



Cover Page



COMPARATIVE STUDY ON PERFORMANCE OF INDIA AND UNITED STATES OF AMERICA AGAINST COVID-19 DURING FIRST QUARTER OF 2023

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ABSTRACT

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is the virus which triggers the highly contagious sickness coronavirus disease 2019 (COVID-19). Over 6 million individuals have died as a result of its terrible effects on the planet. It has turned out to be the most significant worldwide health problem since the 1918 influenza epidemic. During the COVID-19 pandemic spread, infections, hospitalisations, and fatalities differed between and within nations and regions globally, raising concerns regarding COVID-19 risk and mitigating variables. Many researchers have occasionally discovered pandemic evaluation upon factors including severity, precautions, and risk factors for COVID-19, etc. The United States of America (USA) and India, among the leading two COVID-19 afflicted countries, are briefly compared in the current research piece. The Weekly Change Rate (WCR %) of Total Confirmed Cases and Death Cases in both nations is the focus of the study. It should be noted that there are more new cases being reported every day; this evaluation is based on information gathered from WHO websites between 26 December 2022 and 10 April 2023.

Keywords: COVID-19, Respiratory Syndrome, Symptoms, WHO.

INTRODUCTION

The varied group of viruses known as coronaviruses may affect a wide range of animals also cause moderate to severe respiratory diseases in people. In the Chinese city of Wuhan at the close of 2019, a brand-new coronavirus known as SARS-CoV-2 arose and spread an uncommon infectious pneumonia pandemic. This new coronavirus disease, also known as COVID-19 or coronavirus disease 2019, has spread quickly over the world due to its high transmissibility [1].

The increase in cases has been attributed to novel SARS-CoV-2 variations, particularly Delta and Omicron, which are often less harmful and simpler to spread than their ancestral forms. Even though the acute COVID-19 sickness is less severe and lasts less time, lingering symptoms are nonetheless common. The lower respiratory system has been less involved in acute sickness caused by the Omicron variant than in those caused by the variants that came before it. In comparison to illness caused by the Delta variety, it also had a lower probability of hospitalisation. Additionally, those receiving Omicron were twice as inclined to recover in a week despite shorter sickness durations [2]. Although some of these improvements may be attributed to higher degrees of inherent and vaccine-induced immunity, it is significant that those who were hospitalised were often younger, with shorter hospital stays and reduced oxygen requirements for a working-age group. At the end of 2020, a global vaccination campaign against COVID-19 was launched. By June 2022, more than 12 billion doses had been given worldwide. These vaccines have successfully decreased death and hospital stays, delayed transmission, and decreased protracted morbidity. They are based on on conventional vaccine process or new mRNA approaches.

The total number of Covid-19 confirmed cases worldwide had exceeded 180 million, with more than 3.9 million deaths. Like several parts of the world, India and USA have also witnessed a tremendous storm of Covid-19 cases. The country, India and USA have successfully defended the first wave of Covid-19 without any significant mortality or morbidity through several protection measures, but the second wave overwhelmed the health system. With a huge population and an inadequate health system, India lost several lives due to Covid-19 [3].

Based on daily reported cases, the USA and India are currently the top two nations. As of 19 April 2023, there had been 763,740,140 verified cases of COVID-19 documented to WHO, including 6,908,554 fatalities. A total of 13,321,463,740 doses of vaccine have been given as of April 15, 2023. Despite the fact that we are still not safe, medical professionals cautioned us regarding the impending wave of Covid-19. Politicians are especially concerned about the third wave of the Covid-19 epidemic due to the fatal effects that it has on people's lives [4].



Cover Page



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In the present article emphasis is given to analyze the performance of India and USA against COVID-19 from last week of December 2022 to second week of April 2023. For such reason several data has been collected from WHO official websites. This article evaluates the WCR % of both countries to establish a comparative study.

MATERIAL AND METHODS

In this section the data on weekly basis is collected both from India and USA through WHO. The WCR % for total confirmed cases was determined using the formula (1) however; for deaths cases the WCR % was determined by formula (2).

Formula 1:
$$\text{Weekly Change Rate \%} = \frac{\text{Weekly Change in Cases of present week}}{\text{Total Confirmed Cases in previous week}} \times 100$$

Formula 2:
$$\text{Weekly Change Rate \%} = \frac{\text{Weekly Change in deaths of present week}}{\text{Total deaths in previous week}} \times 100$$

The two type of graph were plotted between confirmed cases or deaths against date of weekly analysis. The plot in x-axis shows new confirmed cases or deaths however; plot of y-axis shows date of weekly analysis. The graph of comparative study has its x-axis with weekly change % and y-axis with date of weekly analysis.

RESULTS AND DISCUSSION

Table 1. Total weekly confirmed cases in India (as on 12-Apr-2023) [5].

Date	Total Confirmed Cases	Weekly Decrease	Increase/	Weekly Rate %	Change
26-Dec-22	1543	389		33.71	
2-Jan-23	1275	-268		-17.37	
9-Jan-23	1116	-159		-12.47	
16-Jan-23	881	-235		-21.06	
23-Jan-23	718	-163		-18.5	
30-Jan-23	724	6		0.84	
6-Feb-23	755	31		4.28	
13-Feb-23	799	44		5.83	
20-Feb-23	1100	301		37.67	
27-Feb-23	1803	703		63.91	
6-Mar-23	2672	869		48.2	
13-Mar-23	4928	2256		84.43	
20-Mar-23	8727	3799		77.09	
27-Mar-23	18458	9731		111.5	
3-Apr-23	34011	15553		84.26	
10-Apr-23	61499	27488		80.82	



Cover Page



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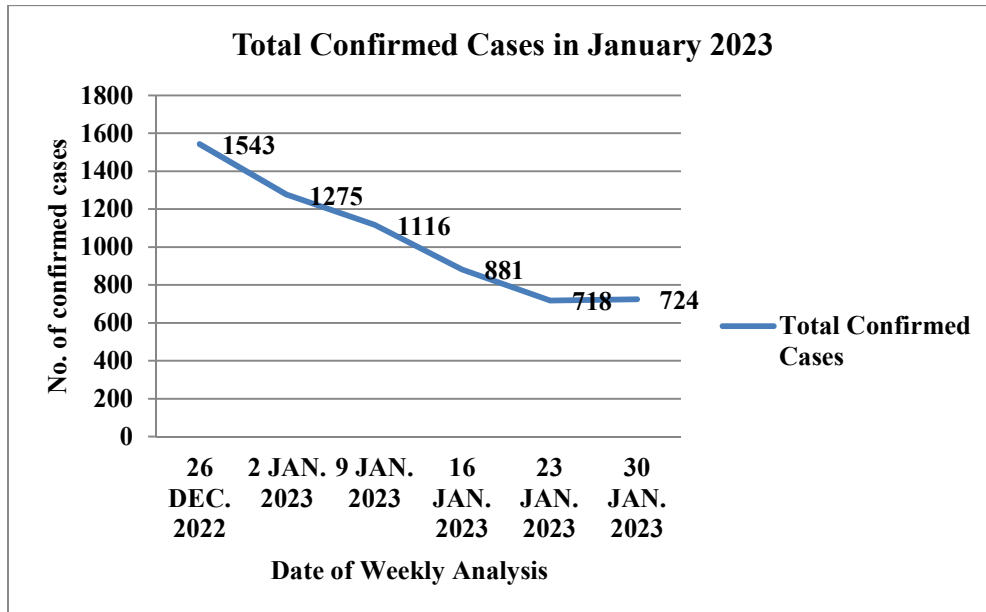


