukhopadhyaya Colony,
Opp. Bazar Samiti Main Gate,
Near Rampur Road, P.O – Mahendru,
Patna - 800006, Bihar, India,
E-mail: punit.1628@gmail.com*

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BACKGROUND

The first case of Covid-19 in India was reported on 30 January 2020. The World Health Organisation declared the novel coronavirus disease 2019 (Covid-19) outbreak as a global pandemic on March 11, 2020.¹ First case of Covid-19 was seen in Bihar on 22 March 2020 and India enforced one of the world's largest lockdowns on 25th March 2020² to minimize the impact of the Covid-19 pandemic. According to WHO, people, efforts and medical supplies all shift to respond to the emergency. This often leads to the neglect of basic and regular essential health services. People with health problems unrelated to the epidemic find it harder to get access to health care services.³ The health workforce has been further reduced by nosocomial Covid-19 infection.⁴ The vast majority of stillbirths, 84 %, occurred in low and lower-middle-income countries.⁵ A 50 % reduction in health services due to the pandemic could cause nearly 200 000 additional stillbirths over a 12-month period in 117 low and middle-income countries. This corresponds to an increase in the number of stillbirths by 11.1 %.⁵ Healthcare professionals already work under highly stressful conditions in labour room emergency and added to their anxiety due to pandemic of Covid-19, adverse effects on doctors and patients are more evident.

As such to know the Covid-19 pandemic mental and physical health effects on non Covid-19 healthcare professionals and its impact on women healthcare in a tertiary centre and coping strategy of a low-income setting (human development index 0.576 in 2018) state Bihar from India (third most populated state, with maternal mortality ratio 294, infant mortality rate 52, institutional delivery 51.9 %, mothers with full ante natal check-up 6 % in the year 2012)⁶ this study was done. This study was conducted to know the impact of pandemic on women health indicators.

METHODS

Study Design and Participants

This was a case-control study conducted in the Department of Obstetrics and Gynaecology at Patna Medical College and Hospital, Patna, Bihar. Study period was of six months from 1st April 2020 to 30th September 2020. This study was conducted to analyse the effect of Covid-19 pandemic on a tertiary health care centre in Bihar, and its impact on overall care of female patients with special emphasis on maternal care. They were divided into two groups. All the patients except Covid-19 positive cases, coming to department of GOPD (Gynaecology Outpatient), ANC (Ante-Natal Care) and LRE (Labour Room Emergency) were included in the study. Patients coming to department from April 2019 to September 2019 which included a total of 20,961 were in "pre Covid-19" group acting as control while those who came from April 2020 to September 2020 total of 8,859 were in "during Covid-19" group as case. Cross-sectional study was done on "during Covid-19" group.

Data Sources

Data was collected during duties and matched with the record room of hospital. Records of all health parameters for patients

were reviewed, the parameters with incomplete data were excluded from the study. All the data was arranged on Microsoft Excel 2010 Ink. and calculations were done on this spreadsheet. Health parameters were then divided into two groups as patient input indicators and healthcare efficiency indicators. Number of patients visited GOPD, ANC and admitted in LRE comprised patient input indicators (implying hospital avoiding attitude) while delivery rate, D& E rate, still birth rate and mortality rate comprised healthcare efficiency indicators.

Definitions and Measurements

Delivery rate is the total number of deliveries (lower segment caesarean section (LSCS) and normal vaginal deliveries (NVD)) per 100 LRE admissions. Still birth rate is total still births per 100 deliveries. D & E rate is total number of D & E per 100 LRE admissions and Mortality rate is total number of deaths per 100 LRE admissions.

