



EFFECT OF COVID-19 PANDEMIC ON THE DELIVERY TIME AND THE POINT OF RE-ORDER OF PHARMACEUTICALS AT THE LOGISTICS SERVICES IN A GOVERNMENTAL HOSPITAL IN RIYADH SAUDI ARABIA

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BACKGROUND

- The World Health Organization (WHO) has declared that COVID-19 as a global pandemic condition in March 10, 2020 after the outbreak of a Flu-like respiratory condition in Wuhan, China at early December 2019.¹
- COVID-19 Pandemic affected a lot of industries and services around the world including the delivery of pharmaceutical items which plays a major role in the provision of high quality health care.²
- The Pharmaceutical industries play a crucial role in maintaining the provision of health care and cost effective medicines which becomes of most importance during the pandemic periods when the pharmaceutical logistics and supply chain becomes either overutilized due to the spikes in demands or compromised because of the shutdown that took place during the pandemic.³
- Shortages in pharmaceutical items supply was an immanent result to the demand change and panic buying during the pandemic period, which has been seen in oral home medications especially for chronic conditions which has been directly linked by some investigators to the pharmaceutical supply chains incosistencies⁴
- Proper planning and maintenance of Pharmaceutical items stock levels becomes of most importance during these challenging circumstances and requires a high sense of good

OBJECTIVES

- This study aims to investigate the impact of the COVID-19 pandemic on the delivery cycle (time from placing the order until the physical delivery) of the pharmaceutical items and the point of the planners' re-order level for pharmaceutical items in one of the governmental hospitals in Riyadh, Saudi Arabi.

METHODS

- A retrospective data were collected from the Supply Chain Maintenance system used by the hospital for the years 2017-2022 during the period between Mach 23rd until June 21st (the curfew period) for all the deliveries and points of re-order of pharmaceutical items.
- The average delivery times and points of re-order were compared for the same specified period of each respective year.
- The point of re-order is defined as the stock level that the current item enough for in days.
- The Analysis of Variance (ANOVA) was used to compare the means of delivery times and points of re-order for each year.

- A post-hoc tests (Tukey's Test) was used to make a pairwise comparisons between the means of the delivery times and the points of re-order for each year.
- The data were collected and depicted in graphs using Microsoft Excel (Microsoft, 2021) and the inferential statistics were done using the SPSS Statistical Package (IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp)

RESULTS AND DISCUSSIONS

- A total of 176,142 data points were collected from the Supply Chain Maintenance System which represented all the operations that took place during the specified period of each year (March 23rd until June 21st).
- After carefully examining the data points, a total of 1,322 duplicate data points were removed and a total of 694 data points were excluded due to lack of data regarding Average Monthly Usage (AMU). In the next round of examining the data points, a total of 85 data points were excluded for being an outliers (>24 months for the delivery time). The remaining data points (174,041) were fit for the inclusion into the study analysis (Figure-1)
- The mean delivery time was the longest for the year 2021 (137.67 days) and shortest for the year 2019 (52.66 days). The Analysis of variance shows that mean difference between all the year was statistically significant ($p<0.05$). The post-hoc test (Tukey's Test) shows that the mean differences between the years 2019 and 2021 and the rest of years were statistically significant ($p<0.05$).

