Original Article

Impact of COVID-19 Pandemic on Aspirational Districts from Kerala and Maharashtra

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Abstract - The COVID-19 pandemic is the most damaging crisis humanity has faced in recent times. It has undoubtedly left its mark on the world, and its impact will be felt for decades in the future. This impact has not yet been documented in-depth, particularly the effects on health and education in India. The present study explores the impact of the COVID-19 pandemic on the development of health & nutrition as well as education facilities in the most affected districts of the Aspirational District Programme. Two states were identified with the highest overall amounts of covid cases and identified a total of 5 aspirational districts within them. The results showed a general growth in health indicators for most districts, although certain districts in Maharashtra, like Gadchiroli, showed decreases at times. There was a lot of missing data for education indicators, possibly due to the pandemic, which made it hard to draw a conclusion on the growth of education during the pandemic. The pandemic is a definite cause for the lack of data for the education sector. However, in some indicators, the complete absence of data precedes the pandemic, indicating a larger problem is the monitoring of the programme.

I. INTRODUCTION

The COVID-19 pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has had 230 million confirmed cases and 4.72 million deaths in 22 months of existence as of writing this (October 2021) and is one of the deadliest pandemics humankind has ever faced. It has forced most of the world into lockdown at some point and has caused major worldwide economic damage. The first few cases of the novel coronavirus were identified between November to December 2019 in Wuhan, China. By March 2020, the pandemic had spread to India, causing a nationwide lockdown to be enforced [1].

According to a study carried out in May of 2020, the pandemic has had several adverse effects on the Health System of India. Health facilities are focusing on COVID-19 patients, overwhelmed by the pandemic. This has made it harder for patients with other ailments to gain access to care and treatment, and medical emergencies apart from COVID-19 patients are being neglected, as are patients of infectious diseases like TB and HIV/AIDS. The number of new TB cases being reported has gone down significantly since the implementation of nationwide lockdown, as resources are being diverted towards the pandemic response effort [2].

Due to the pandemic, all educational institutions were closed to enforce social distancing. The education system was disrupted and was forced to shift to an online medium. A study from July 2020 investigated the impact of the pandemic on education. The positive impacts included a shift towards a mixture of online and offline learning, allowing students to get the most out of both mediums as well as an enhancement in general digital literacy, arising out of necessity. However, technical problems hampered education, as students and teachers alike were unprepared for this sudden shift, and many lacked technological knowledge. Plus, the digital medium itself is not available to all, causing many unfortunate students to be left behind [3].

In January 2018, the National Institution for Transforming India (NITI) Aayog started the Aspirational Districts Programme (ADP), which focuses on uplifting the most backward districts from all over the country and improving living conditions in these areas. These districts were named 'aspirational districts.' In April 2018, the Champions of change portal was set up by NITI Aayog to monitor the progress of the programme in the aspirational districts [4]. This portal, which is open to the public, provides the data and comprehensive analysis of the 5 key areas of focus of the programme:

  a. Health and Nutrition
  b. Education
  c. Agriculture and Water Resources
  d. Financial inclusion and skill development

e. Basic Infrastructure includes access to roads, potable water, rural electrification, and individual household toilets.

The COVID-19 pandemic has left a very prominent mark on many different sectors, and its effects have not yet truly been documented. Thus, through this study, we plan to investigate the impact of the COVID-19 pandemic had on the development of health and education facilities in aspirational districts from the most covid-affected states, as well as identify districts that may be falling behind. Therefore, we identified the 2 states with the highest overall amounts of covid cases and identified a total of 5 aspirational districts within them. Then, we used the Champions of change portal to examine their performance during the pandemic.

II. METHODOLOGY

A. Aim of the study

The present study explores the impact of the COVID-19 pandemic on the development of health & nutrition as well as education facilities in 5 districts chosen for the Aspirational Districts Programme, from the 2 most covid affected states in India. This study will also identify districts that may require special attention in terms of financial aid or otherwise.

B. Research design

This study used a secondary data analysis research method. A secondary data analysis design allowed this research to answer new research questions that weren't addressed by the original source, considering a real-world event like the COVID-19 pandemic and coming to new conclusions. This method had no control over any other variables.

C. Hypothesis

- **Null Hypothesis 1 -** Health and Nutrition indicators do not show an increase in indicator value during the COVID-19 pandemic
- **Alternate Hypothesis 1 -** Health & Nutrition indicators show an increase in indicator value during the COVID-19 Pandemic
- ❖ **Null Hypothesis 2 -** Education indicators do not show an increase in indicator value during the COVID-19 pandemic
- ❖ **Alternate Hypothesis 2 -** Education indicators show an increase in indicator value during the COVID-19 Pandemic

D. Data Collection Procedure and Analysis

From the 28 Indian states, Kerala and Maharashtra were picked as the 2 most covid-affected states, respectively, with the help of a volunteer-driven crowdsourced dashboard that tracks the coronavirus in India, using state bulletins and official government handles as sources[5]. There were a total of 5 Aspirational Districts between Kerala and Maharashtra, 1 from Kerala and 4 from Maharashtra:

      a. **Kerala -** Wayanad
      b. **Maharashtra -** Gadchiroli, Nandurbar, Osmanabad Washim

Each area of development has several indicators that are used to monitor it, and thus they cover a very broad area together. Growth in these indicators is calculated by "indicator values." The methods of calculating these indicator values vary from indicator to indicator. However, any non-zero indicator value of an indicator indicates growth in the area/indicator it represents. A higher value correlates to faster growth, and a smaller value indicates slower growth. In this study, some indicators from the complete list of indicators have been chosen, and others have not, as all indicators are not meaningful in the context of the COVID-19 pandemic. A list of all Health & Nutrition indicators, as well as all Education indicators, was compiled, and relevant indicators were picked. 7 Health & Nutrition indicators were chosen out of a total of 31 indicators, and 6 Education indicators were chosen out of a total of 9 indicators [6].

List of chosen Health and Nutrition Indicators (H&N):

1. **H&N- 1:** Proportion of Sub centres/ PHCs converted into Health & Wellness Centres (HWCs)
2. **H&N- 2:** Proportion of Primary Health Centres compliant to Indian Public Health Standards
3. **H&N- 3:** Proportion of functional FRUs (First referral units) against the norm of 1 per 5,00,000 population (1 per 3,00,000 for hilly terrain)
4. **H&N- 4:** Proportion of specialist services available in District hospitals against 10* core specialist services
5. **H&N- 5:** Percentage of Anganwadis centres/Urban PHCs reported to have conducted at least one Village Health Sanitation &Nutrition Day / Urban Health Sanitation &Nutrition Day/ respectively in the last month
6. **H&N- 6:** Proportion of Anganwadis with own buildings
7. **H&N- 7:** Percentage of First referral units (FRU) having labour room and obstetrics OT NQAS certified (i.e., meet LaQShya guidelines)

List of chosen Education Indicators (E):

1. **E-1:** Transition Rate - Primary to Upper Primary level
2. **E-2:** Transition Rate - Upper Primary to Secondary level
3. **E-3:** Learning outcomes
    a. Mathematics performance in Class 3
    b. Language performance in Class 3
    c. Mathematics performance in Class 5
    d. Language performance in Class 5
    e. Mathematics performance in Class 8
    f. Language performance in Class 8
4. **E-4:** Female literacy rate (15+ Age group)
5. **E-5:** Percentage of elementary schools complying with RTE specified Pupil-Teacher Ratio
6. **E-6:** Percentage of schools providing textbooks to children within 1 month of the start of the academic session

Data for all indicators across every district was available from March 2018 at an official government dashboard [7]. Data was collected for a period of 30 months, from December 2018 to May 2021. This was further divided into two separate categories according to the pandemic:

1. **Pre Covid Era -** December 2018 to February 2020
2. **Covid Era -** March 2020 to May 2021

Different indicators show changes at different frequencies. Thus, the data collection time was different for different indicators in the programme. Indicators that show change over a longer period are assessed on an annual basis. As the time required to show sufficient change decreases, so does the data collection period, from yearly, to half-yearly, to quarterly and finally, some monthly. For the quarterly process, each year was divided into 4 quarters: January to March, April to June, July to September, October to December. 6 of the indicators being used in this study are quarterly indicators. Thus, the 30 months period was divided into 12 quarters for this study, as follows:

1. **Quarter 1 (Q1)-** December 2018
2. **Quarter 2 (Q2)-** January 2019 to March 2019
3. **Quarter 3 (Q3)-** April 2019 to June 2019
4. **Quarter 4 (Q4)-** July 2019 to September 2019
5. **Quarter 5 (Q5)-** October 2019 to December 2019
6. **Quarter 6 (Q6)-** January 2020 to February 2020
7. **Quarter 7 (Q7)-** March 2020
8. **Quarter 8 (Q8)-** April 2020 to June 2020
9. **Quarter 9 (Q9)-** July 2020 to September 2020
10. **Quarter 10 (Q10)-** October 2020 to December 2020
11. **Quarter 11 (Q11)-**January 2021 to March 2021
12. **Quarter 12 (Q12)-** April 2021 to May 2021

The starting month was December instead of January, and because of this, the quarters here aren't the standard 3-month length. While most quarters do cover the 3 months, quarters 1 and 7 are only one month, and quarters 6 and 12 cover 2 months each. Furthermore, quarter 6, the end of the pre covid era, and quarter 7, the beginning of the covid era, are going to have the exact same data as they are just one quarter split into two for the sake of convenience. Following this, the data was compiled indicator-wise for every district.

III. RESULTS AND DISCUSSION

RESULTS

Data for H&N-1, H&N-2, H&N-3, H&N-4, H&N-5 and H&N-6 was taken on a quarterly basis on the dashboard and thus has been compiled accordingly here.

A. H&N-1: Proportion of Sub centres/ PHCs converted into Health & Wellness Centres (HWCs)
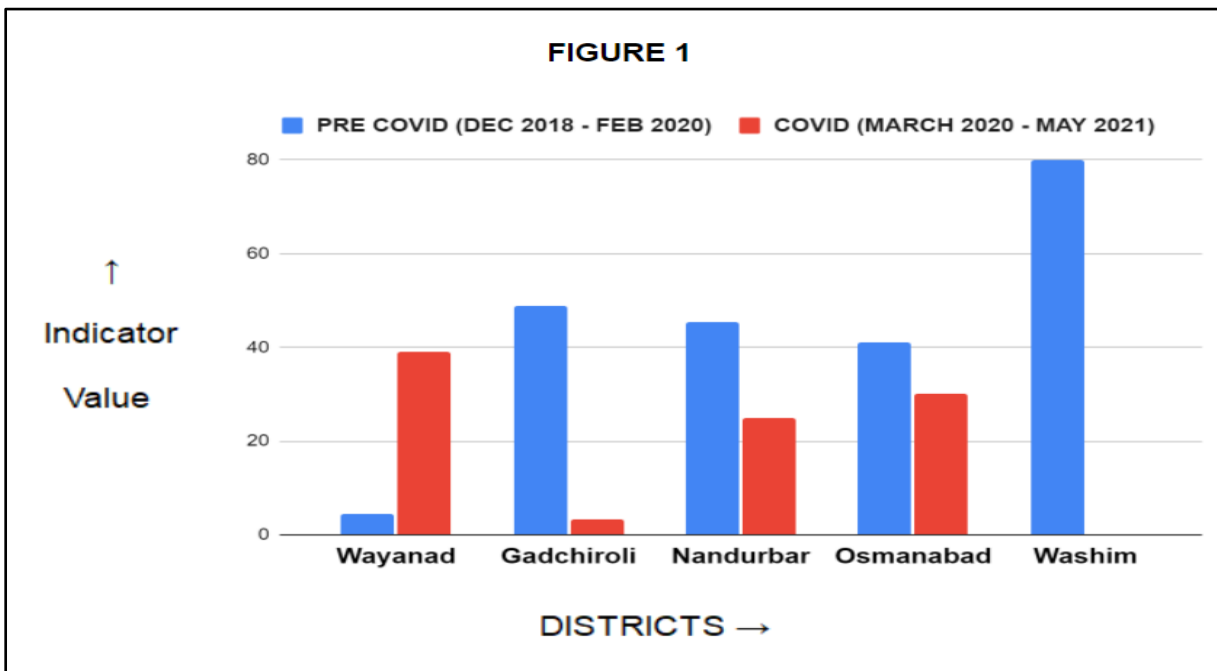