Fig 1. Total Confirmed Cases in January 2023 in India

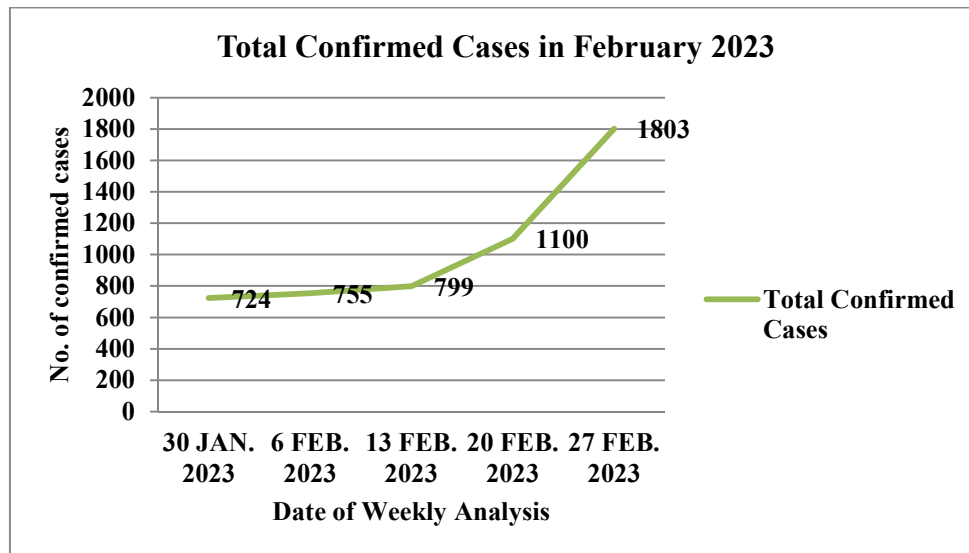


Fig 2. Total Confirmed Cases in February 2023 in India



Cover Page



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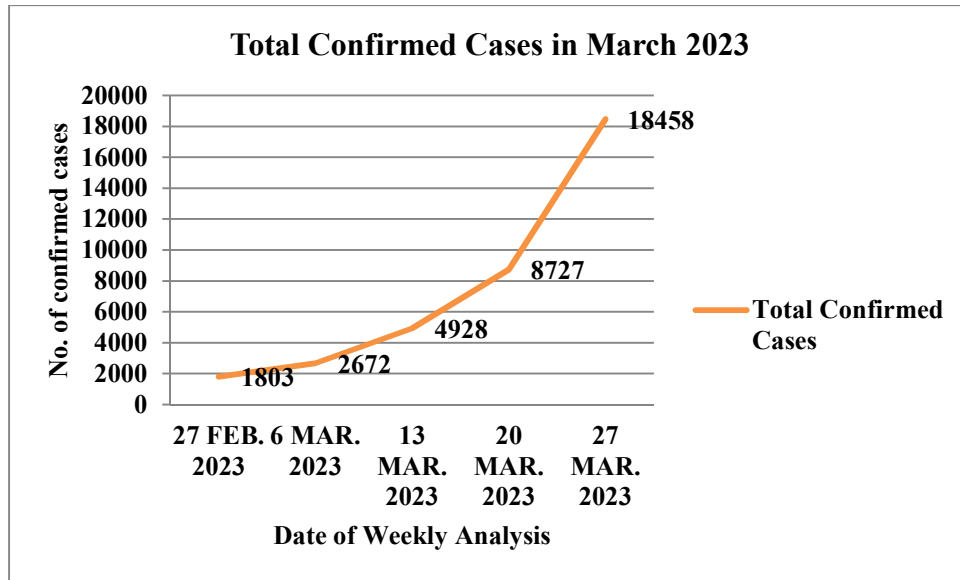


Fig 3. Total Confirmed Cases in March 2023 in India

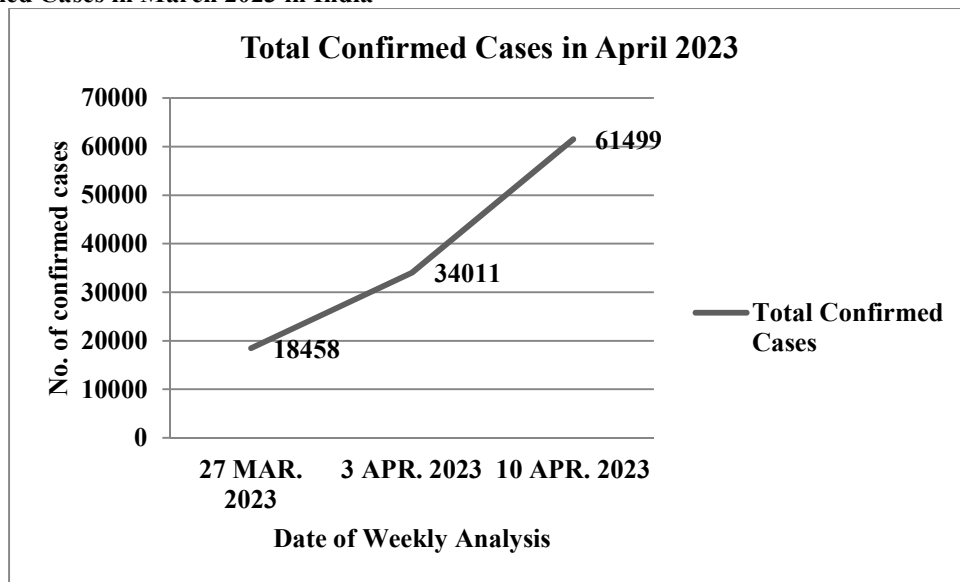


Fig 4. Total Confirmed Cases in April 2023 in India

Table 2. Total weekly Deaths in India (as on 12-Apr-2023) [5].