For studying the effect of pandemic, month wise comparison was done between two groups for each indicator and then percent change for each indicator were graded. Grades for pandemic effects on efficiency indicators = \pm delivery rate change % \pm still birth rate change % \pm D & E rate change % \pm mortality rate change % (changes have to be added or subtracted according to their direction of improvement or deterioration, it will be opposite for still birth rate and mortality rate). Grades for combined lockdown and pandemic effects on input indicators = \pm % change in GOPD \pm % change in ANC (LRE is not included as emergency services were not under lockdown). Changes in LRE admissions were graded as \pm % change. Healthcare professionals on monthly rotation duty or temporary duty were all excluded so study was done on total 30 junior doctors (of second and third year only) as they were working regularly in LRE since April 2019 and active cases only confirmed with reverse transcriptase polymerase chain reaction (RT-PCR) test for Covid-19 were included in study. To study the effect of shortage of healthcare professionals due to Covid-19 infection and deployment in Covid-19 duty, total work days available per 100 LRE admissions were calculated for each month in both the study groups.

Total work days available (W) = total work days - lost work days

Total work days = total number of employee \times total working days

Lost workdays = sum of each employee absent days.

Alternatively,

$W = \text{Number of employees (fixed) working per day (D)} \times \text{number of working days} - \text{absence days for each employee}$

Assuming total working days as fixed variable and no other leave, total workdays available (W) were directly proportional to the total number of employees. In our scenario (assuming no other leave as its emergency services): Each junior doctor works in LRE two days per week and total 10 days per month, so total working days = 10.

Total work days available (W) = total number of junior doctors (30) \times total working days (10 or 11) per junior doctor - number of deployed junior doctors \times total working days per junior doctor - Covid-19 absent days (for one week - 2 days,

for two weeks - 4 days, for 3 weeks - 6 days). Or, in pre pandemic, W = D × 30 or 31 days.

Statistical Analysis

Comparison table was constructed for the external factors influencing the efficiency in both the study groups. Chi-square test was applied and P value calculated for the difference of total numbers in each indicator between two groups. Month wise performance of healthcare in relation to number of active cases in Bihar was studied on area graph. Data for active cases (on 15th of each month) in Bihar was collected from the website and twitter handle of health department of Bihar.⁷

Student's t-test was applied to measure the effect of pandemic on indicators. Pearson coefficient of correlation was used to predict the relation between the various indicators. To lower the bias due to festivals and seasonal variations, same months from both years (2019 and 2020) were included in the study. Healthcare professionals were also same in both groups.

RESULTS

As in Table 2, overall patients visiting our department dropped down from 21,361 to 8859 (by 58.5 %). GOPD patients were decreased by 74 % while total ANC patients decreased by 44 %. During the six months of Covid-19, elective cases dropped drastically by 97 % mainly due to decreased input, confusion and reluctance of patients. Overall mortality rate also increased by 60.2 %.

Factors	2019	2020
Tertiary centre	Same	Same
Infrastructure	Same	Same
Population	Same	Same
Time period	Same	Same
Seasons	Same	Same
Group of health professionals	Same	Same
Pandemic (Covid-19) media reporting	Absent	Present
Active cases in population	Absent	Present
Active cases among health professionals	Absent	Present
Avg. workdays per 100 LRE admission	44.2	63.2 (increased)

Table 1. Table of Comparison of External Factors

Indicators	2019	2020	% Change	
Patient input indicators (P-value are calculated with Chi-square 2 × 2 contingency table of each indicator with total patients visit)				
GOPD	11470	2970	74.1 (decrease)	P < 0.00001
ANC	5684	3169	44.24 (decrease)	P < 0.00001
LRE admissions	4207	2720	35.3 (decrease)	P < 0.00001
Total patients visit	21361	8859	58.5 (decrease)	
Healthcare efficiency indicators (P-value are calculated with Chi-square test 2 × 2 contingency table)				
% LSCS	34.8 (1465 / 4207)	32.75 (891 / 2720)	5.8 (decrease)	P = 0.212
% NVD	34.9 (1470 / 4207)	39.37 (1071 / 2720)	12.8 (increase)	P = 0.011
% D & E	3.77 (159 / 4207)	3.1 (85 / 2720)	17.7 (decrease)	P = 0.163
Still birth rate	5.93 (174 / 2935)	7.3 (143 / 1962)	23 (increase)	P = 0.076
Mortality rate	1.33 (56 / 4207)	2.13 (58 / 2720)	60.2 (increase)	P = 0.0118