Figure 1: The graph shows the comparison of the total change in indicator value between Pre Covid and Covid Eras
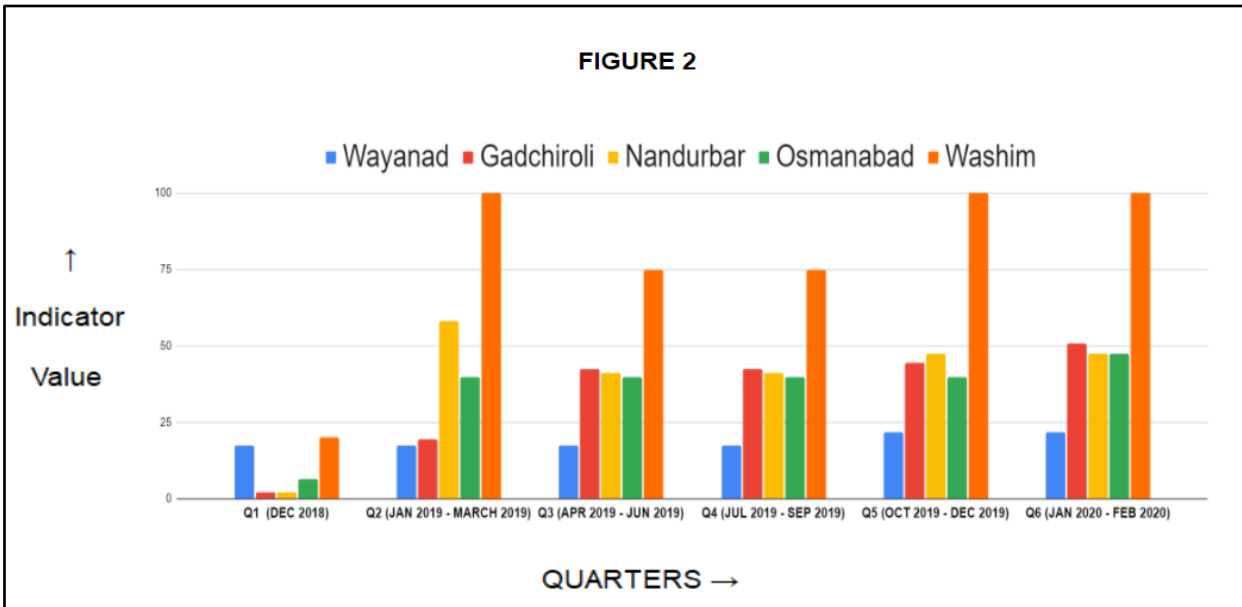
Figure 2: The graph shows the change in indicator value across Pre Covid Era (Q1-Q6)
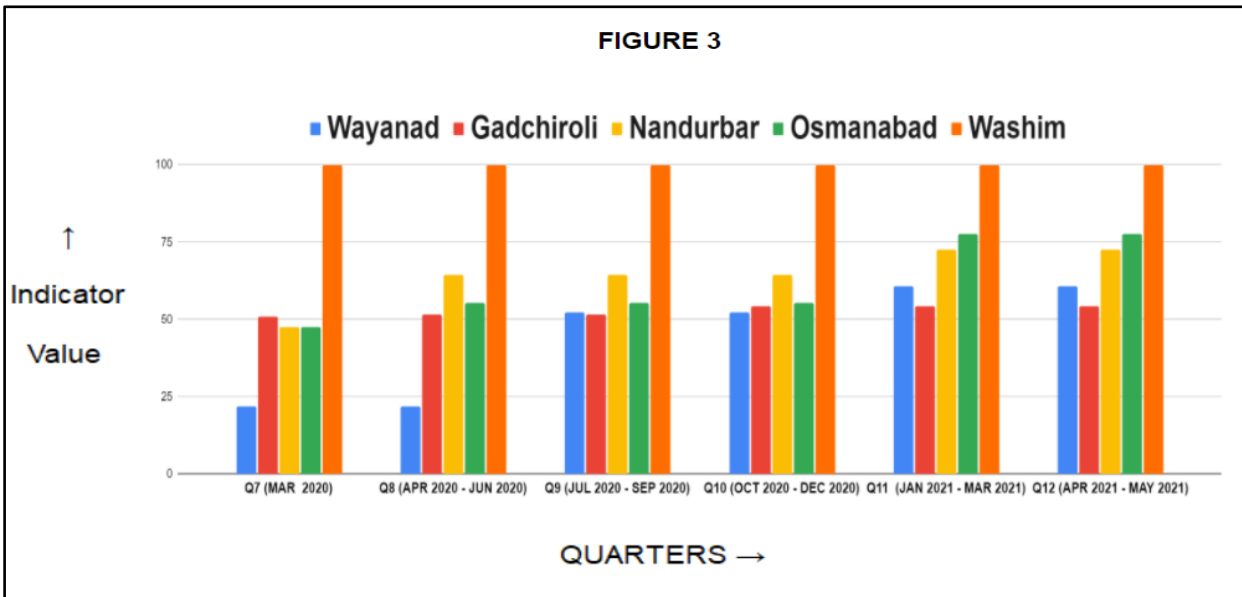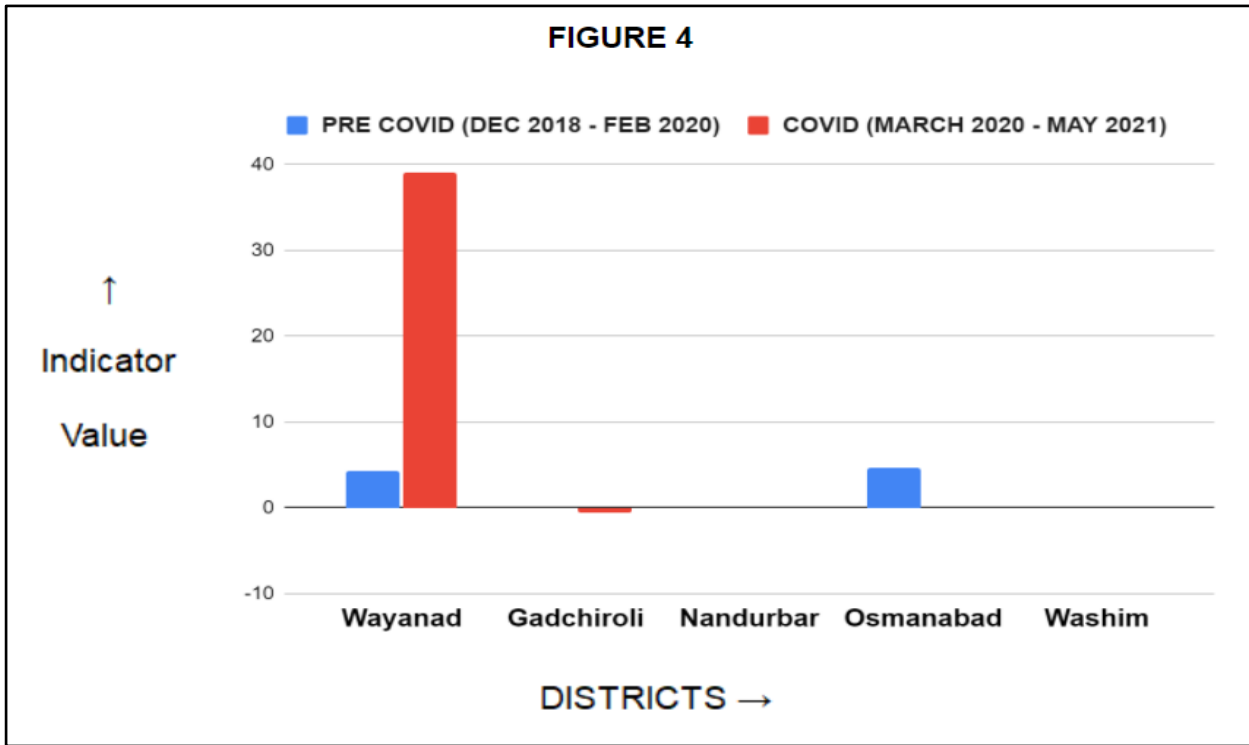

Figure 3: The graph shows the change in indicator value across Covid Era (Q7-Q12)

All aspirational districts see spikes of growth in the Proportion of Sub Centers/Primary Health Centers converted into Health & Wellness Centres during the pre covid era. Wayanad, the lone district from Kerala, is the only district that sees a higher increase in indicator value during the covid era with a value of 39.13 as compared to the pre covid era with an increase of 4.35. The four Maharashtra districts see a lesser increase in indicator value across the covid era as compared to the pre covid era *(Figure 1)*. However, these four districts all had much larger growth in indicator values than Wayanad during the pre covid era, Gadchiroli showing an increase of 48.82, Nandurbar of 45.29, Osmanabad of 41.04 and Washim showing an increase of 80. Washim showed no further increase in indicator value after Q5 but still had the overall highest indicator value out of all the districts *(Figure 2 and 3)*.