Figure 1: Stages of Selecting and Refining the Study Datapoints

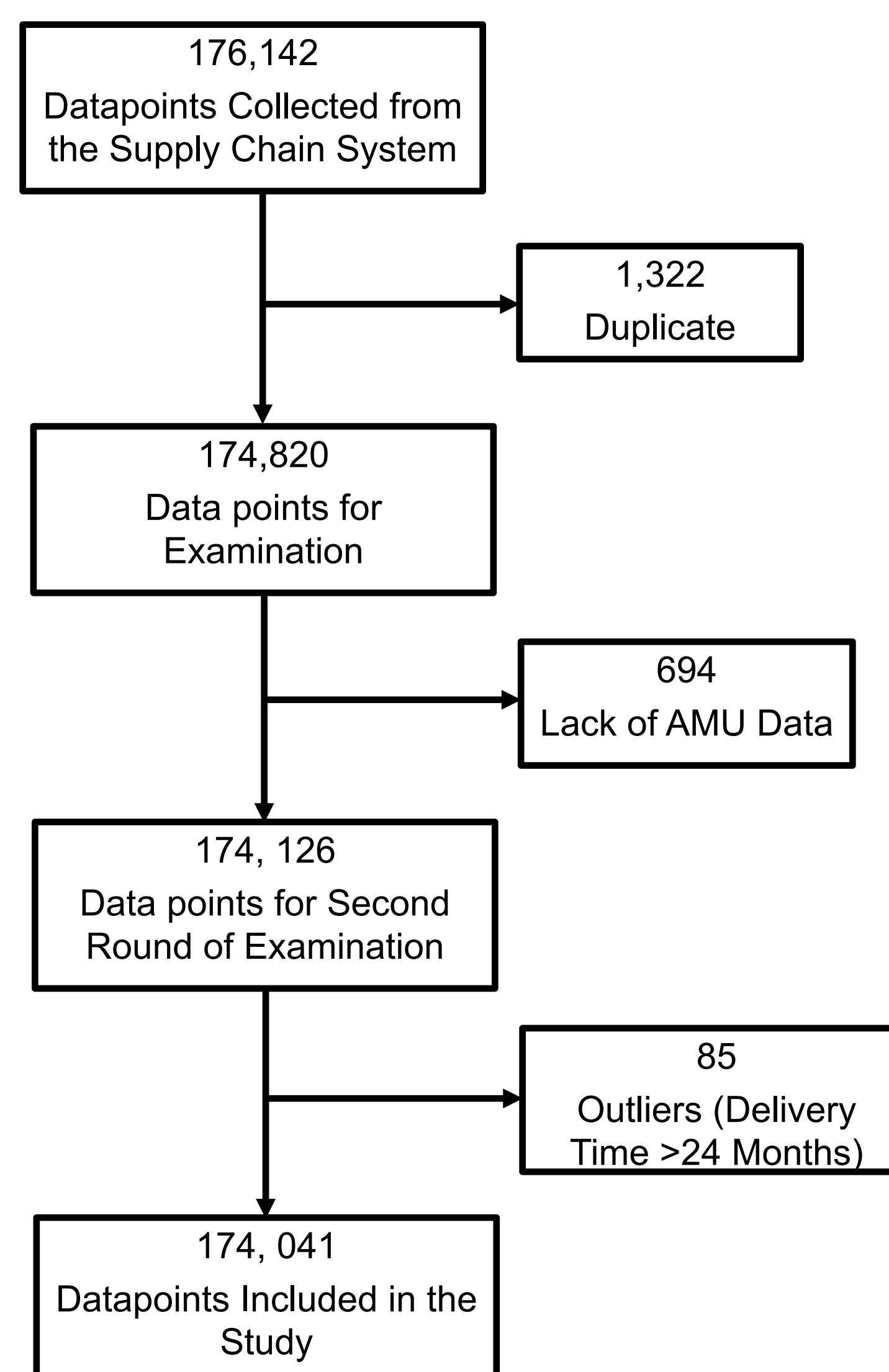


Figure 1: Mean Delivery