Table 2. Comparison of Health Indicators of the Two Study Periods Pre Covid-19 and during Covid-19

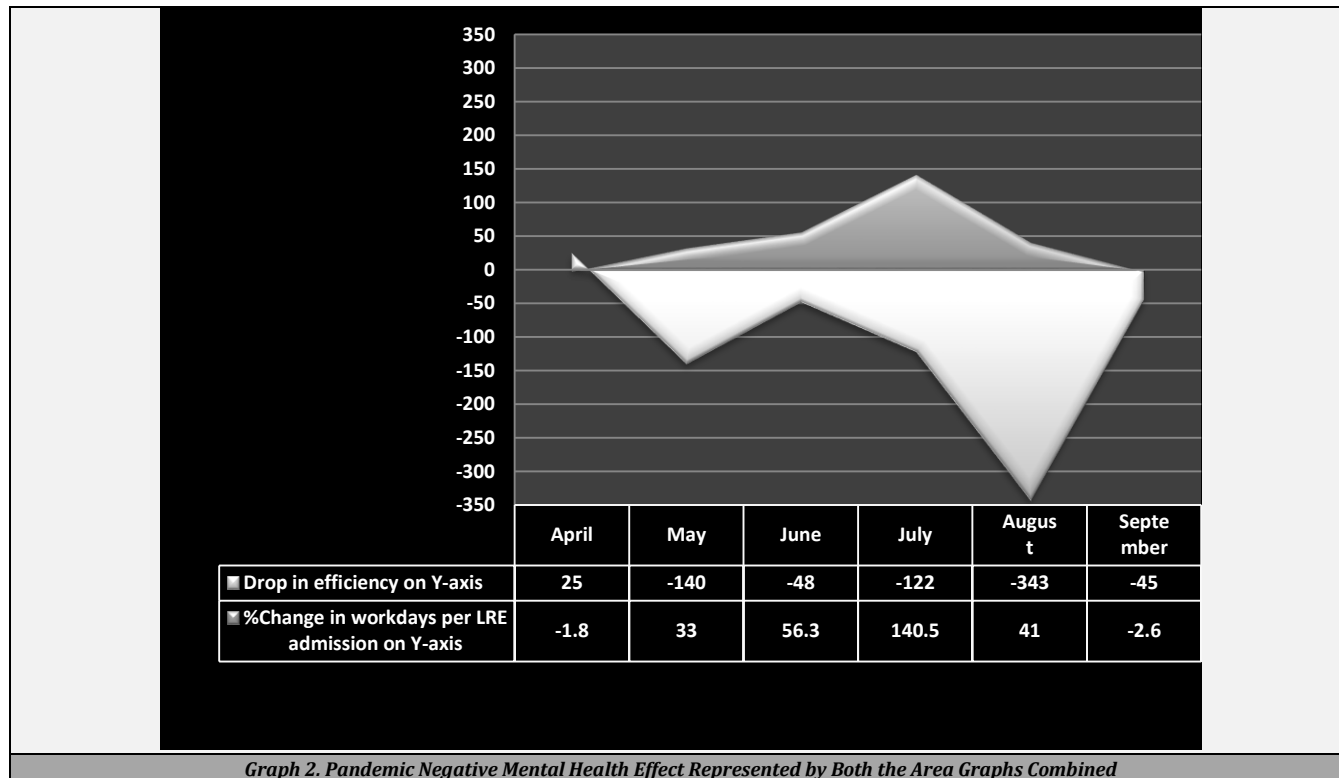
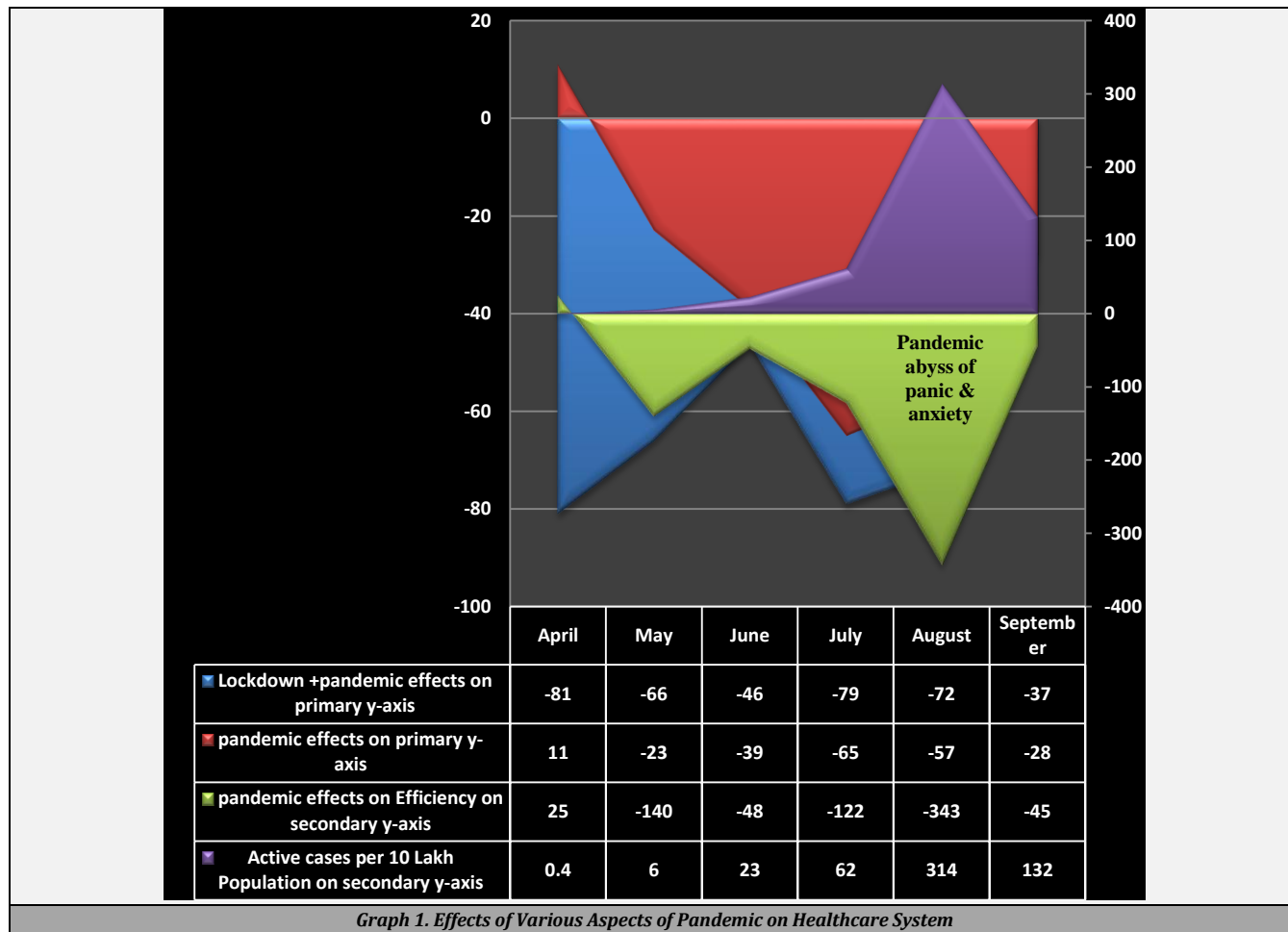
Month	2019 Still Birth Rate	2020 Still Birth Rate	% Change Still Birth Rate	2019 Mortality Rate	2020 Mortality Rate	% Change Mortality	2019 D & E Rate	2020 D & E Rate	% Change D & E	
April	5.95	7.36	- 23.7	9.1	1.256	- 38	3.4	5.02	+47.6	
May	5.96	6.79	- 13.9	1.2	2.9	- 142	4	4.65	+16.25	
June	7.86	6.45	+17.9	1.91	2.35	- 23	3.6	2.35	- 34.7	
July	6.18	9.95	- 61	1.48	1.52	- 2.7	4.1	1.14	- 72	
Aug	4.24	8.88	- 109	1.07	3.01	- 181	4.1	2.08	- 49	
Sept	6.02	5.76	+4.3	1.39	1.75	- 25.9	3	2.1	- 30	
Overall pandemic effects on efficiency (all figures rounded)										
Month	2019 delivery rate	2020 delivery rate	% change delivery rate	2019 LRE admission	2020 LRE admission	Effect on LRE admission	2019 work days available per 100 admission	2020 work days available per 100 admission		