B. H&N-2: Proportion of Primary Health Centres compliant to Indian Public Health Standards

Figure 4: The graph shows the comparison of the total change in indicator value between Pre Covid and Covid Eras
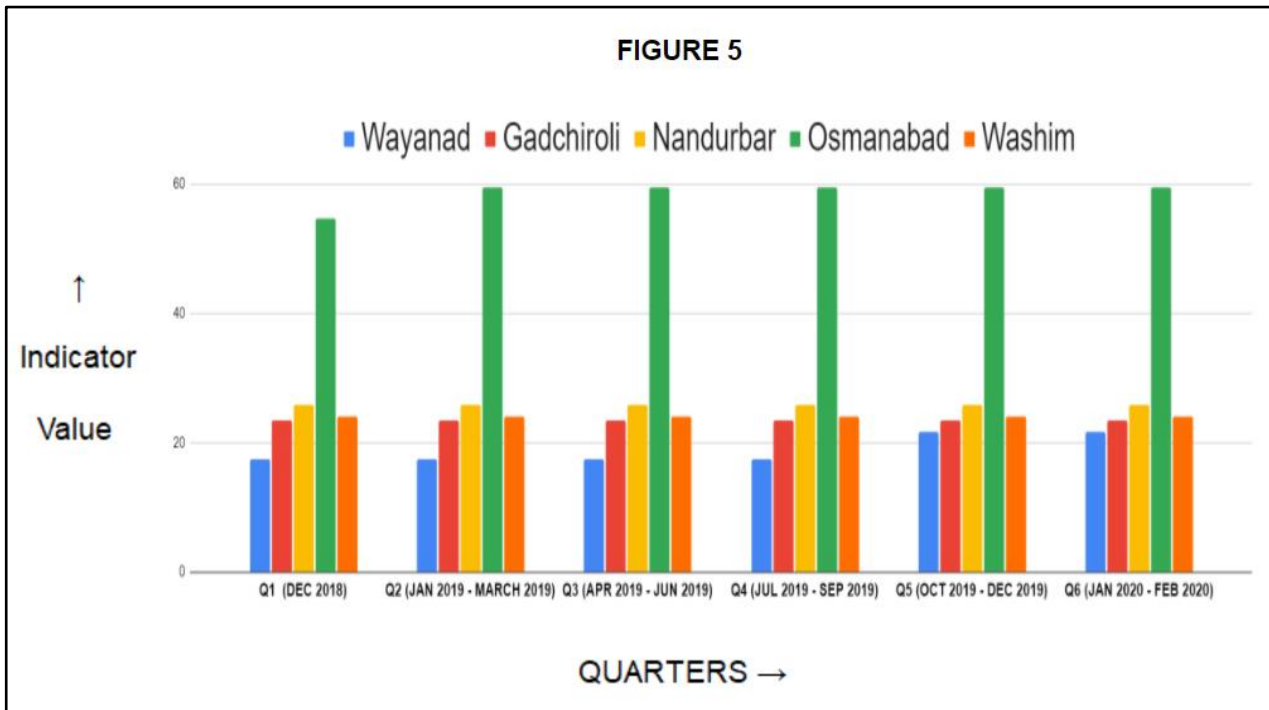

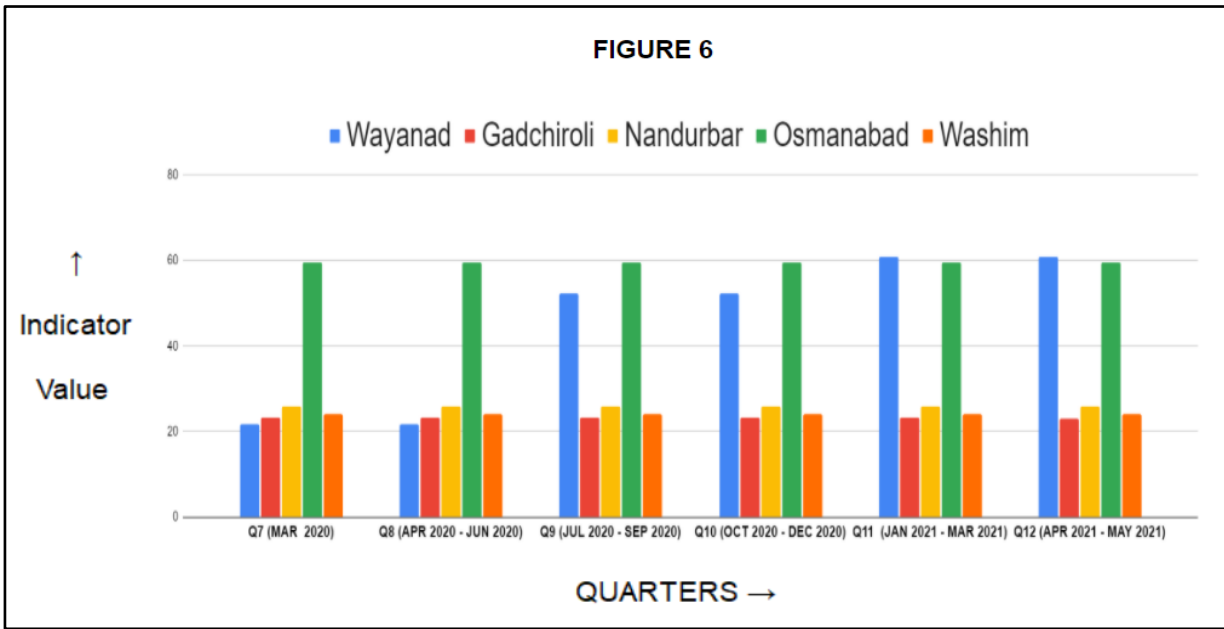**Figure 5 The graph shows the change in indicator value across Pre Covid Era (Q1-Q6)**

Figure 6: The graph shows the change in indicator value across Covid Era (Q7-Q12)

The aspirational districts show varying but continued levels of growth in the Proportion of Primary Health Centres compliant to Indian Public Health Standards during the pre covid era. Wayanad is the only district that sees a higher increase in indicator value for this indicator across the covid era as compared to the pre covid era, with an increase of 4.35 during the pre covid era and 39.13 during the covid era. Nandurbar and Washim show no change in indicator value in the pre covid and covid eras *(Figure 4)*. Osmanabad showed an increase of 4.76 in the value from Q4 to Q5 of the covid era, then stagnated as well. Gadchiroli showed no change in indicator value during the pre covid era and instead saw a slight decrease of 0.48 in overall indicator value during the covid era. This decrease seemingly occurred from Q11 to Q12, right at the end of the covid era, coinciding with the peak of the pandemic's second wave in India *(Figure 5 and 6)*.

C. H&N-3: Proportion of functional FRUs (First referral units) against the norm of 1 per 5,00,000 population (1 per 3,00,000 for hilly terrain)
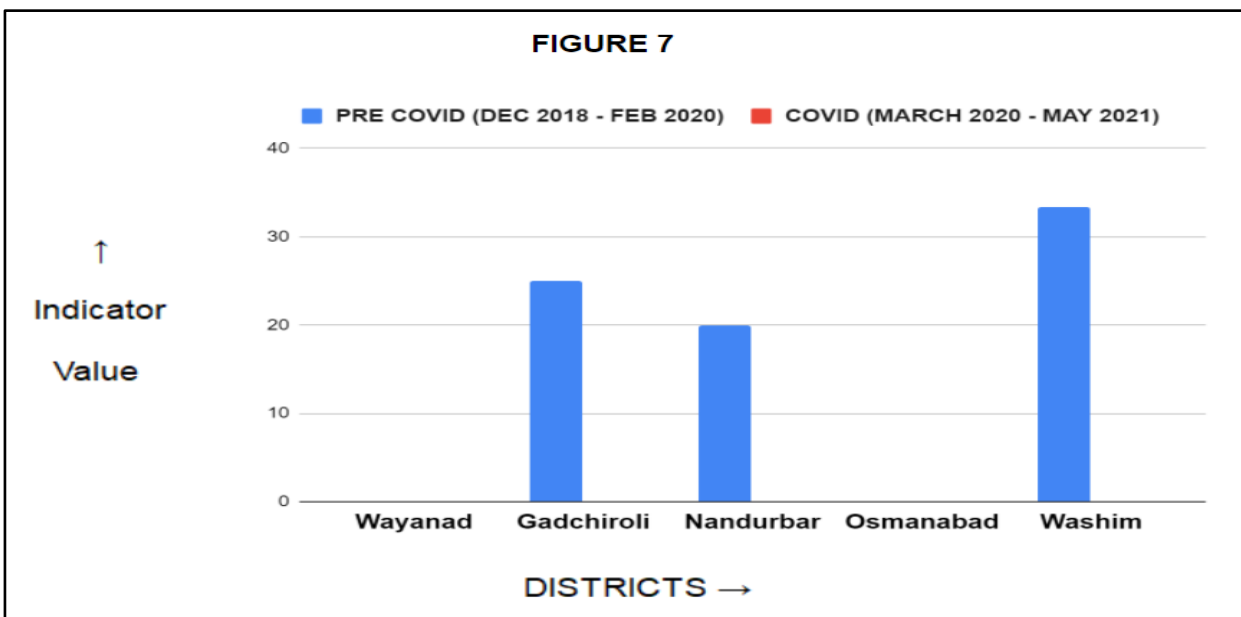

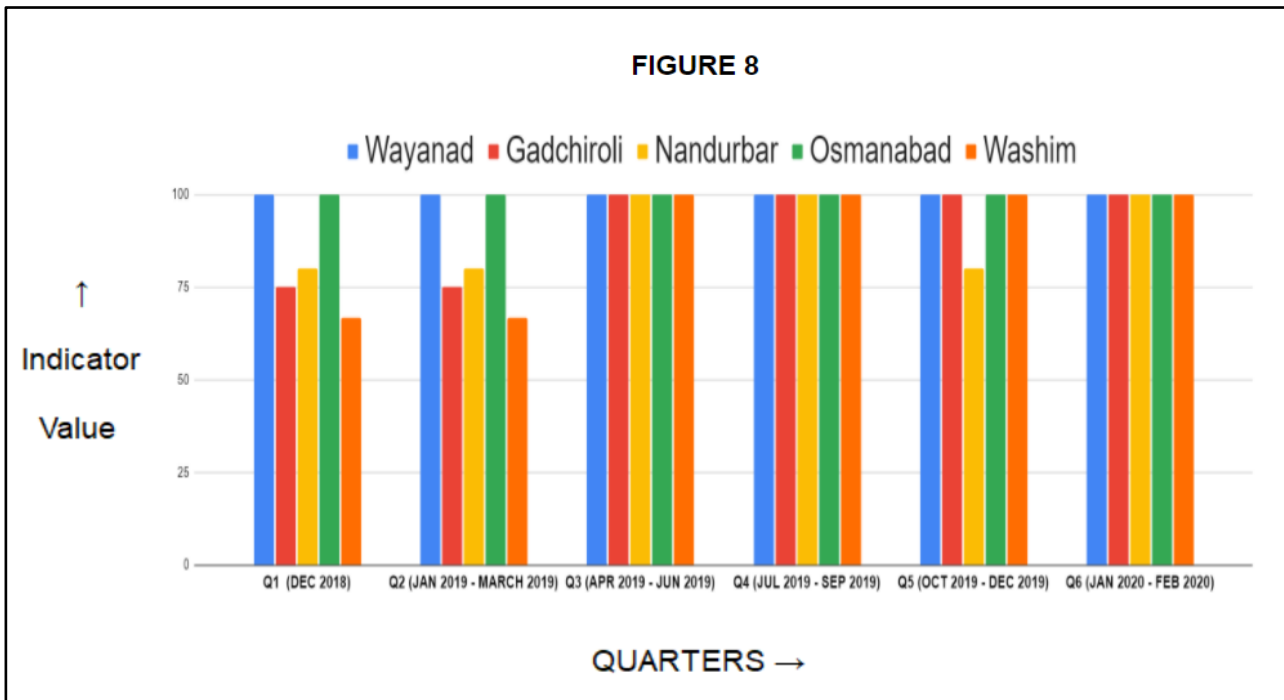**Figure 7: The graph shows the comparison of the total change in indicator value between Pre Covid and Covid Eras**