Date	Total Deaths	Weekly Increase/ Decrease	Weekly Change Rate %
26-Dec-22	12	-9	-42.86
2-Jan-23	15	3	25
9-Jan-23	6	-9	-60
16-Jan-23	7	1	16.67
23-Jan-23	7	0	0



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30-Jan-23	5	-2	-28.57
6-Feb-23	5	0	0
13-Feb-23	10	5	100
20-Feb-23	9	-1	-10
27-Feb-23	6	-3	-33.33
6-Mar-23	6	0	0
13-Mar-23	21	15	250
20-Mar-23	29	8	38.1
27-Mar-23	50	21	72.41
3-Apr-23	84	34	68
10-Apr-23	149	65	77.35

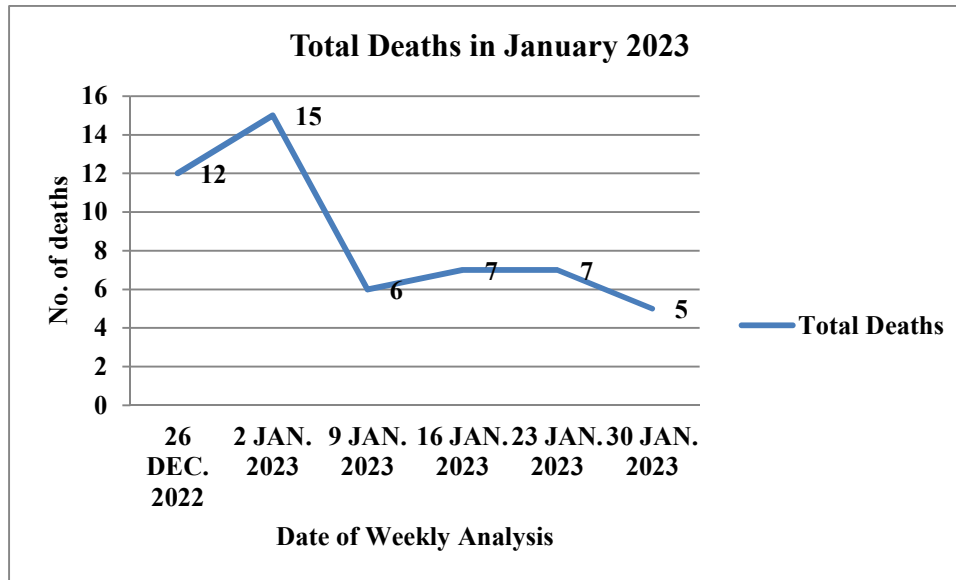


Fig 5. Total Death Cases in January 2023 in India



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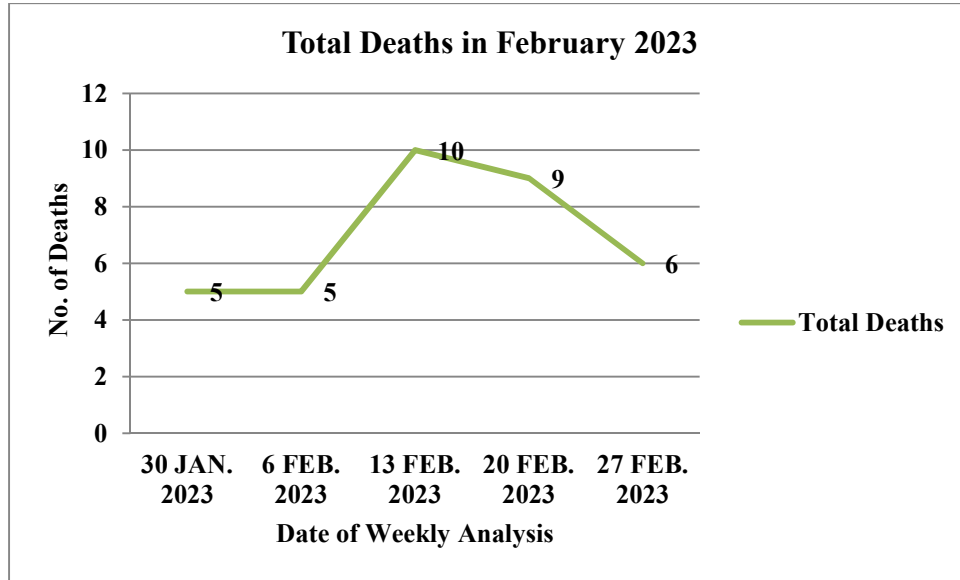


Fig 6. Total Death Cases in February 2023 in India

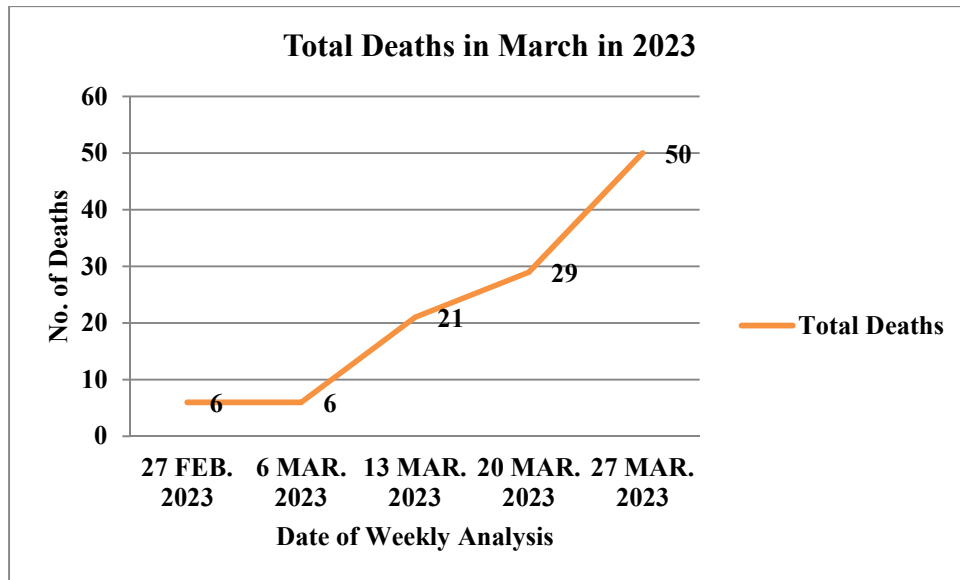


Fig 7. Total Death Cases in March 2023 in India



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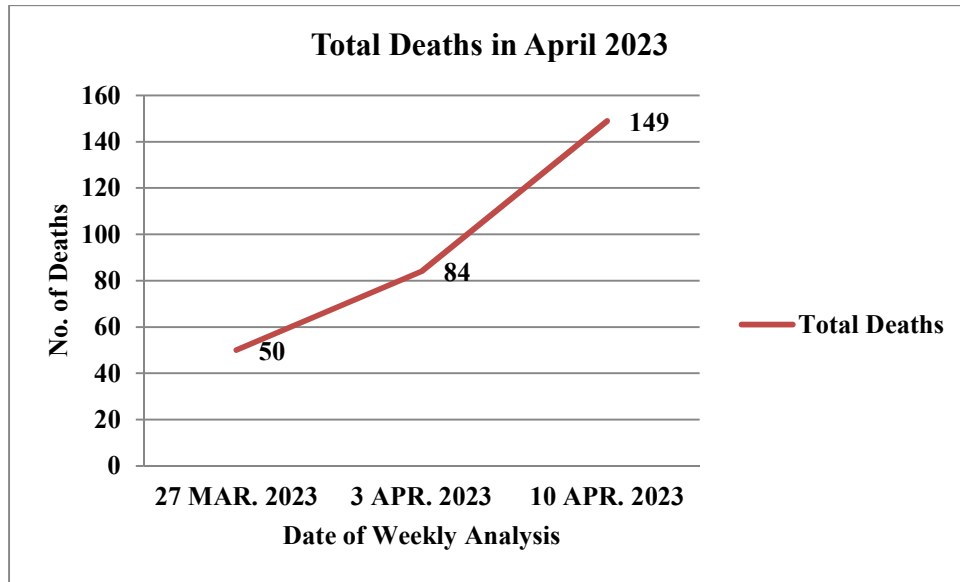


Fig 8. Total Death Cases in April 2023 in India

Table 3. Total weekly confirmed cases in USA (as on 12-Apr-2023) [6].