Time of Pharmaceutical Items for Years 2017-2022

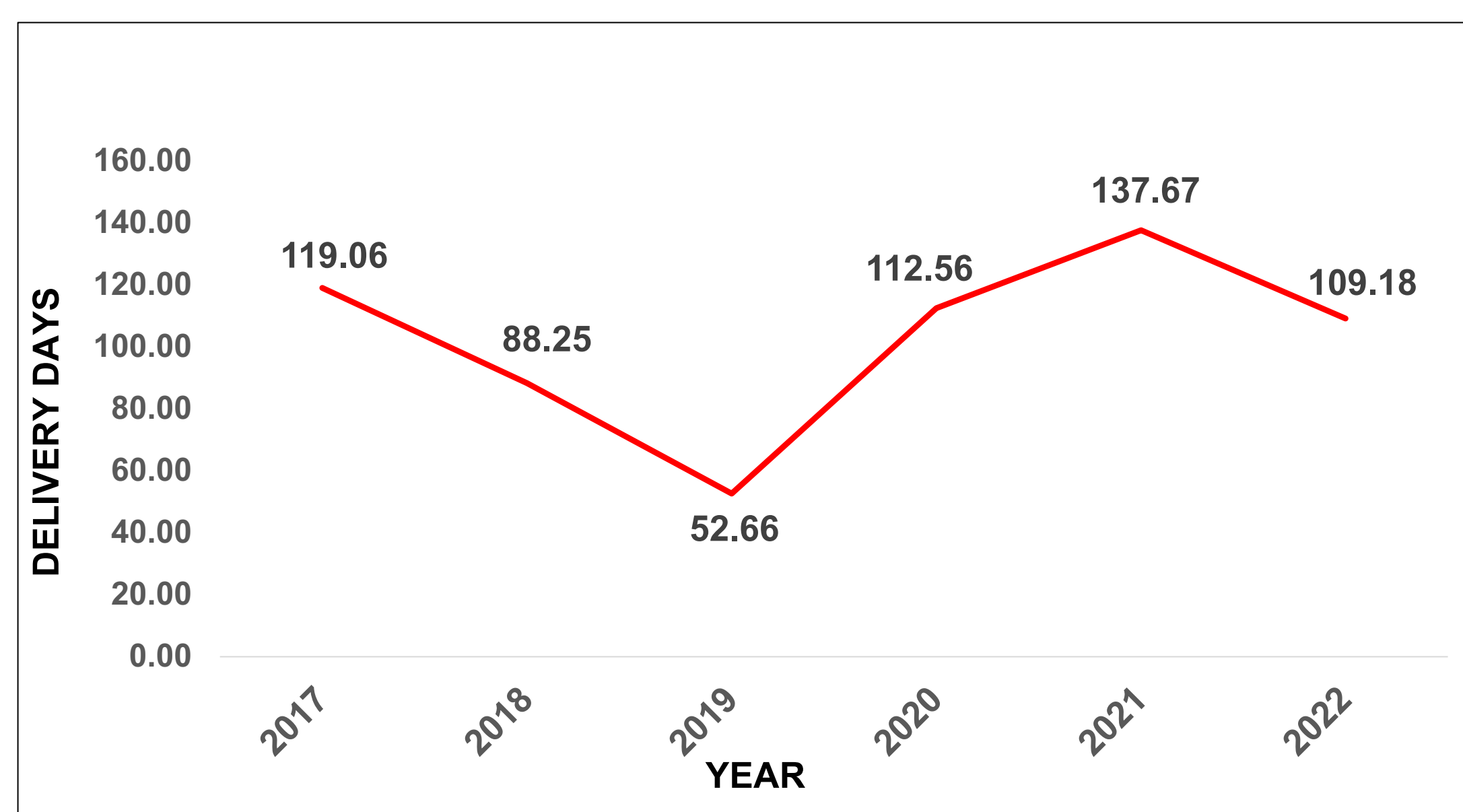
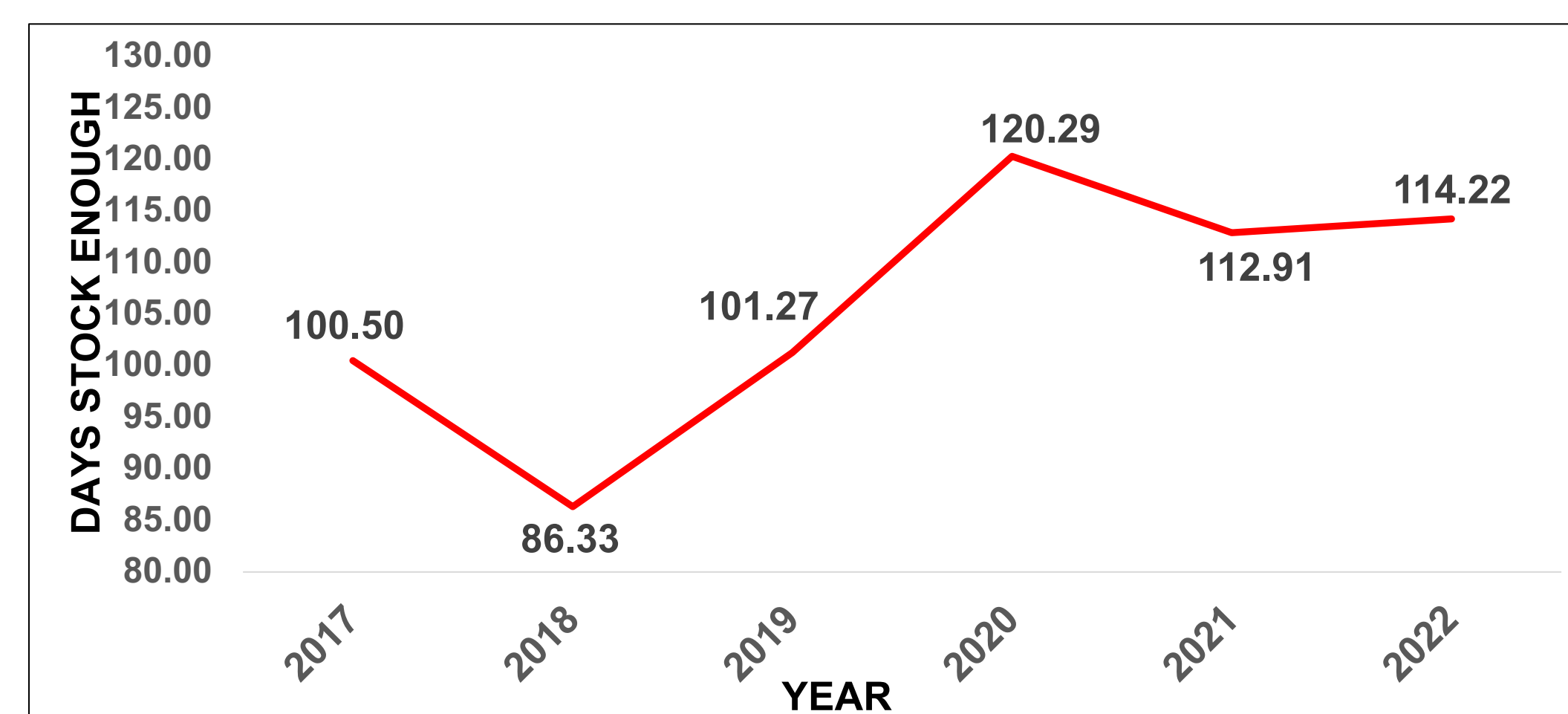