Figure 8: The graph shows the change in indicator value across Pre Covid Era (Q1-Q6)
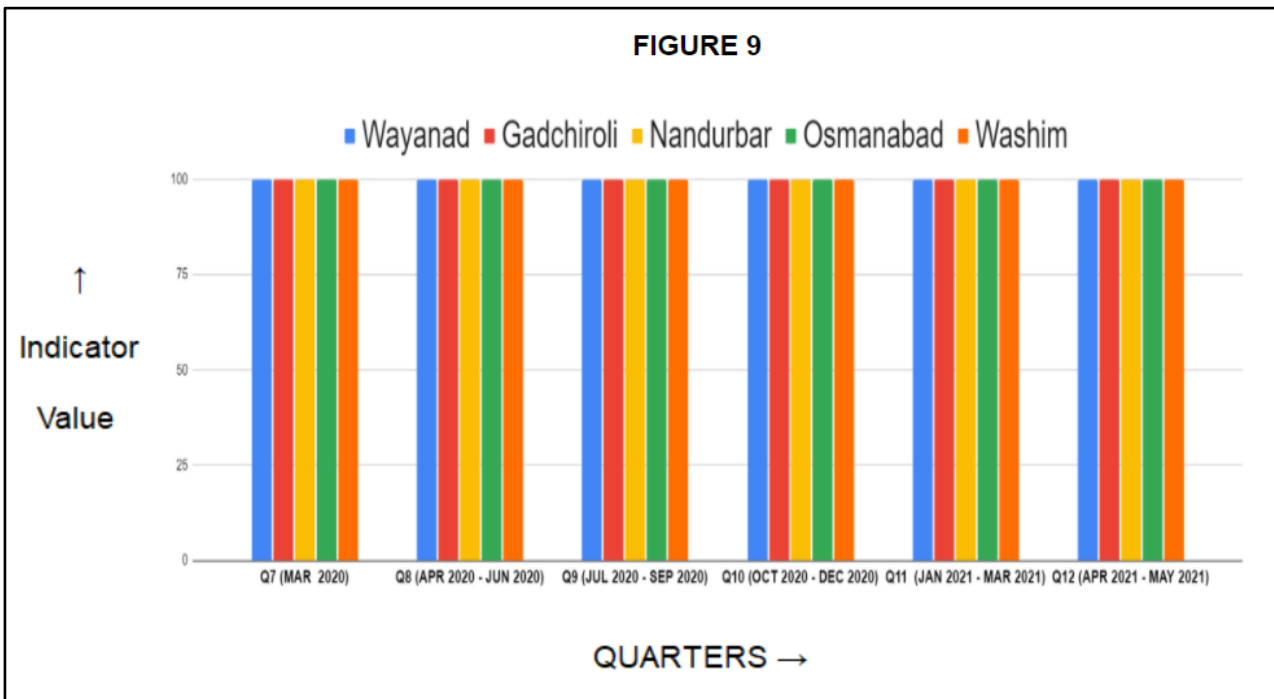

Figure 9 The graph shows the change in indicator value across Covid Era (Q7-Q12)

From the figure, we can see that no district showed any change in the indicator value for the proportion of functional FRUs (First referral units) against the norm during the covid era. No district shows any change in the indicator value during the covid era. Wayanad and Osmanabad showed no increase or decrease in the pre covid era, while Gadchiroli, Nandurbar and Washim show overall increases of 25, 20 and 33.33 in their indicator values, respectively, during the same *(Figure 7)*. For these three districts, there's a common trend of increase in the indicator value during Q3, Q4 and Q5 *(Figure 8)*. In the covid era, however, no district shows any increase or decrease in indicator value. However, it should be noted that all the districts show roughly equal and very high levels of growth throughout the 30 month period. In fact, every district ended with an indicator value of 100, which may be a factor in the stagnation of the indicator value *(Figure 9)*.

D. H&N-4: Proportion of specialist services available in District hospitals against 10* core specialist services
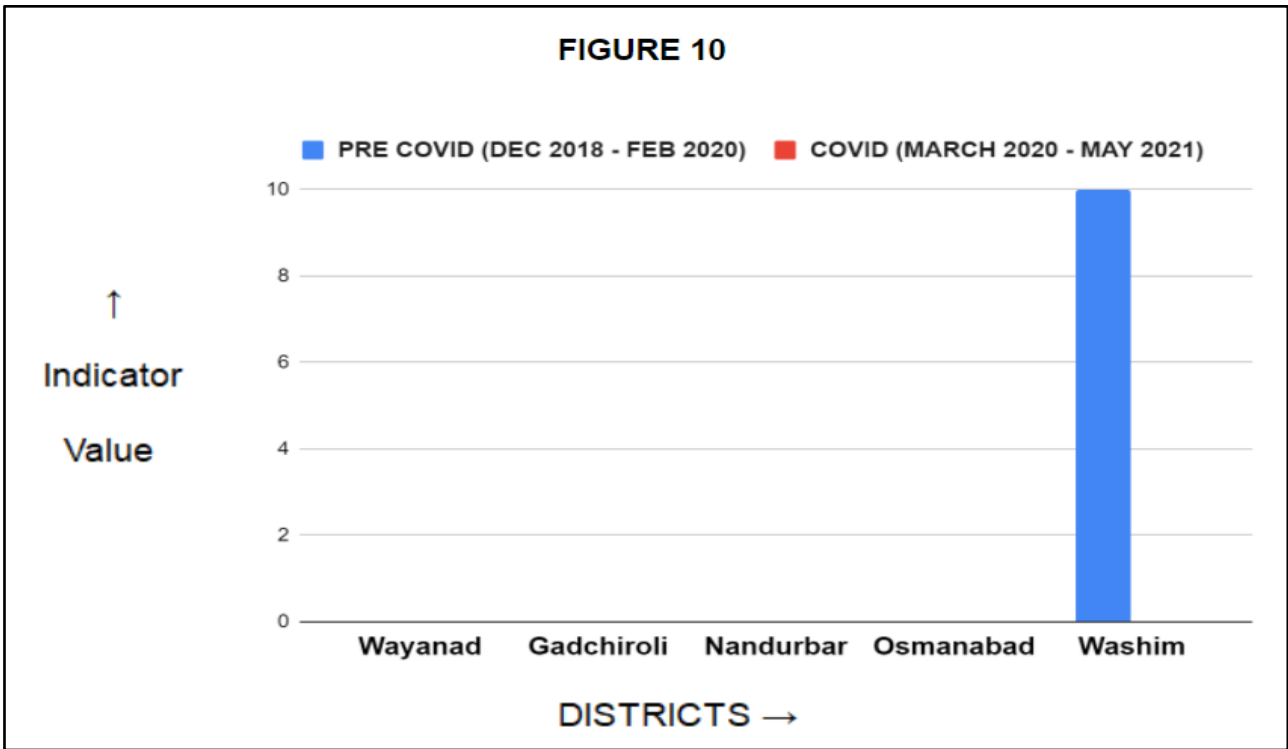

Figure 10: The graph shows the comparison of the total change in indicator value between Pre Covid and Covid Eras
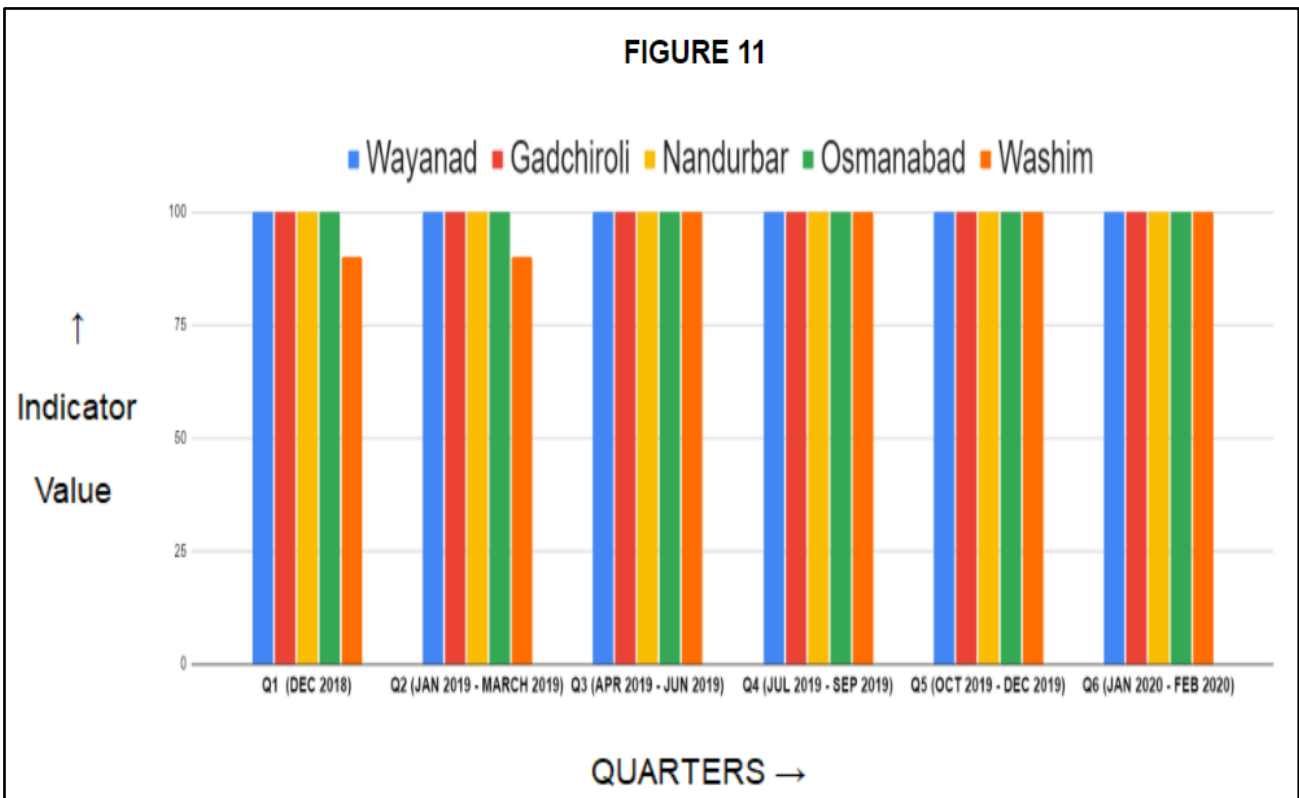

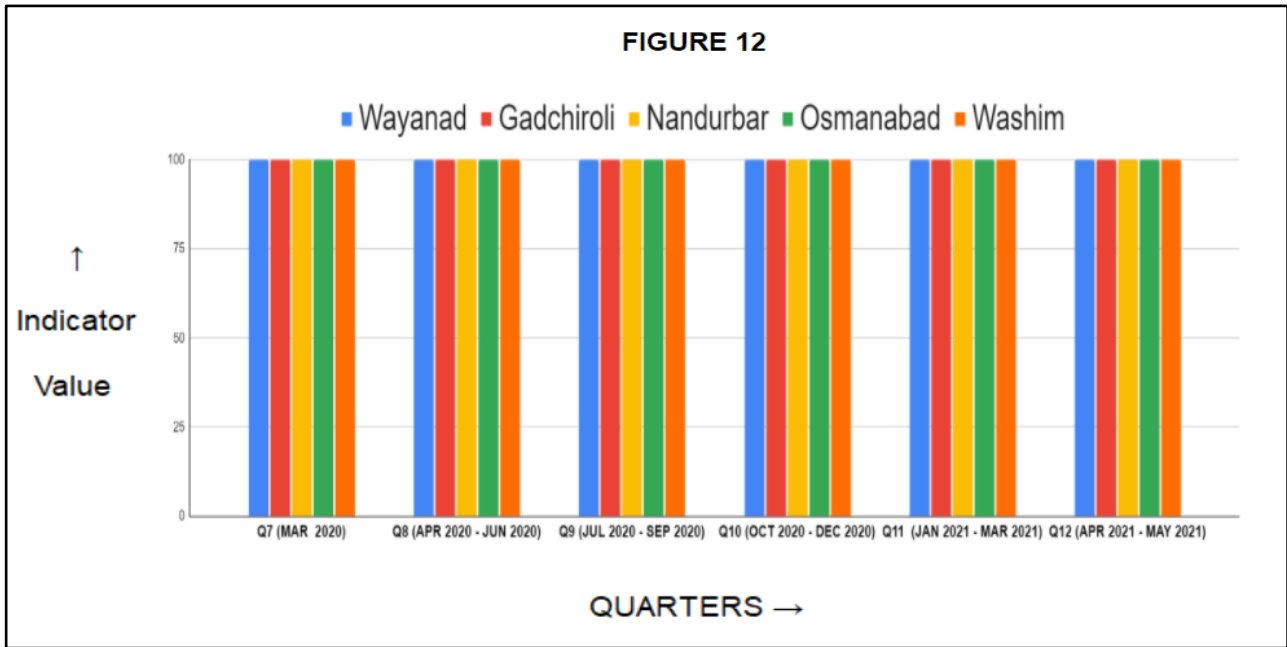**Figure 11: The graph shows the change in indicator value across Pre Covid Era (Q1-Q6)**

Figure 12: The graph shows the change in indicator value across Covid Era (Q7-Q12)

All districts show high levels of growth in the proportion of specialist services available in District hospitals against 10* core specialist services. Wayanad, Gadchiroli, Nandurbar and Osmanabad showed no increase or decrease in the indicator value, Washim being the only district that showed a change, an overall increase of 10 in the indicator value during the pre covid era *(Figure 10)*. This change comes during the pre covid era, with the only change being an increase between Q2 and Q3 *(Figure 11)*. In the covid era, no district shows any increase or decrease in indicator value *(Figure 12)*. However, just like with the precious Indicator, *H&N-4*, all the districts show roughly equal and very high levels of growth throughout the pre covid and covid eras. Every district did end the pre covid and covid eras with 100 as the indicator value, which may be a factor in the apparent stagnation of growth for this indicator as well.