Total weekly confirmed cases in United States of America (as on 12-Apr-2023)					
Date	Total Confirmed Cases	Weekly Decrease	Increase/	Weekly Rate %	Change
26-Dec-22	392203	-115806		-22.8	
2-Jan-23	471714	79511		20.27	
9-Jan-23	448092	-23622		-5.01	
16-Jan-23	308025	-140067		-31.26	
23-Jan-23	294867	-13158		-4.27	
30-Jan-23	285402	-9465		-3.21	
6-Feb-23	278228	-7174		-2.51	
13-Feb-23	254372	-23856		-83.57	
20-Feb-23	267168	12796		5.03	
27-Feb-23	227828	-39340		-14.72	
6-Mar-23	170593	-57253		-25.12	
13-Mar-23	126613	-43980		-25.78	
20-Mar-23	152968	26355		20.82	
27-Mar-23	176358	23390		15.29	
3-Apr-23	0	-176358		-100	
10-Apr-23	0	-103472		-100	



Cover Page



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Total Confirmed Cases in January 2023 in USA

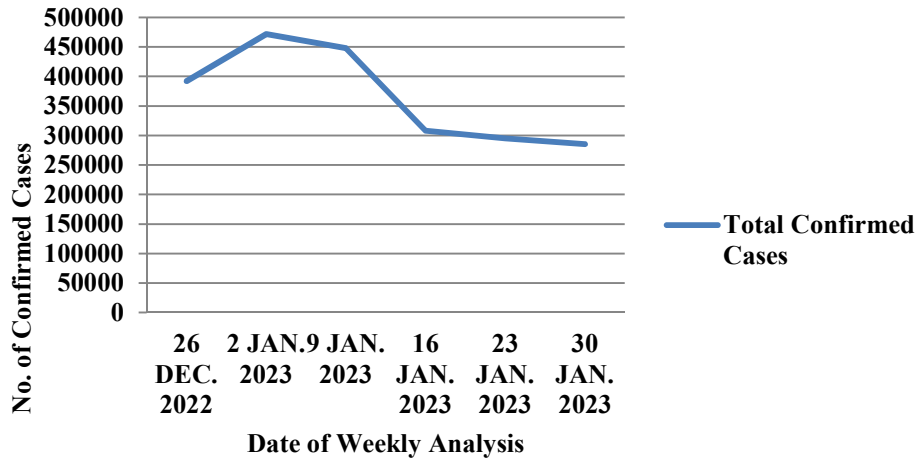


Fig 9. Total Confirmed Cases in January 2023 in USA

Total Confirmed Cases in February 2023 in USA

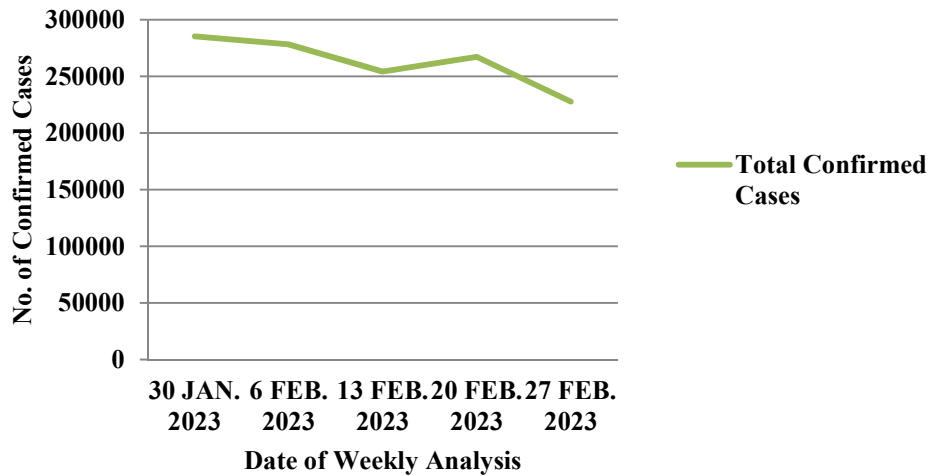


Fig 10. Total Confirmed Cases in February 2023 in USA



Cover Page



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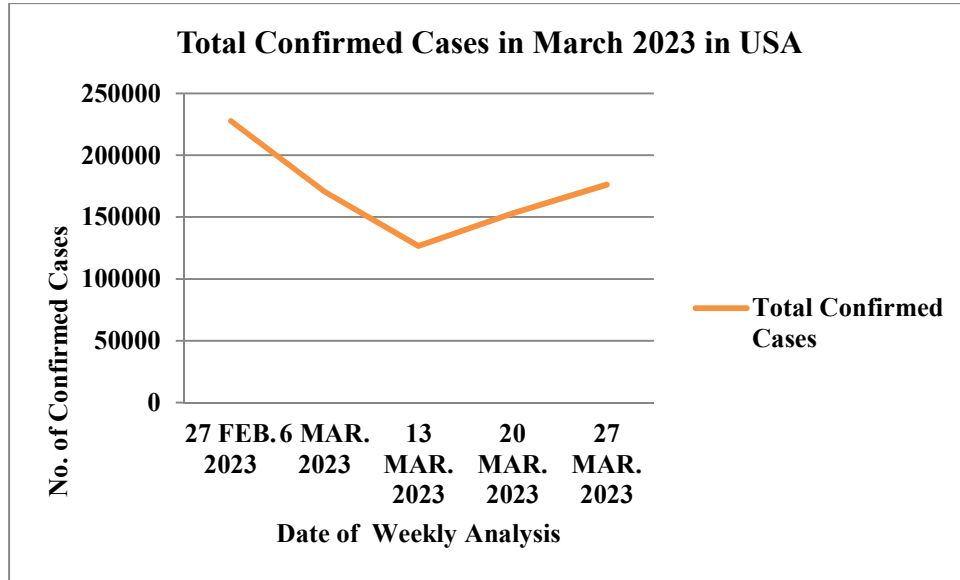


