

Asian Journal of  
**Applied**  
Sciences

## Research Article

# Update Report on Progress of COVID-19 Pandemic from 19th-25th January, 2022 Across Different Countries of the World

<sup>1</sup>Joseph Oyepata Simeon, <sup>2</sup>Joseph Opeyemi Tosin and <sup>3</sup>Sabastine Aliyu Zubairu

<sup>1</sup>Department of Pharmacology and Toxicology, Faculty of Pharmaceutical Sciences, Federal University, Oye-Ekiti, Ekiti, Nigeria

<sup>2</sup>Department of Pharmacy, University College Hospital, Agodi 200285, Ibadan, Oyo, Nigeria

<sup>3</sup>Department of Pharmacology and Therapeutics, Faculty of Pharmacy, Gombe State University, 760214 Gombe, Nigeria

## Abstract

**Background and Objective:** The COVID-19 has set the globe on a difficult path. While several successes have been achieved, there are still many yet to be understood. This study provides an update report on progress of COVID-19 pandemic from 19th-25th January, 2022 across different countries of the world. **Materials and Methods:** Data from one hundred and ninety six countries and regions of the world were gotten from United Nations geoscheme. Results were collated and subsequently compared to the values obtained for USA. **Results:** Comparing available data with that of USA, American continent had higher mortality Comparism Factor than infection cases, while European continents had higher infectious comparism value than mortality value. African continents, with exception of South Africa and Botswana, seems unbothered in value of mortality and infectivity. **Conclusion:** The new wave and virus variant have caused a renewed surge in it global consequence. There is the need to understand how Africa has survive all variant of the virus with minimal medical facilities.

**Key words:** Africa, America, continent, COVID-19, Europe, Nigeria, USA

**Citation:** Simeon, J.O., J.O. Tosin and S.A. Zubairu, 2023. Update report on progress of COVID-19 pandemic from 19th-25th January, 2022 across different countries of the world. Asian J. Appl. Sci., 16: 55-63.

**Corresponding Author:** Joseph Oyepata Simeon, Department of Pharmacology and Toxicology, Faculty of Pharmaceutical Sciences, Federal University, Oye-Ekiti, Ekiti, Nigeria

**Copyright:** © 2023 Joseph Oyepata Simeon *et al.* This is an open access article distributed under the terms of the creative commons attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

**Competing Interest:** The authors have declared that no competing interest exists.

**Data Availability:** All relevant data are within the paper and its supporting information files.

## INTRODUCTION

Scientists are still puzzled by the outbreak. Some believed that the virus began in animals while others think it's from Wuhan Lab. At some point one or more humans acquired infection from an animal or laboratory leakage to affect humans and those infected humans may have transmitted the original or mutated viral version to other humans<sup>1-4</sup>. It can also be transmitted through contact with hands or surfaces that have been previously exposed by the virus and touch the body opening with the contaminated hands<sup>5-8</sup>. Coronaviruses (CoV) is among the family of viruses that cause illness ranging from less severe to more severe diseases. The nCoV is a new variant that has not been previously identified in humans<sup>9-12</sup>. The new virus was subsequently named the "COVID-19" virus. The novel virus was first identified in Wuhan, a city in China, in December, 2019, an immediate lockdown in Wuhan and other surrounding cities failed to contain the outbreak, resulting in it spread to different parts of the world<sup>13-17</sup>. On 30th January, 2020, The World Health Organization (WHO) declared an international public health emergency on pandemic<sup>18</sup>. Different strain of the virus have been discovered, most notable of which are the delta and the Omicron variants<sup>19-21</sup>. The COVID-19 symptoms range from simple to life-threatening. Studies have shown that older persons are more likely to suffer from complications of the virus<sup>22-24</sup>.