E. H&N-5: Percentage of Anganwadis centres/Urban PHCs reported to have conducted at least one Village Health Sanitation &Nutrition Day / Urban Health Sanitation &Nutrition Day/ respectively in the last month
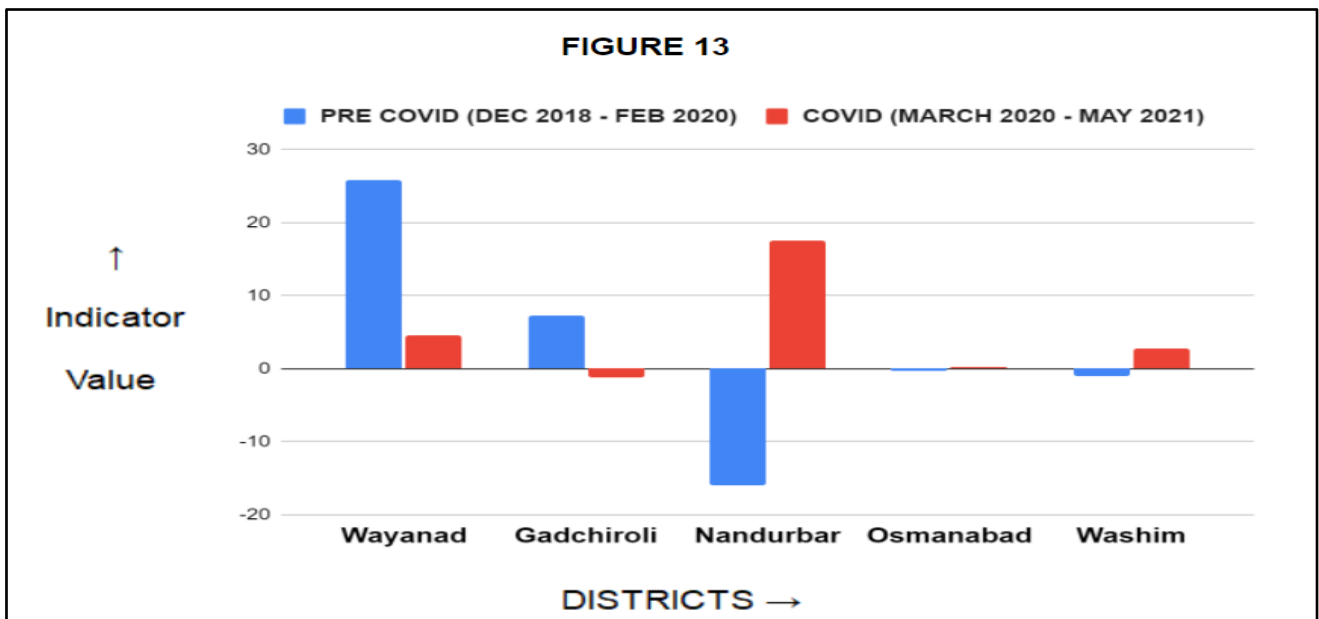

Figure 13: The graph shows the comparison of the total change in indicator value between Pre Covid and Covid Eras
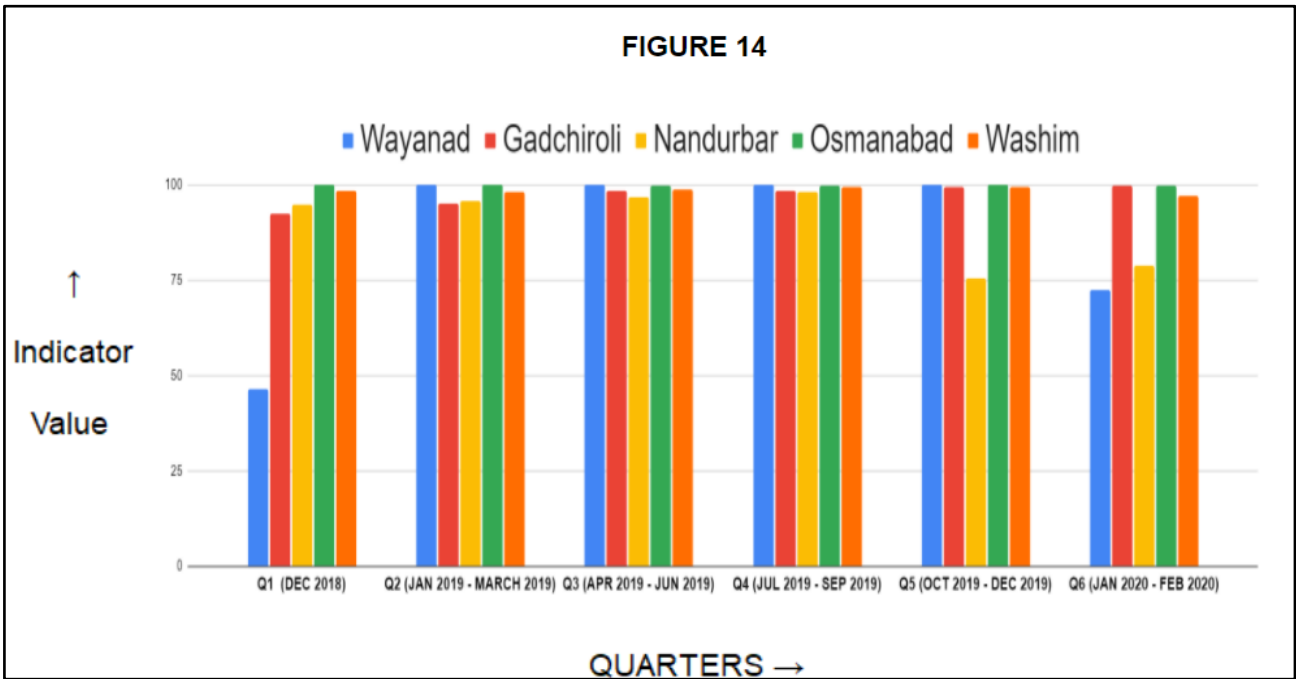
Figure 14: The graph shows the change in indicator value across Pre Covid Era (Q1-Q6)
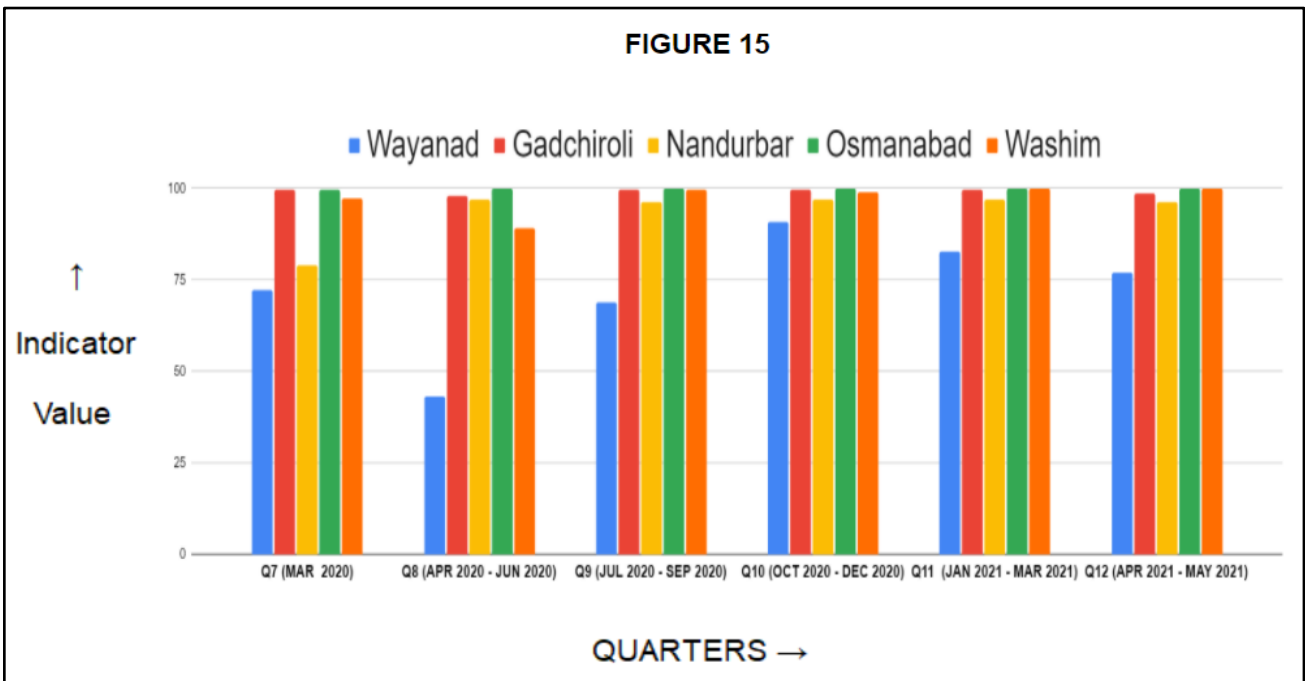

Figure 15: The graph shows the change in indicator value across Covid Era (Q7-Q12)

The percentage of Anganwadis centres/Urban PHCs reported to have conducted at least one Village Health Sanitation &Nutrition Day / Urban Health Sanitation &Nutrition Day/ respectively in the last one month has increased at varying levels of growth over the 30-month period. Gadchiroli showed a growth of 7.26 during the pre covid era. Wayanad showed an increase of 25.86 in the indicator value during the pre covid era and continued to do so throughout the covid era, albeit with a lesser increase of 4.58*(Figure 13)*. In Maharashtra, all districts except Gadchiroli showed a *decrease* in the indicator value during the pre covid era, then bounced back and showed an increase during the covid era. All districts apart from Gadchiroli, including Wayanad, showed a decrease in the indicator value from Q4 to Q6*(Figure 14)*. After showing an increase during the pre covid era, Gadchiroli showed a decrease of 1.13 in the overall indicator value during the covid era.