Fig 11. Total Confirmed Cases in March 2023 in USA

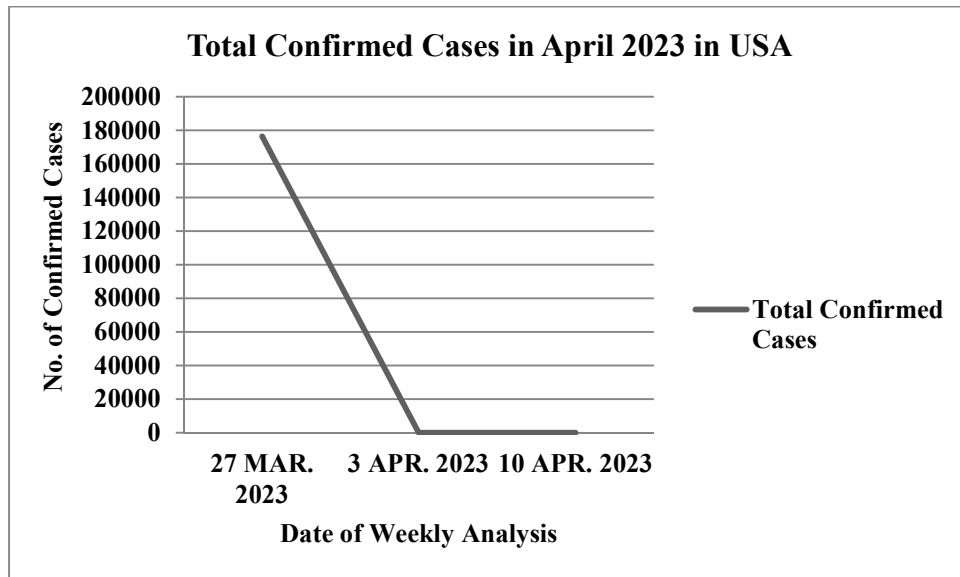


Fig 12. Total Confirmed Cases in April 2023 in USA

Table 4. Total weekly death cases in USA (as on 12-Apr-2023) [6].

Total weekly Deaths in United States of America (as on 12-Apr-2023)					
Date	Total Deaths	Weekly Decrease	Increase/	Weekly Rate %	Change
26-Dec-22	2480	-553		-18.23	
2-Jan-23	2764	284		11.45	
9-Jan-23	4407	1643		59.44	
16-Jan-23	3664	-743		-16.86	



Cover Page



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23-Jan-23	3743	79	2.16
30-Jan-23	3452	-291	-7.77
6-Feb-23	3440	-12	-0.35
13-Feb-23	2857	-583	-16.95
20-Feb-23	2362	-495	-17.33
27-Feb-23	2197	-165	-6.99
6-Mar-23	1887	-310	-14.11
13-Mar-23	1741	-146	-7.74
20-Mar-23	2084	343	19.7
27-Mar-23	1746	-338	-16.22
3-Apr-23	1729	-17	-0.97
10-Apr-23	0	-1729	-100

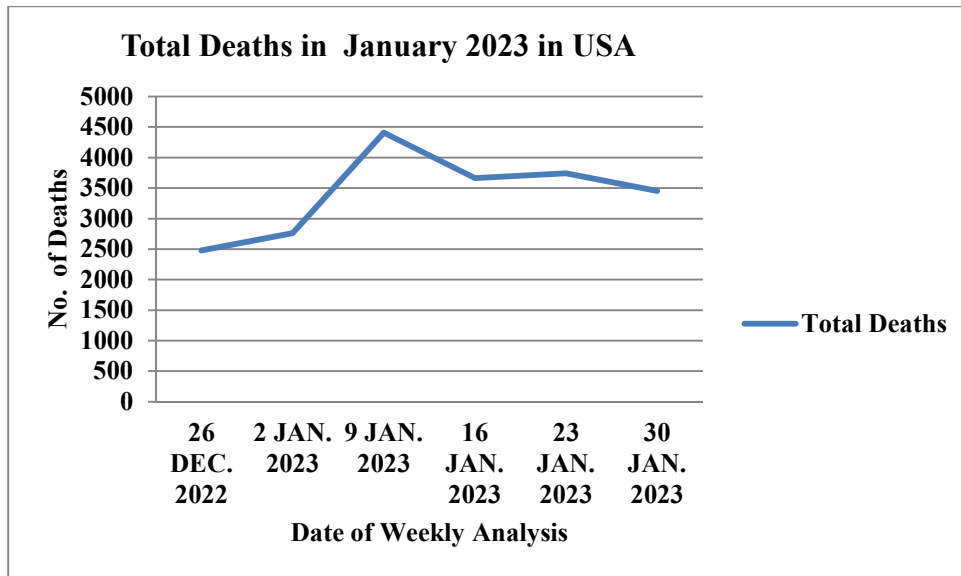


Fig 13. Total Death Cases in January 2023 in USA



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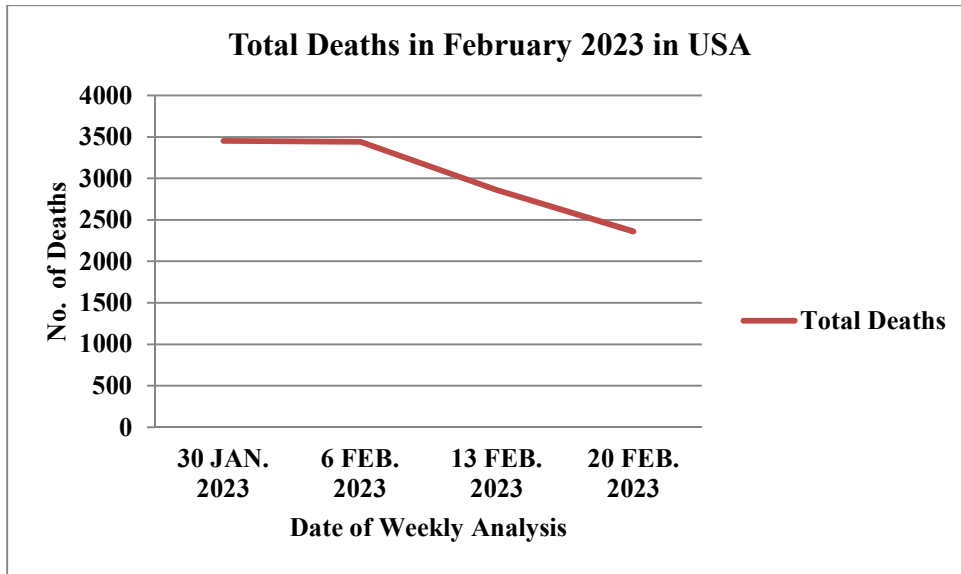