There is serious concern and study on the different waves caused by the pandemic. This may be due to weather condition and predictable mutation<sup>25-28</sup>. There is the need to study this cases per country and region with respect to the infectious and spreading ability of the various variants. Different work has been done on the demographic, nature and strength of the virus and analyzing an periodic information per time is also predicated in managing the trend<sup>29-35</sup>. The aim of this study was to provide update report on progress of COVID-19 pandemic from 19th-25th January, 2022 across different countries of the world.

## MATERIALS AND METHODS

**Study area:** Data from December, 7th-13th, 2021 were obtained from United Nations geoscheme and WHO (WHO 2021).

**Methodology:** One hundred and ninety six nations from different continents and regions of the world were selected for this study. Data used were obtained from 19th-25th of January, 2022 from United Nations geoscheme and WHO<sup>36</sup>. The data obtained for these countries over 7 days per 100000 populations, were analyzed and compared directly with the values gotten for USA. The USA was used as a Comparison Factor (CF) or Oyeputa Factor (OF) because it is a country with one of the best health system and also has highest COVID-19 cases with a relatively large population in the world.

**Statistical analysis:** In this work markers as cumulative cases and cumulative cases of death per 1,000,000 population were analyzed against that of USA. Bivariate analysis, was used and Chi-square Test, to compare proportions of all variables. Country observations are scaled to represent a comparison of two countries similar in all other respects.

## RESULTS

Comparing available data with that of USA, American continent had higher mortality Comparison Factor than infection cases, while European continents had higher infectious comparison value than mortality value. African continents, with exception of South Africa and Botswana has an unbothered value of mortality and infectivity when compared to the rest of the world (Table 1).

Data used were obtained from WHO/World meter's as at 18th January, 2022.

Table 1: Cases and death of COVID-19

| Country     |                     |                      |               | CIL7DPM | DIL7DPM | D/13460 | E/48.76 |
|-------------|---------------------|----------------------|---------------|---------|---------|---------|---------|
| Other       | Cases in 7 days (A) | Deaths in 7 days (B) | Population    | D       | E       | F       | G       |
| USA         | 4,496,822           | 16,289               | 334,077,703   | 13460   | 48.76   | 1.00    | 1.00    |
| France      | 2,563,251           | 1,851                | 65,502,366    | 39132   | 28.26   | 2.91    | 0.58    |
| India       | 2,183,875           | 3,928                | 1,401,494,922 | 1558    | 2.80    | 0.12    | 0.06    |
| Brazil      | 1,118,521           | 2,323                | 214,953,059   | 5204    | 10.81   | 0.39    | 0.22    |
| Germany     | 816,069             | 1,089                | 84,208,414    | 9691    | 12.93   | 0.72    | 0.27    |
| Italy       | 1,140,783           | 2,456                | 60,320,945    | 18912   | 40.72   | 1.41    | 0.84    |
| Russia      | 375,597             | 4,770                | 146,033,616   | 2572    | 32.66   | 0.19    | 0.67    |
| UK          | 677,921             | 1,854                | 68,450,986    | 9904    | 27.09   | 0.74    | 0.56    |
| Spain       | 876,792             | 1,099                | 46,783,474    | 18741   | 23.49   | 1.39    | 0.48    |
| Turkey      | 498,736             | 1,222                | 85,776,474    | 5814    | 14.25   | 0.43    | 0.29    |
| Netherlands | 365,763             | 61                   | 17,194,945    | 21272   | 3.55    | 1.58    | 0.07    |
| Japan       | 313,639             | 89                   | 125,862,915   | 2492    | 0.71    | 0.19    | 0.01    |