Figure 2: Mean Re-Order Point of Pharmaceutical Items for Years 2017-2022



- The mean re-order point was the highest for the year 2020 (120.29 Days) and the lowest for the year 2018 (86.33 Days). The analysis of variance shows a statistically significant difference between the mean re-order points for all the included years ($p<0.05$). The post-hoc test shows that the differences between the years 2018 and 2019 and the rest of the years included were statistically significant ($p<0.05$).
- The findings from this study shows that the delivery time was not affected immediately after the pandemic, since the year 2021 showed the longest delivery time (137.67 days), which means that the impact of the pandemic took about 2 years to show it's results.
- The re-order point in this study was affected by the pandemic, since the study shows that the highest re-order point was for the year 2020 (120.29 days). This could be explained by the fact that the pharmaceutical planners might have reverted panic buying or received notices of demand changes a counter measure during the curfew period of the pandemic.
- Both measures showed some level of improvements afterwards since the following years showed some downward and lesser upward fluctuations.

CONCLUSIONS

- The delivery time was not immediately affected during the pandemic year 2020, however, the effect started after the pandemic curfew. The point of reorder was affected during the pandemic curfew. Both measures showed improvements afterwards.
- This study indicates that supply chain services were impacted by the pandemic and there's a need for a resilient supply chain services should similar circumstances occur in the future.

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