April	58.4	70.7	+39	546	557	+11 (2.01 %)	55	54		
May	68	68.4	0	666	516	- 150 (22.5 %)	45	60		
June	71	64.9	- 8.59	626	382	- 244 (38.97 %)	48	75		
July	67.4	76.4	+13.3	743	263	- 480 (64.6 %)	42	101		
Aug	75.89	73.08	- 3.7	838	431	- 480 (57.27 %)	37	52		
Sept	73.7	78.98	+7.1	788	571	- 217 (27.5 %)	38	37		
Combined lock down & epidemic effect - ANC + GOPD										
Month	2019 GOPD	2020 GOPD	% change GOPD	2019 ANC	2020 ANC	% change ANC	Active cases in Bihar on 15 th of each month			
April	1993	200	- 1793	991	380	- 611	- 2404 (80.5 %)		45	
May	1910	429	- 1481	1034	559	- 475	- 1956 (66.44 %)		632	
June	1756	690	- 1066	885	729	- 156	- 1222 (46.27 %)		2357	
July	1979	311	- 1668	1061	330	- 731	- 2399 (78.9 %)		6482	
Aug	1931	376	- 1555	880	411	- 469	- 2024 (72 %)		32,715	
Sept	1901	964	- 937	833	760	- 73	- 1010 (36.94 %)		13,731	