This decrease happened in Q12, coinciding with the second wave of the pandemic*(Figure 15)*. However, once again, it should be noted that all the Maharashtra districts show close and very high levels of growth throughout, which may be a factor in the slight dip of the indicator value in Gadchiroli.

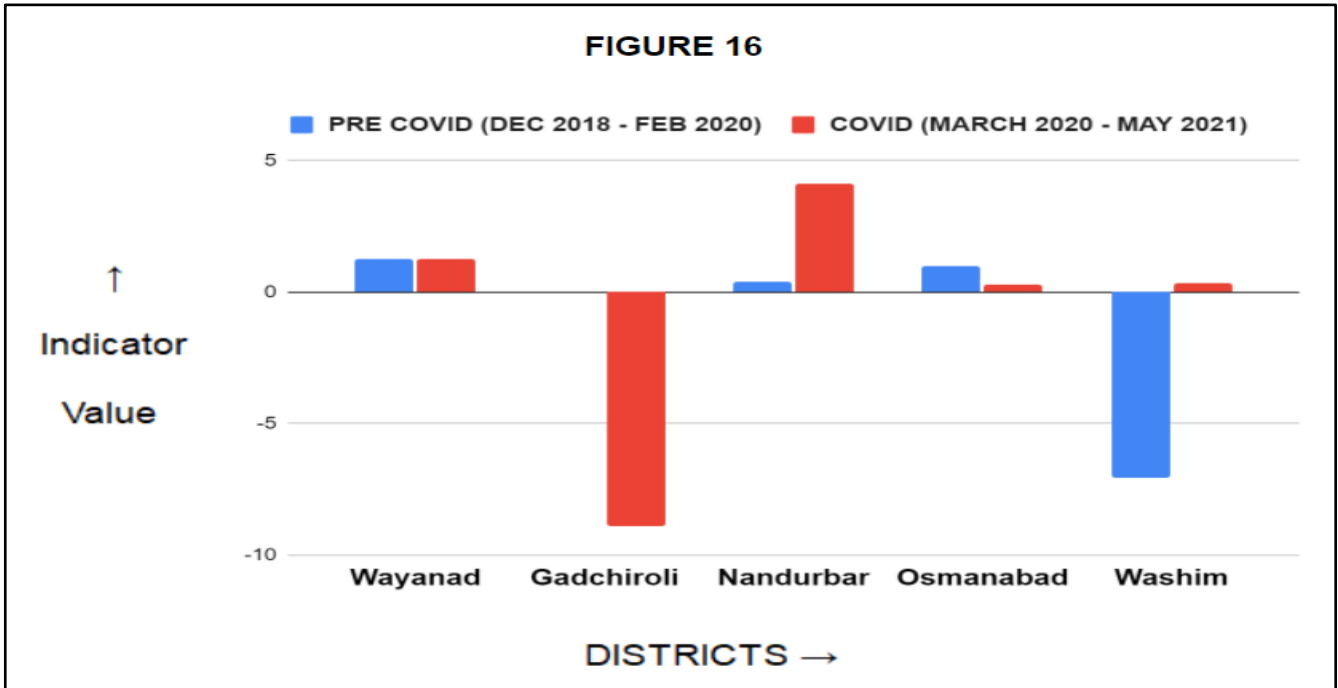*F. H&N-6: Proportion of Anganwadis with own buildings*

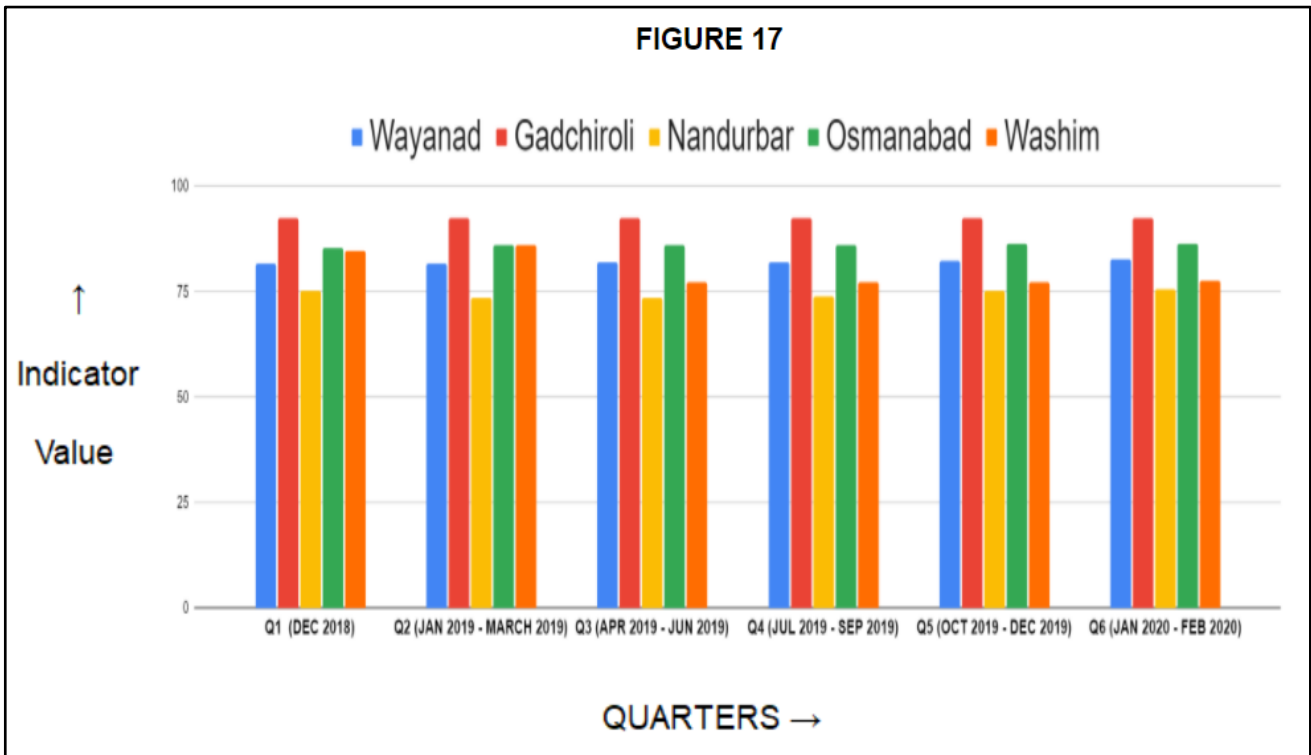**Figure 16: The graph shows the comparison of total change in indicator value between Pre Covid and Covid Eras**

Figure 17: The graph shows the change in indicator value across Pre Covid Era (Q1-Q6)
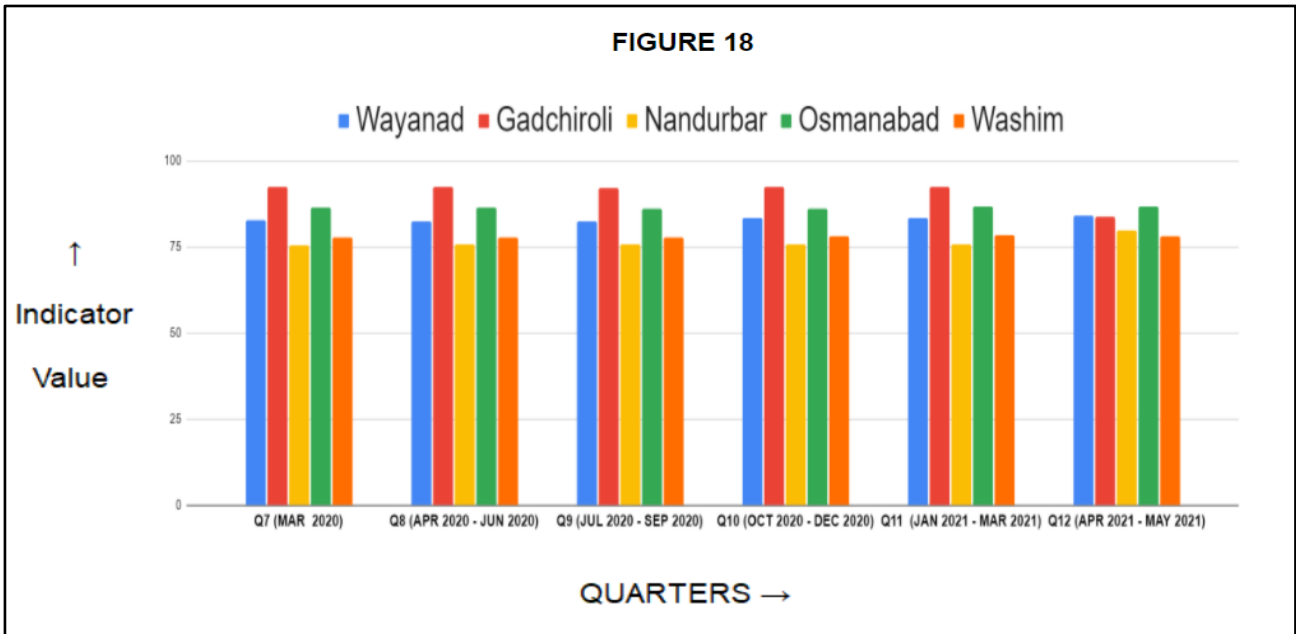
Figure 18: The graph shows the change in indicator value across Covid Era (Q7-Q12)

The indicator value of the Proportion of Anganwadis with their own buildings continued to increase at a constant rate of 1.26 in Wayanad throughout the pre covid and covid eras. Nandurbar and Osmanabad continue to show varying levels of growth throughout the 30 month period, showing an increase in the indicator value across the pre covid and covid eras. Gadchiroli and Washim, on the other hand, see an overall decrease in the indicator value *(Figure 16)*. Washim saw a decrease of 7.08 in indicator value during the pre covid era, between Q2 and Q3, and Gadchiroli showed no increase during the pre covid era *(Figure 17)*. Washim then saw a gradual overall increase during the covid era, but Gadchiroli showed a decrease of 8.92 in the indicator value during the covid era, specifically between Q11 and Q12, coinciding with the second wave of the pandemic in India *(Figure 18)*.

Data for both H&N-7 and E-5 was taken on a monthly basis on the dashboard and thus had been compiled accordingly here.