Table 1: Continue

| Country      |                     |                      |             | CIL7DPM | DIL7DPM | D/13460 | E/48.76 |
|--------------|---------------------|----------------------|-------------|---------|---------|---------|---------|
| Other        | Cases in 7 days (A) | Deaths in 7 days (B) | Population  | D       | E       | F       | G       |
| Israel       | 501,868             | 116                  | 9,326,000   | 53814   | 12.44   | 4.00    | 0.26    |
| Argentina    | 723,215             | 1,283                | 45,852,707  | 15773   | 27.98   | 1.17    | 0.57    |
| Portugal     | 361,620             | 281                  | 10,149,596  | 35629   | 27.69   | 2.65    | 0.57    |
| Poland       | 241,224             | 1,410                | 37,780,927  | 6385    | 37.32   | 0.47    | 0.77    |
| Belgium      | 346,692             | 174                  | 11,669,537  | 29709   | 14.91   | 2.21    | 0.31    |
| Australia    | 413,858             | 449                  | 25,968,473  | 15937   | 17.29   | 1.18    | 0.35    |
| Denmark      | 272,811             | 116                  | 5,824,520   | 46838   | 19.92   | 3.48    | 0.41    |
| Mexico       | 300,352             | 1,832                | 131,078,326 | 2291    | 13.98   | 0.17    | 0.29    |
| Czechia      | 169,675             | 150                  | 10,740,461  | 15798   | 13.97   | 1.17    | 0.29    |
| Peru         | 352,532             | 942                  | 33,699,175  | 10461   | 27.95   | 0.78    | 0.57    |
| Austria      | 174,606             | 77                   | 9,087,812   | 19213   | 8.47    | 1.43    | 0.17    |
| Switzerland  | 243,850             | 97                   | 8,754,887   | 27853   | 11.08   | 2.07    | 0.23    |
| Sweden       | 273,427             | 178                  | 10,199,030  | 26809   | 17.45   | 1.99    | 0.36    |
| Romania      | 120,590             | 295                  | 19,034,321  | 6335    | 15.50   | 0.47    | 0.32    |
| Ukraine      | 121,400             | 894                  | 43,317,391  | 2803    | 20.64   | 0.21    | 0.42    |
| Chile        | 108,231             | 116                  | 19,376,133  | 5586    | 5.99    | 0.41    | 0.12    |
| Iran         | 39,710              | 161                  | 85,695,494  | 463     | 1.88    | 0.03    | 0.04    |
| Norway       | 126,776             | 27                   | 5,488,393   | 23099   | 4.92    | 1.72    | 0.10    |
| Greece       | 126,867             | 655                  | 10,342,374  | 12267   | 63.33   | 0.91    | 1.30    |
| Georgia      | 68,290              | 262                  | 3,977,033   | 17171   | 65.88   | 1.28    | 1.35    |
| Colombia     | 183,993             | 1,469                | 51,741,894  | 3556    | 28.39   | 0.26    | 0.58    |
| Serbia       | 112,649             | 216                  | 8,681,600   | 12976   | 24.88   | 0.96    | 0.51    |
| S. Korea     | 49,877              | 210                  | 51,339,099  | 972     | 4.09    | 0.07    | 0.08    |
| Hungary      | 96,018              | 417                  | 9,621,480   | 9980    | 43.34   | 0.74    | 0.89    |
| Philippines  | 188,837             | 636                  | 111,890,761 | 1688    | 5.68    | 0.13    | 0.12    |
| Canada       | 140,678             | 1,141                | 38,266,342  | 3676    | 29.82   | 0.27    | 0.61    |
| Vietnam      | 110,186             | 1,038                | 98,725,892  | 1116    | 10.51   | 0.08    | 0.22    |
| Slovenia     | 77,824              | 83                   | 2,079,391   | 37426   | 39.92   | 2.78    | 0.82    |