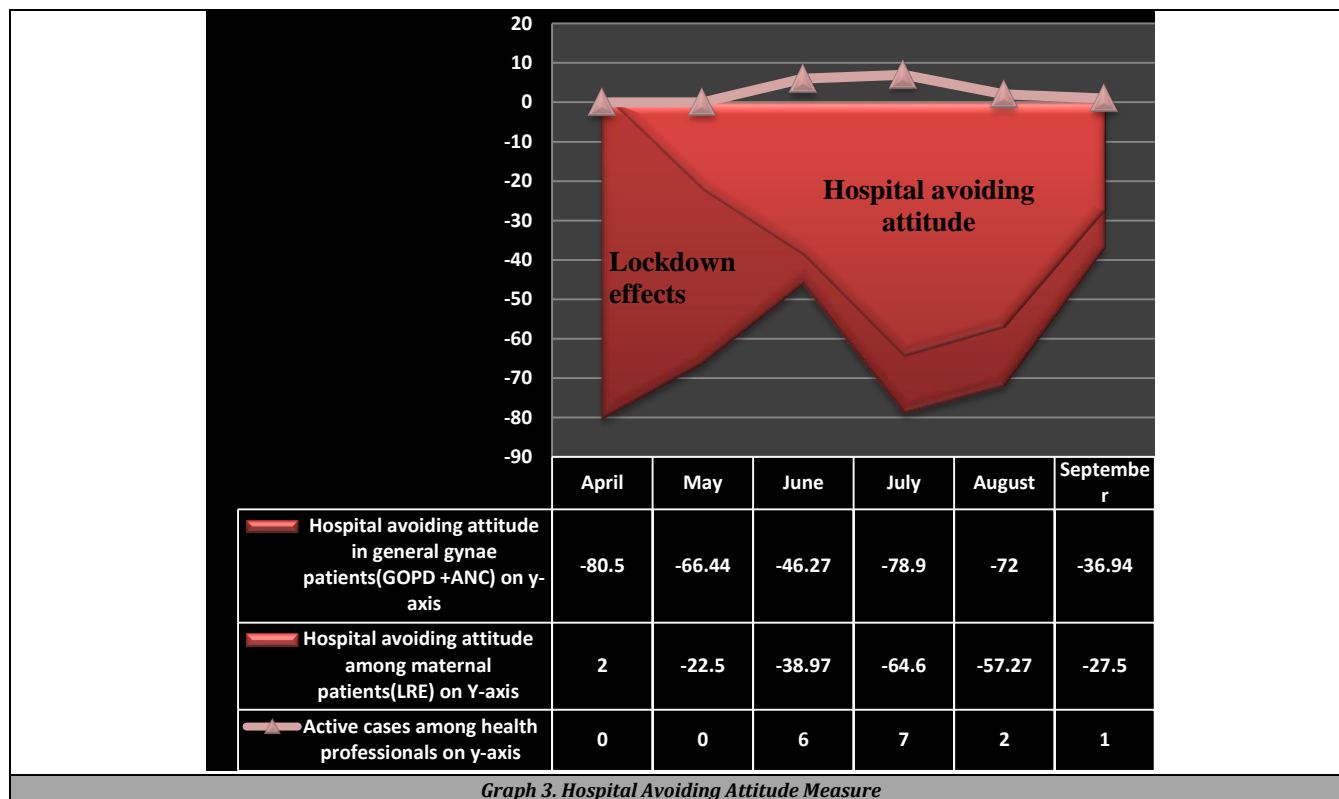
Table 3. Monthly Comparison and Changes of Healthcare Efficiency Indicators and Patient Input Indicators between the Two Groups of the Study