G. H&N-7: Percentage of First referral units (FRU) having labour room and obstetrics OT NQAS certified (i.e., meet LaQShya guidelines)
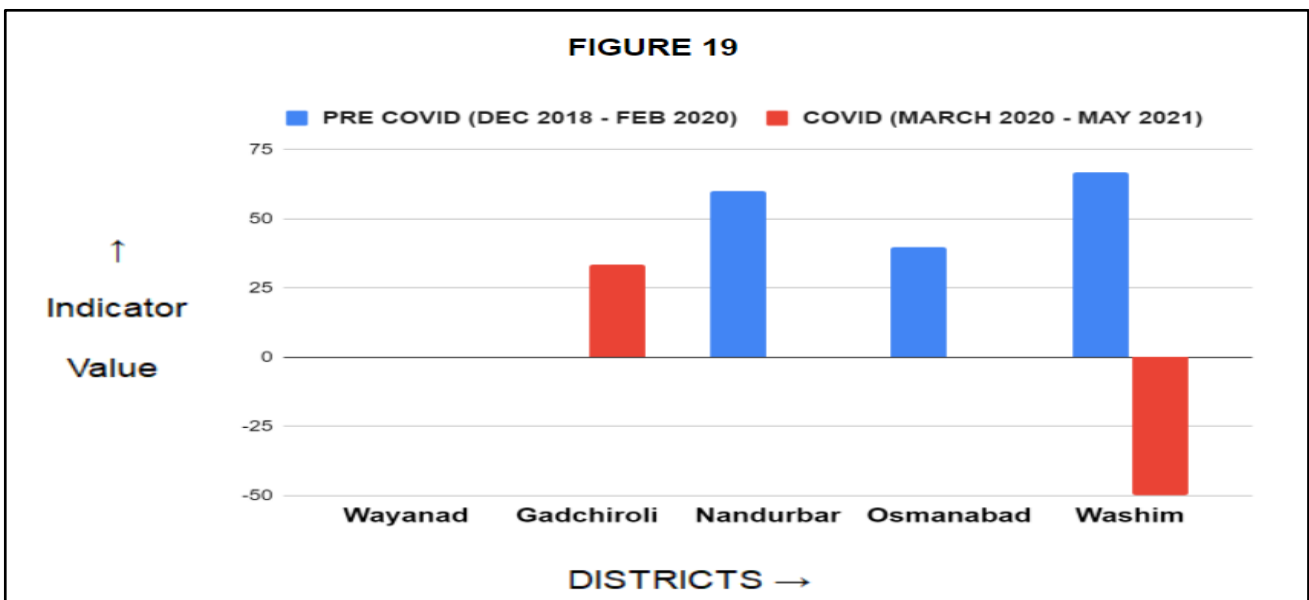

Figure 19: The graph shows the comparison of the total change in indicator value between Pre Covid and Covid Eras
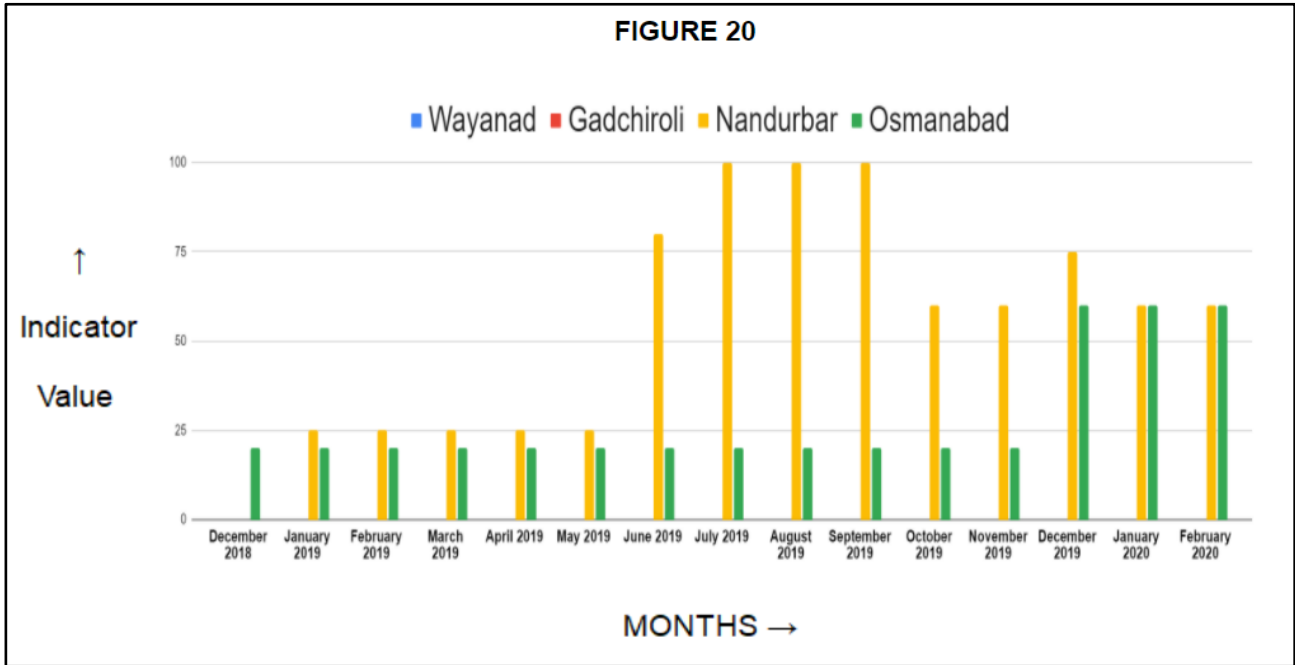
Figure 20: The graph shows the change in indicator value across Pre Covid Era (December 2018- February 2020)
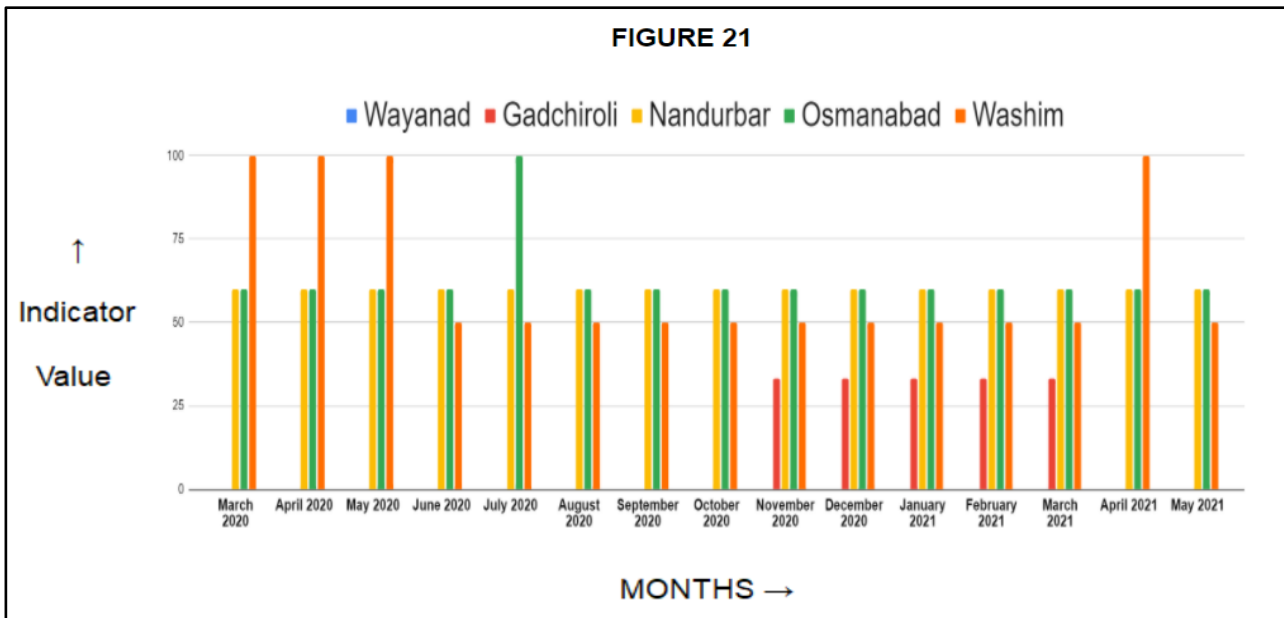

Figure 21: The graph shows the change in indicator value across Covid Era (March 2020-May 2021)

Gadchiroli is the only district that shows a higher increase during the covid era in the percentage of First referral units (FRU) having labour room and obstetrics OT NQAS certified, with a value of 33.33. All the other districts either show no change or show a decline in the indicator value during the pre covid era. Wayanad and Gadchiroli had no increase in indicator value during the pre covid era, with Wayanad not showing any growth in the covid era either. Nandurbar and Osmanabad showed varying levels of growth throughout the pre covid era, showing overall increases of 60 and 40 respectively, then stagnated at constant indicator values for the duration of the covid era. *(Figure 19)*. Midway through the covid era, starting from September 2020, data for Washim stops being available here. Gadchiroli showed some growth during the covid era, from November 2020 to March 2021, before data stopped being available. Washim looks like it had an overall increase of 66.7 in the value during the pre covid era. However, it needs to be noted that data for Washim in the pre covid era was only available during the last month, February 2020, so this date may not be representative of the actual growth. Washim had a fluctuating indicator value and an overall decrease of 50 in the indicator value over the covid era *(Figure 20 and 21)*.

H. E-5: Percentage of elementary schools complying with RTE specified Pupil-Teacher Ratio
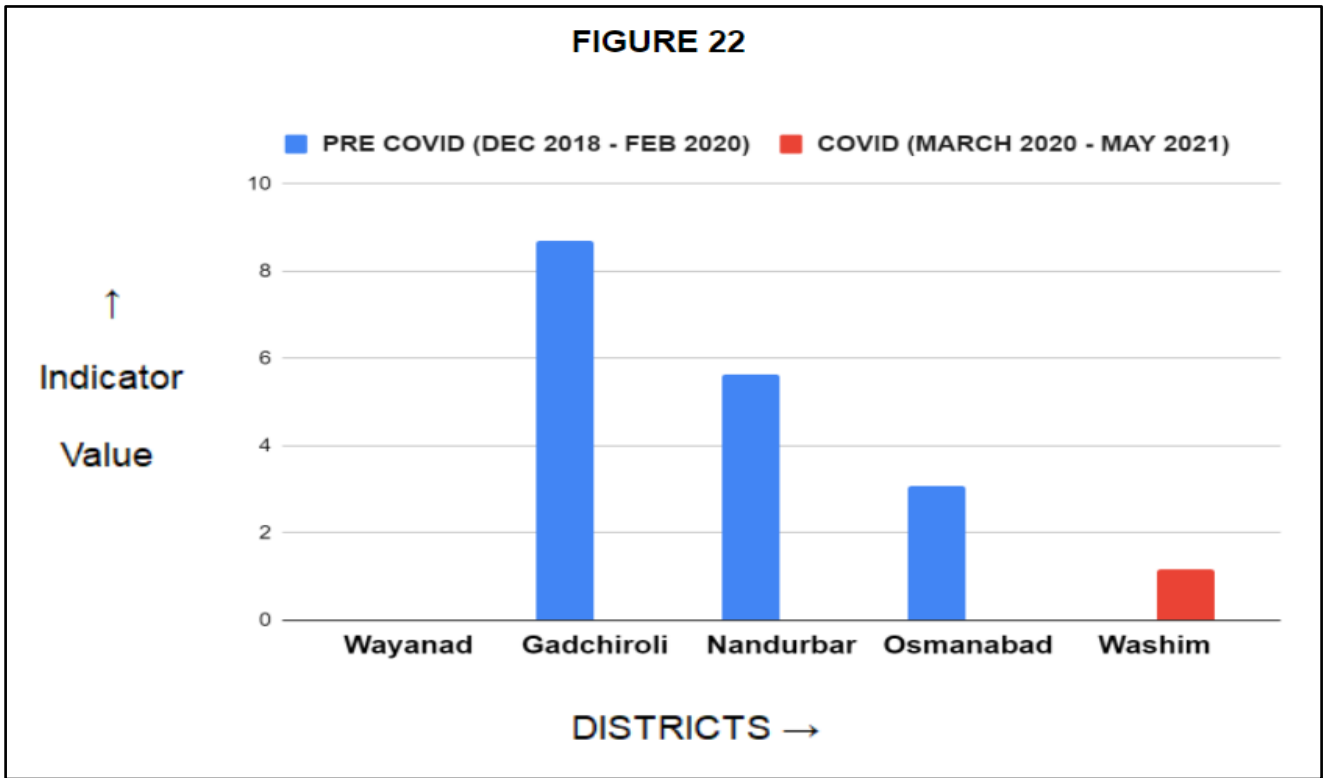