| Bangladesh   | 83,203              | 92                   | 167,288,252 | 497     | 0.55    | 0.04    | 0.01    |
| Slovakia     | 44,937              | 300                  | 5,463,832   | 8224    | 54.91   | 0.61    | 1.13    |
| Jordan       | 53,158              | 88                   | 10,363,573  | 5129    | 8.49    | 0.38    | 0.17    |
| Indonesia    | 20,400              | 64                   | 278,104,745 | 73      | 0.23    | 0.01    | 0.00    |
| Lithuania    | 43,015              | 99                   | 2,662,093   | 16158   | 37.19   | 1.20    | 0.76    |
| Kazakhstan   | 95,567              | 66                   | 19,132,410  | 4995    | 3.45    | 0.37    | 0.07    |
| Uruguay      | 78,333              | 86                   | 3,492,804   | 22427   | 24.62   | 1.67    | 0.50    |
| Bulgaria     | 61,891              | 531                  | 6,865,554   | 9015    | 77.34   | 0.67    | 1.59    |
| Croatia      | 60,982              | 290                  | 4,065,148   | 15001   | 71.34   | 1.11    | 1.46    |
| Thailand     | 53,546              | 101                  | 70,077,492  | 764     | 1.44    | 0.06    | 0.03    |
| Latvia       | 36,531              | 72                   | 1,853,150   | 19713   | 38.85   | 1.46    | 0.80    |
| Lebanon      | 40,273              | 101                  | 6,777,009   | 5943    | 14.90   | 0.44    | 0.31    |
| Tunisia      | 62,092              | 184                  | 12,014,494  | 5168    | 15.31   | 0.38    | 0.31    |
| Iraq         | 42,420              | 47                   | 41,650,829  | 1018    | 1.13    | 0.08    | 0.02    |
| Pakistan     | 47,631              | 93                   | 227,681,484 | 209     | 0.41    | 0.02    | 0.01    |
| Panama       | 67,536              | 83                   | 4,422,310   | 15272   | 18.77   | 1.13    | 0.38    |
| Réunion      | 46,914              | 38                   | 905,434     | 51814   | 41.97   | 3.85    | 0.86    |
| Bahrain      | 24,599              | 1                    | 1,795,081   | 13704   | 0.56    | 1.02    | 0.01    |
| Kuwait       | 33,069              | 9                    | 4,370,577   | 7566    | 2.06    | 0.56    | 0.04    |
| Estonia      | 30,107              | 26                   | 1,327,949   | 22672   | 19.58   | 1.68    | 0.40    |
| Paraguay     | 38,457              | 188                  | 7,271,292   | 5289    | 25.86   | 0.39    | 0.53    |
| Ecuador      | 52,763              | 125                  | 18,067,256  | 2920    | 6.92    | 0.22    | 0.14    |
| Costa Rica   | 35,732              | 67                   | 5,167,802   | 6914    | 12.96   | 0.51    | 0.27    |
| Palestine    | 14,610              | 41                   | 5,289,066   | 2762    | 7.75    | 0.21    | 0.16    |
| Finland      | 57,026              | 91                   | 5,554,358   | 10267   | 16.38   | 0.76    | 0.34    |
| Singapore    | 22,146              | 7                    | 5,923,229   | 3739    | 1.18    | 0.28    | 0.02    |
| Malaysia     | 26,291              | 100                  | 33,022,719  | 796     | 3.03    | 0.06    | 0.06    |
| Bolivia      | 57,191              | 380                  | 11,925,171  | 4796    | 31.87   | 0.36    | 0.65    |
| Ireland      | 38,081              | 52                   | 5,025,145   | 7578    | 10.35   | 0.56    | 0.21    |
| Nepal        | 59,665              | 43                   | 29,966,412  | 1991    | 1.43    | 0.15    | 0.03    |
| Saudi Arabia | 34,925              | 14                   | 35,672,322  | 979     | 0.39    | 0.07    | 0.01    |
| Morocco      | 47,939              | 189                  | 37,603,446  | 1275    | 5.03    | 0.09    | 0.10    |