According to Table 3, the t-test value and P-value for pandemic effects on health indicators were: still birth rate t-value = 1.87369 and P-value = .045229, mortality rate: t = 2.418 and P = .018 (implying increase in still birth rate and mortality due to pandemic effects), D & E rate: t = - 1.217 and P = .125, total delivery rate: t 0.916 and P = .190, LRE admissions: t = - 3.77 and P = .0018, ANC: t = - 4.965 and P = .00028, GOPD: t = -11.788 and P = < 0.00001. The t-test value for workdays per 100 LRE admissions in the two groups was t

= 2.002, P = 0.036 implying increased workdays per 100 LRE admissions during Covid-19, owing to decreased admissions which overshadowed the effects of shortage of healthcare professionals.

Number of active cases of Covid-19 in the state was found to have strong positive correlation with negative pandemic effects on healthcare efficiency (Pearson coefficient R = 0.8189, P = 0.0462) and moderate positive correlation with negative effects on LRE admissions (R = 0.5446, P = 0.263861).





Graph 3. Hospital Avoiding Attitude Measure

DISCUSSION

As per Table 2, Month of April seems completely unaffected by pandemic as shown by positive change (+ 25) in healthcare efficiency indicators while effects on input indicators were mainly due to lockdown, and initial decision by various government hospitals to shutdown Outpatient Departments (OPDs) and elective cases to prepare for the pandemic. Better results for efficiency indicators can be explained due to phase of ignorance as there was least fear of Covid-19.

Among indicators GOPD ($t = -11.788, P < 0.00001$) seems to be most negatively affected by both pandemic and lockdown effects, while Normal delivery rate showed positive rise which can be attributed to lower admissions and reluctance on part of healthcare professionals for surgical interventions in fear of Covid-19 and difficulty in working with PPE kit.

As per Figure 1, area graph for effect on GOPD and ANC shows two peaks downwards at April and July coinciding with the strict lockdown period by central government in April 2 and reinforcement of lockdown strictness by state government in July (16th to 31st).⁸

The peak (downward) of area graph of LRE admissions effect coincides with the second peak (downward) of area graph of effect on GOPD and ANC, as both were badly affected in July due to add up effect of restrictness by government and upsurge of Covid-19 infections among the healthcare professionals in our health centre, which occurred in last week of June (six junior doctors of the LRE got infected with Covid-19)⁹ leading to increased hospital avoiding attitude of patients.