Fig 14. Total Death Cases in February 2023 in USA

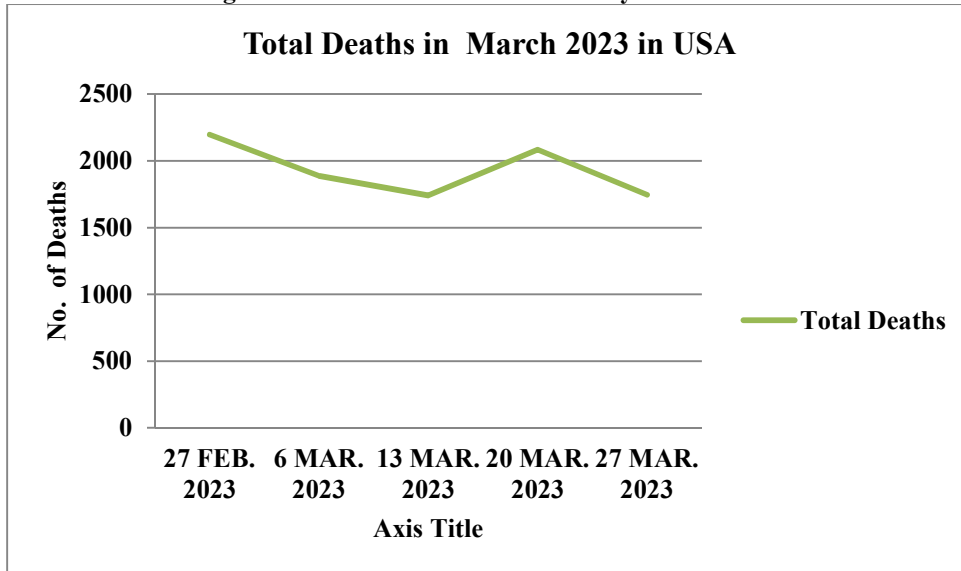


Fig 15. Total Death Cases in March 2023 in USA



Cover Page



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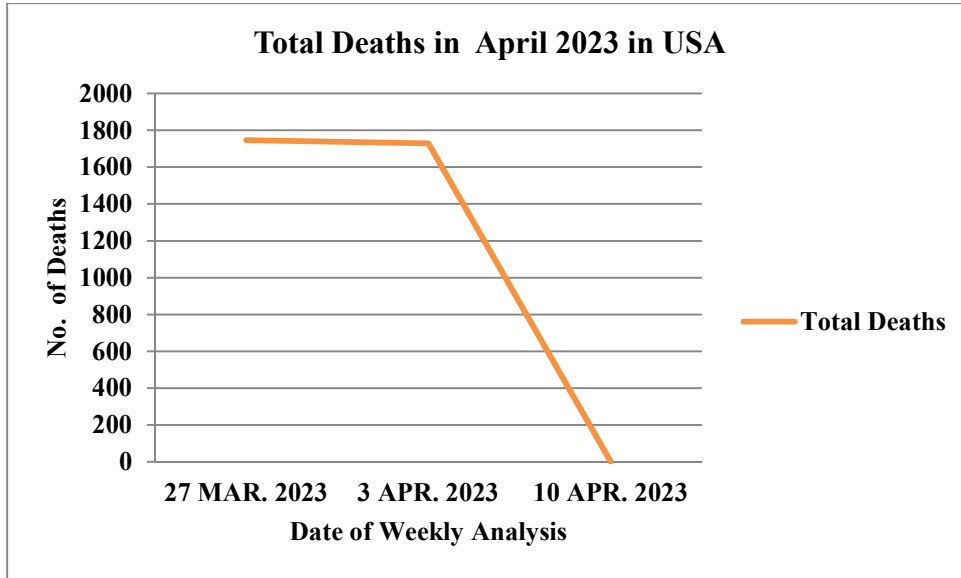


Fig 16. Total Death Cases in April 2023 in USA

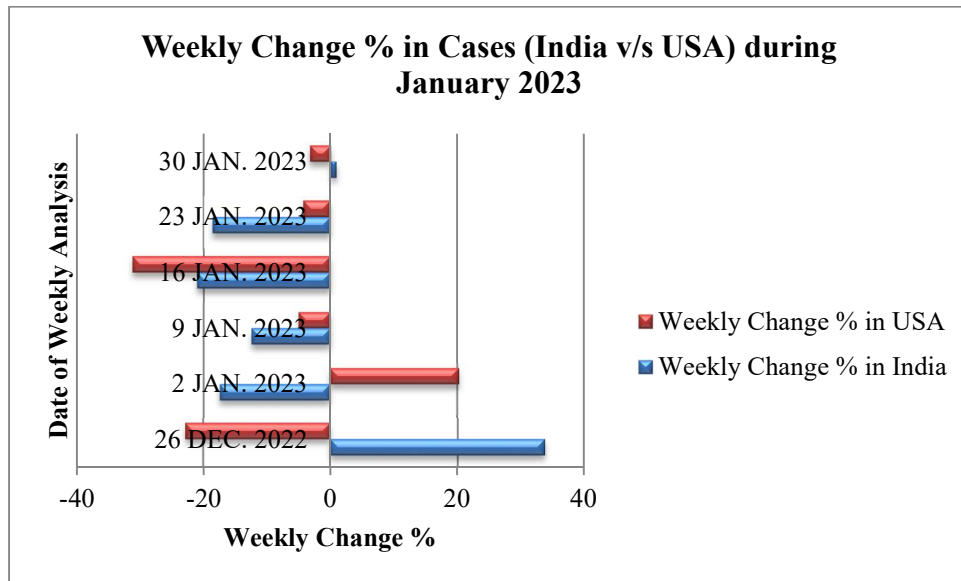


Fig 17. Weekly Change % in Cases (India v/s USA) during January 2023



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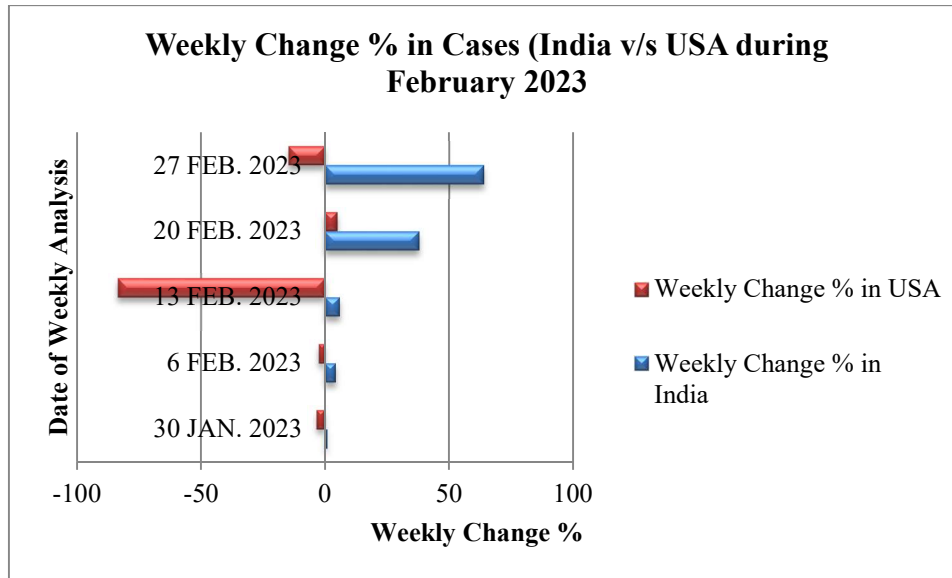