Table 1: Continue

| Country                |                     |                      |             | CIL7DPM | DIL7DPM | D/13460 | E/48.76 |
|------------------------|---------------------|----------------------|-------------|---------|---------|---------|---------|
| Other                  | Cases in 7 days (A) | Deaths in 7 days (B) | Population  | D       | E       | F       | G       |
| Moldova                | 23,946              | 104                  | 4,019,106   | 5958    | 25.88   | 0.44    | 0.53    |
| Azerbaijan             | 9,941               | 91                   | 10,283,940  | 967     | 8.85    | 0.07    | 0.18    |
| Libya                  | 11,881              | 87                   | 7,019,256   | 1693    | 12.39   | 0.13    | 0.25    |
| South Africa           | 21,310              | 846                  | 60,492,914  | 352     | 13.99   | 0.03    | 0.29    |
| Guatemala              | 17,103              | 94                   | 18,440,180  | 927     | 5.10    | 0.07    | 0.10    |
| Maldives               | 16,182              | 6                    | 555,616     | 29124   | 10.80   | 2.16    | 0.22    |
| Cuba                   | 22,534              | 28                   | 11,315,661  | 1991    | 2.47    | 0.15    | 0.05    |
| Cyprus                 | 11,032              | 24                   | 1,221,282   | 9033    | 19.65   | 0.67    | 0.40    |
| Armenia                | 5,586               | 10                   | 2,972,019   | 1880    | 3.36    | 0.14    | 0.07    |
| UAE                    | 19,803              | 26                   | 10,079,655  | 1965    | 2.58    | 0.15    | 0.05    |
| Oman                   | 11,311              | 8                    | 5,312,100   | 2129    | 1.51    | 0.16    | 0.03    |
| Belarus                | 12,109              | 109                  | 9,444,398   | 1282    | 11.54   | 0.10    | 0.24    |
| Luxembourg             | 15,689              | 5                    | 642,102     | 24434   | 7.79    | 1.82    | 0.16    |
| Venezuela              | 14,394              | 27                   | 28,308,265  | 508     | 0.95    | 0.04    | 0.02    |
| Egypt                  | 10,947              | 226                  | 105,389,671 | 104     | 2.14    | 0.01    | 0.04    |
| Mongolia               | 18,978              | 9                    | 3,361,876   | 5645    | 2.68    | 0.42    | 0.05    |
| Bosnia and Herzegovina | 15,646              | 248                  | 3,248,480   | 4816    | 76.34   | 0.36    | 1.57    |
| Dominican Republic     | 33,870              | 22                   | 11,020,216  | 3073    | 2.00    | 0.23    | 0.04    |
| Algeria                | 13,847              | 81                   | 45,104,553  | 307     | 1.80    | 0.02    | 0.04    |
| Qatar                  | 21,588              | 7                    | 2,807,805   | 7689    | 2.49    | 0.57    | 0.05    |
| North Macedonia        | 11,665              | 127                  | 2,083,238   | 5599    | 60.96   | 0.42    | 1.25    |
| Guadeloupe             | 20,806              | 9                    | 400,232     | 51985   | 22.49   | 3.86    | 0.46    |
| Martinique             | 11,620              | 13                   | 374,804     | 31003   | 34.68   | 2.30    | 0.71    |
| Iceland                | 10,151              | 1                    | 344,751     | 29444   | 2.90    | 2.19    | 0.06    |
| Albania                | 14,529              | 40                   | 2,872,818   | 5057    | 13.92   | 0.38    | 0.29    |
| Sri Lanka              | 5,947               | 99                   | 21,555,499  | 276     | 4.59    | 0.02    | 0.09    |
| Uzbekistan             | 9,129               | 23                   | 34,237,280  | 267     | 0.67    | 0.02    | 0.01    |
| Botswana               | 6,017               | 31                   | 2,426,780   | 2479    | 12.77   | 0.18    | 0.26    |
| Montenegro             | 8,341               | 45                   | 628,192     | 13278   | 71.63   | 0.99    | 1.47    |
| New Caledonia          | 2,469               | 1                    | 289,845     | 8518    | 3.45    | 0.63    | 0.07    |
| El Salvador            | 4,768               | 25                   | 6,538,056   | 729     | 3.82    | 0.05    | 0.08    |