Figure 22: The graph shows the comparison of the total change in indicator value between Pre Covid and Covid Eras
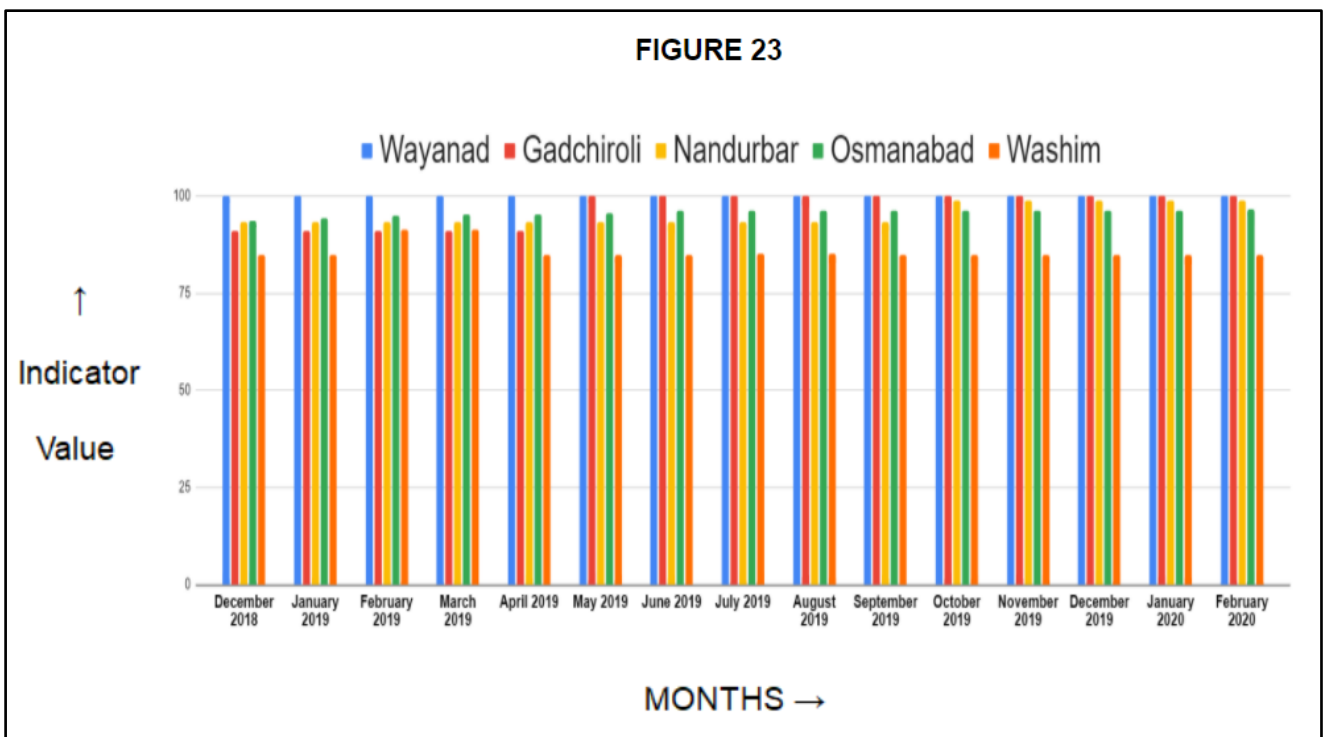

Figure 23: The graph shows the change in indicator value across Pre Covid Era (December 2018- February 2020)
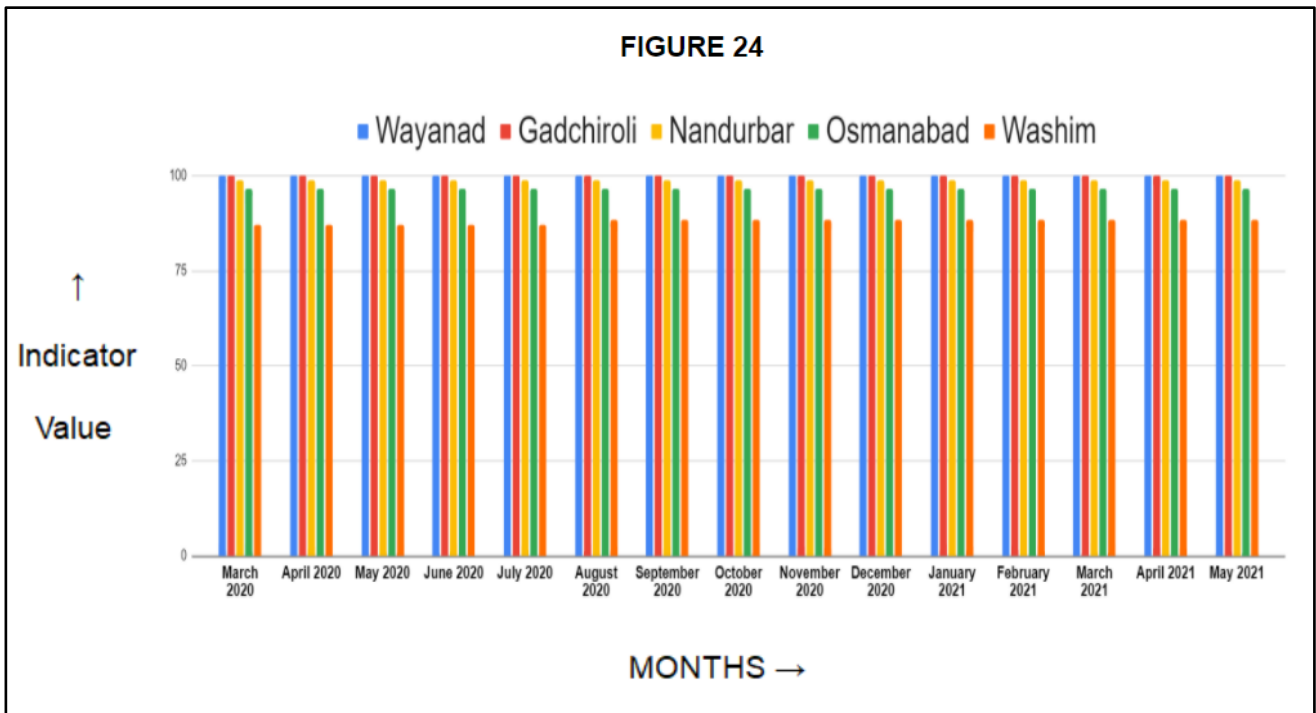
Figure 24: The graph shows the change in indicator value across Covid Era (March 2020-May 2021)

All 5 districts maintained a high level of growth of the Percentage of elementary schools complying with RTE specified Pupil-Teacher Ratio throughout the pre covid and covid era. From figure 22, we can see that except for Washim, no district saw an increase in the indicator value during the covid era *(Figure 22)*. Wayanad maintains the highest level of growth with an indicator value of 100 throughout the 30 months. Gadchiroli, Nandurbar and Osmanabad all show some increase in indicator value during the pre covid era, before stagnating in the covid era. Washim's indicator values fluctuated, going from 84.84 to 91.27 between January 2019 and February 2019, before returning to 84.84 in April 2019. There was another jump to a value of 85.28 between June 2019 to July 2019, before once again returning to 84.84 in September 2019, remaining stagnant for the remaining pre covid era, showing no overall change in growth rate. This saw an immediate jump to 87.06 at the beginning of the covid era, further moving to 88.23 in August 2020 and showing no further change *(Figure 23 and 24)*.

IV. DISCUSSION

For Health Indicators, most districts either showed an increase in the indicator value or maintained a high indicator value throughout. Wayanad showed an increase in the value during the covid era for indicators *H&N-1, H&N-2, H&N-5* and *H&N-6*. For indicators *H&N-3* and *H&N-7,* Wayanad maintained constant growth throughout, showing no increase or decrease in the indicator value. Finally, for indicator *H&N-4,* Wayanad did not show any increase or decrease either; but it did also have a high indicator value of 100 throughout the 30-month period.

Gadchiroli showed an increase in the value during the covid era for indicators *H&N-1* and *H&N-7*. For indicators *H&N-2, H&N-5* and *H&N-6,* Gadchiroli showed an overall decrease in the indicator value. However, it must be noted that these decreases were never large, and the indicator value generally remained high afterwards. Finally, for indicators *H&N-3* and *H&N-4,* Gadchiroli did not show any increase or decrease but had a very high indicator value of 100 throughout the pre covid and covid eras.

Nandurbar showed an increase in the value during the covid era for indicators *H&N-1, H&N-5* and *H&N-6*. For *H&N-2,* there was simply no change in the indicator value throughout the 30-month period. Nandurbar's data showed little change for *H&N-3* and none for *H&N-4,* maintaining indicator values of 100 almost throughout for both. Nandurbar showed an overall decrease in the indicator value. Lastly, for indicator *H&N-7* Nandurbar fluctuated during the pre provider but showed no change during the covid era.

Osmanabad showed an increase in the value during the covid era for indicators *H&N-1* and *H&N-6*. For indicators *H&N-2* and *H&N-7,* Osmanabad maintained constant growth throughout, showing no increase or decrease in the indicator value. Same for indicators *H&N-3* and *H&N-4,* but it did also have a high indicator value of 100 throughout the 30-month period, which may have contributed to this. Osmanabad showed little change for *H&N-5* maintaining indicator values of 100 throughout with minute changes.

Washim showed an increase in the value during the covid era for indicators *H&N-5* and *H&N-6*. For *H&N-2*, Washim showed no increase or decreased throughout the 30-month period. Washim showed a decrease in the overall indicator value for *H&N-7*. For indicators *H&N-1, H&N-3* and *H&N-4*, Washim followed a similar trend; some growth during the pre covid era, reaching a value of 100, then showing no increase or decrease in the indicator value during the covid era.

With education indicators, there was a peculiar trend of missing data during the covid era, and as such, our second hypothesis is near impossible to confirm or deny. Only 1 education indicator (E-5) had sufficient data. For this indicator, every district either saw a high indicator value maintained or an increase in the indicator value across the pre covid and covid eras, like the general trend for health indicators. However, for 3 of the total 6 indicators, the dashboard had data up to the beginning of the covid era, around March 2020, where data stopped being available. For the 2 remaining indicators, there was almost no data at all, neither in the covid era nor the pre covid era. The absence of sufficient data for education indicators coinciding with the rise of the pandemic in India may indicate problems in data collection being caused by said pandemic itself. However, the complete absence of data for some other indicators since the very beginning shows that the pandemic might be just one of the factors causing the absence of data for the education sector, indicating a larger problem is the monitoring of the programme.

V. CONCLUSION

In this study, we investigated the impact of the COVID-19 pandemic had on the development of health and education facilities in 5 aspirational districts from the 2 most covid affected states. The results indicate Alternate Hypothesis 1 to have been true, as the districts either show an increase in the indicator value or maintain a high value even when showing a decrease. No district showed particularly slower growth than the others. Gadchiroli had the highest number of indicators where a decrease in overall indicator value was observed. However, in most cases, Gadchirolis actual value remained higher than other districts despite the decrease.

The hypotheses regarding educational indicators have been harder to confirm due to the lack of data. However, the lack of data itself may indicate that the pandemic is a cause for the absence of data for the education sector. But the absence of data precedes the pandemic for certain areas, indicating a larger problem with the data collection procedure of the programme. This study has one single source: the Champions of Change portal. As such, the lack of and possible inaccuracy of data in certain areas may have affected the results. Future researchers could use other existing dashboards used to monitor this programme as their source.

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