Fig 18. Weekly Change % in Cases (India v/s USA) during February 2023

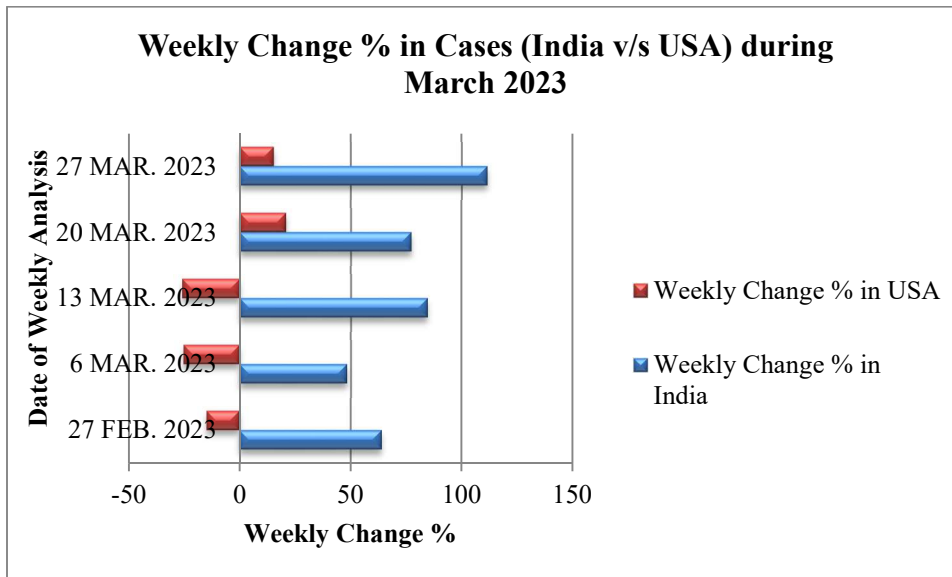


Fig 19. Weekly Change % in Cases (India v/s USA) during March 2023



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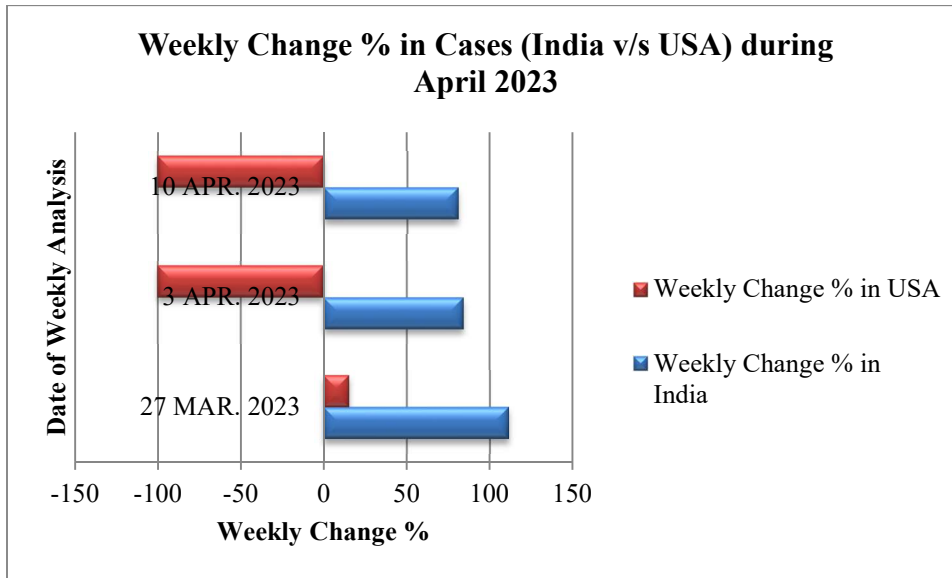


Fig 20. Weekly Change % in Cases (India v/s USA) during April 2023

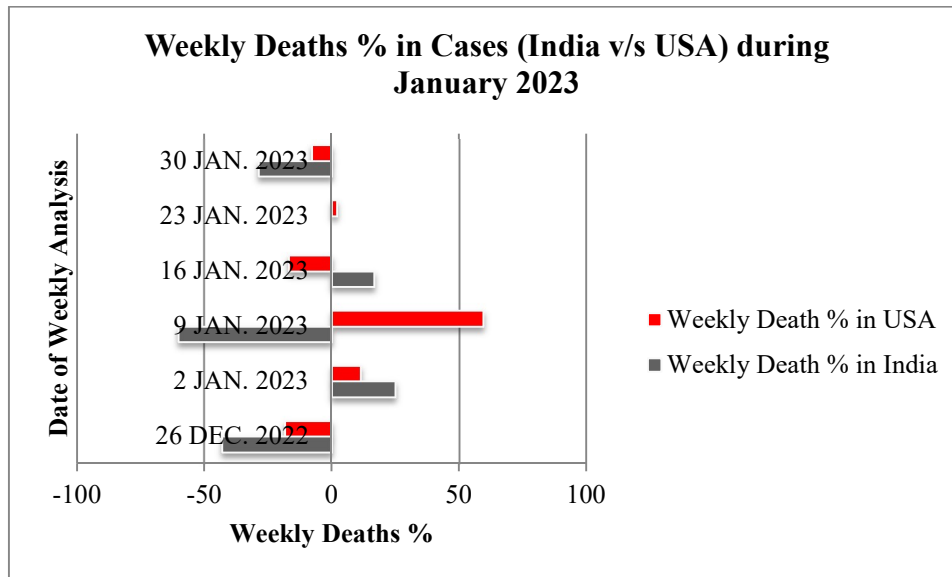


Fig 21. Weekly Deaths % in Cases (India v/s USA) during January 2023



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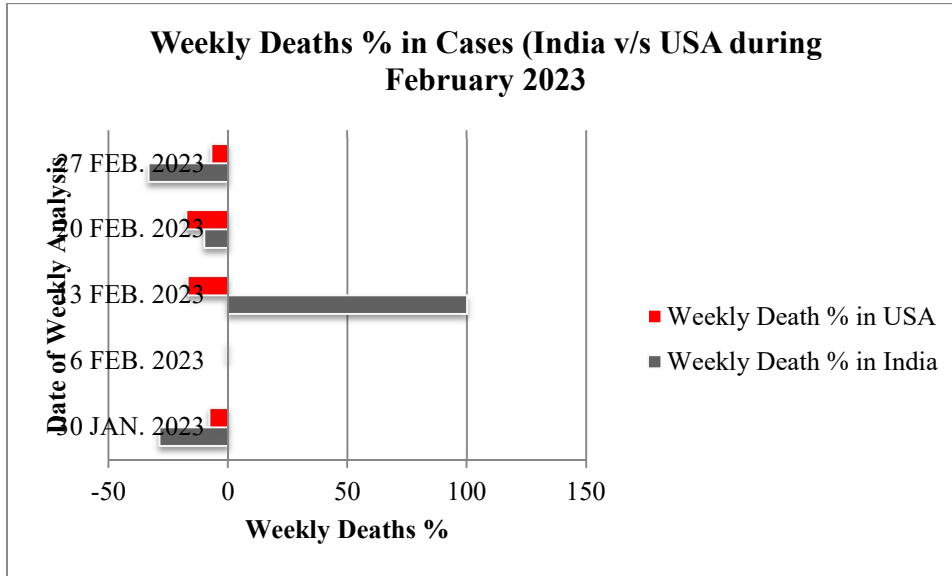