The area graph for effect on healthcare efficiency shows two peaks (May and August) downwards, first one was during which most of the private clinics were closed,¹⁰ there was denial of treatment due to fear and confusion and slow testing rates for Covid-19 as per only availability of RT-PCR tests making total of high risk pregnancies 72 % and referred cases

21 % of LRE admissions in May which were highest during the study period, leading to increased mortality by 141 % in comparison to May 2019.

Peak of active cases in Bihar (314 per 10 lakh populations on 16 August) strikingly coincided with phase of worst effect on efficiency (shown by negative peak in green) of healthcare. As increased number of people were getting infected and disease was encompassing more healthcare professionals and their family members, creating a cocoon of panic, anxiety and fear leading to mental incompetency exertion due to working in PPE kits and reluctance to treat Covid-19 suspect patients resulted in increased load of morbid, high risk and immediately succumbing maternal patients and increased still birth rate (8.88) in our tertiary health center. In addition to this as two major tertiary healthcare centers were declared dedicated Covid-19 hospital¹¹ so, majority of morbid maternal patients were catered in our center.

Both the area graphs (efficiency and active cases) showed declining trend during September, owing to strong implementation of preventive measures and putting strong efforts on increased testing of people for Covid-19 and emphasis on contact that led to drop of active cases by 58 % and in the meantime increased awareness, > 90 % availability of PPE kits and masks, > 90 % (following of preventive behaviors like wearing masks, social distancing, hand washing among healthcare workers along with use of rapid antigen kit tests for screening of all the patients being admitted, and specially motivating healthcare professionals to work with positive attitude, led to decreased negative effect on efficiency by 87 %.

Figure 2 is a symbolic presentation of deep negative impact on efficiency of health professionals during pandemic leading to worst performance as healers themselves are in need of care. Figure 3 depicts the influence of surge of Covid-19 infection among health professionals on hospital avoiding attitude of patients.

In our study total LRE admissions decreased by 35.3 % slight lower than 49.8 % in a retrospective analysis of deliveries in four tertiary care centers in India done by Kumari V et al.¹² Increase in still birth rate (23 %) was similar to a modelling report by researchers from the Johns Hopkins Bloomberg School of Public Health, that says 13 countries could see a 20 % increase or more in the number of stillbirths over a 12 month period 5 but was much lower than Khalil et al. (JAMA, 2020) study.¹³

According to Tam CW T et al. study, during acute health crises, healthcare services are placed under tremendous pressure, making working life even more stressful than normal.¹⁴

As in this study improvement of efficiency and attitude of patients after full implementation of preventive measures and awareness, proves the perceived efficacy of the training and personal protective equipment that healthcare professionals receive as well as the general quality of organizational leadership and communication similar findings with the other studies.^{15,16,17} These factors are important not just for motivation – they are also associated with better psychological outcomes in healthcare professionals on the front line during epidemics.

CONCLUSIONS

Negative psychological impact of a pandemic could not be ignored. Strong emphasis should be on positive counselling of both the health professionals and patients along with the implementation of preventive measures. Healthcare professionals are also human beings and being affected by the anxiety and fear of any unknown catastrophe is a natural human instinct and with the lack of proper resources to fight against it increases the panic. This explains the worsening of healthcare efficiency with increased active cases. Apprehension due to the rapid spread of the pandemic resulted in hospital avoiding behaviour among pregnant women.

Lockdown appears to be two-edged sword as it prevented the spread of Covid-19, but mortality due to other causes increased. Appearance of rapid antigen kits for screening, was an important step in fighting against pandemic leading to early detection of cases and mitigation of fear of contracting Covid-19 resulting in promptness of healthcare professionals in treating patients.

Limitations of the Study

- Single centre study.
- Long term effects could not be known due to short duration of study.

Data sharing statement provided by the authors is available with the full text of this article at jemds.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jemds.com.

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