Fig 22. Weekly Deaths % in Cases (India v/s USA) during February 2023

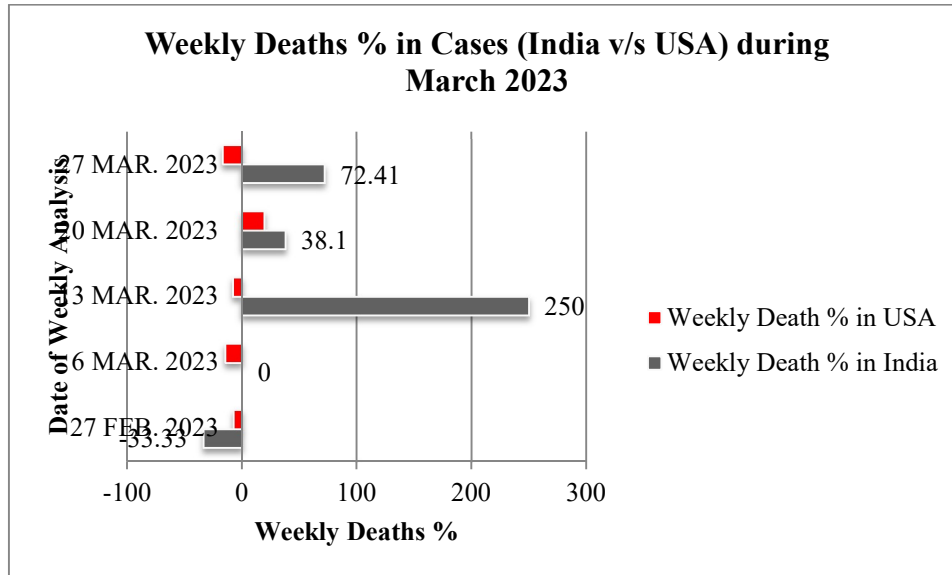


Fig 23. Weekly Deaths % in Cases (India v/s USA) during March 2023



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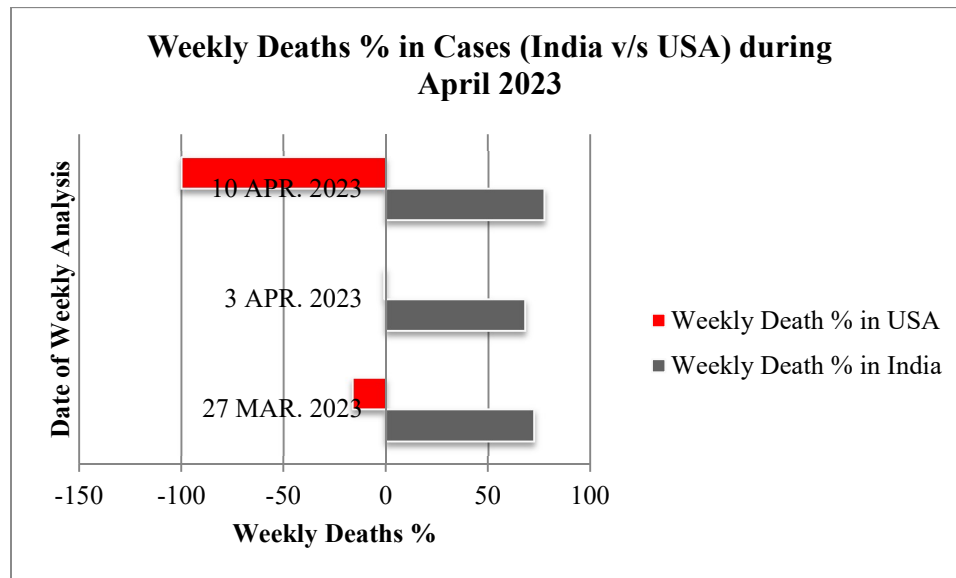


Fig 24. Weekly Deaths % in Cases (India v/s USA) during April 2023

The calculated WCR % on the basis of confirmed cases and death cases for India is shown in table 1 and 2 respectively, while the same data for USA is shown in table 3 and 4 respectively. For new confirmed cases, in India maximum WCR % was found on 27-Mar-23 with value of 111.5 % however the minimum WCR % was determined on 16-Jan-23 having value -21.06 %, in USA the elevated WCR % was determined on 20-Mar-23 with 20.82 % WCR value and lowered WCR % value found on 3 and 10-Apr-23 with value of -100%. The positive WCR % shows that in USA the rate of new cases is less as comparison to India, also the recovery rate i.e. negative value of WCR % is also upto 100% in USA. This shows that the USA has less upcoming pandemic situation as comparison to India based on the data.

Similarly for deaths cases the WCR % was calculated and results shows maximum value 250% and 59.44% for India and USA respectively. Overall the death rate in USA is low as comparison to India. The thing to be noted that the no. of cases for both in new confirmed cases and deaths is greater in USA nevertheless the WCR % shows favorable values for USA as no. of recovered cases is high in USA than India.

Conclusion

The worldwide pattern has been upset as a result of the coronavirus disease's unanticipated global expansion. Rehab progress and intensity are influenced by a nation's health, social worker, and economic strategies. It's conceivable that SARS-CoV2 won't entirely disappear because of how the virus is still evolving. However, it is anticipated that COVID-19 will ultimately resemble seasonal influenza, where the illness continues with reduced symptoms, as long as the Omicron subvariants continue to prevail.

Herd immunity is also likely to be attained if the bulk of the population develops layers of immunological defence. Therefore, COVID-19 will need to be included into daily living. The emergence of the Omicron subvariants, which induce mild symptoms despite being substantially more virulent than the other variations, has increased expectations that the COVID-19 pandemic may become endemic. In order to prevent COVID-19 from interfering with daily life, everybody should be given the knowledge required to cohabit with it.

The present study suggests that the Weekly Change Rate favors the USA despite the India. For this, the main reason is that, the recovery rate of patient is higher in USA along with the hospitalization facilities. The plotted graph shown that in USA the deaths cases is even nil in last week of April however in India the death case is high with low recovery rate showing unfavorable WCR % comparative to USA. Thus, the study concluded that the performance of USA during first quarter of 2023 against COVID-19 is more relevant than India.



Cover Page



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