| Faeroe Islands         | 4,465               | 2                    | 49,157      | 90831   | 40.69   | 6.75    | 0.83    |
| Trinidad and Tobago    | 5,384               | 111                  | 1,406,668   | 3827    | 78.91   | 0.28    | 1.62    |
| Barbados               | 4,246               | 6                    | 287,933     | 14746   | 20.84   | 1.10    | 0.43    |
| Belize                 | 5,148               | 11                   | 409,055     | 12585   | 26.89   | 0.94    | 0.55    |
| Laos                   | 4,787               | 29                   | 7,442,735   | 643     | 3.90    | 0.05    | 0.08    |
| Afghanistan            | 1,288               | 13                   | 40,315,711  | 32      | 0.32    | 0.00    | 0.01    |
| Jamaica                | 6,450               | 58                   | 2,981,645   | 2163    | 19.45   | 0.16    | 0.40    |
| Zambia                 | 4,537               | 32                   | 19,198,341  | 236     | 1.67    | 0.02    | 0.03    |
| Channel Islands        | 2,384               | 5                    | 176,401     | 13515   | 28.34   | 1.00    | 0.58    |
| Suriname               | 5,655               | 26                   | 594,958     | 9505    | 43.70   | 0.71    | 0.90    |
| Seychelles             | 1,521               | 3                    | 99,312      | 15315   | 30.21   | 1.14    | 0.62    |
| Cameroon               | 4,447               | 14                   | 27,591,338  | 161     | 0.51    | 0.01    | 0.01    |
| Ethiopia               | 3,561               | 96                   | 119,469,104 | 30      | 0.80    | 0.00    | 0.02    |
| Sudan                  | 3,488               | 21                   | 45,469,298  | 77      | 0.46    | 0.01    | 0.01    |
| Guyana                 | 4,594               | 47                   | 792,565     | 5796    | 59.30   | 0.43    | 1.22    |
| Kyrgyzstan             | 4,944               | 18                   | 6,694,613   | 739     | 2.69    | 0.05    | 0.06    |
| Cayman Islands         | 0                   | 0                    | 66,944      | 0       | 0.00    | 0.00    | 0.00    |
| Myanmar                | 975                 | 5                    | 54,987,647  | 18      | 0.09    | 0.00    | 0.00    |
| Madagascar             | 1,548               | 54                   | 28,817,252  | 54      | 1.87    | 0.00    | 0.04    |
| Malta                  | 2,017               | 27                   | 443,406     | 4549    | 60.89   | 0.34    | 1.25    |
| Honduras               | 5,020               | 32                   | 10,154,024  | 494     | 3.15    | 0.04    | 0.06    |
| French Guiana          | 4,080               | 11                   | 310,930     | 13122   | 35.38   | 0.97    | 0.73    |
| Andorra                | 4,813               | 3                    | 77,461      | 62134   | 38.73   | 4.62    | 0.79    |
| Bhutan                 | 781                 | 0                    | 785,065     | 995     | 0.00    | 0.07    | 0.00    |
| Solomon Islands        | 619                 | 2                    | 713,535     | 868     | 2.80    | 0.06    | 0.06    |
| Uganda                 | 1,778               | 60                   | 48,025,301  | 37      | 1.25    | 0.00    | 0.03    |
| San Marino             | 1,147               | 5                    | 34,044      | 33692   | 146.87  | 2.50    | 3.01    |
| Zimbabwe               | 1,889               | 50                   | 15,205,526  | 124     | 3.29    | 0.01    | 0.07    |
| Mozambique             | 2,651               | 25                   | 32,640,542  | 81      | 0.77    | 0.01    | 0.02    |
| Palau                  | 590                 | 0                    | 18,231      | 32362   | 0.00    | 2.40    | 0.00    |

Table 1: Continue

| Country                |                     |                      |               | CIL7DPM | DIL7DPM | D/13460 | E/48.76 |
|------------------------|---------------------|----------------------|---------------|---------|---------|---------|---------|
| Other                  | Cases in 7 days (A) | Deaths in 7 days (B) | Population    | D       | E       | F       | G       |
| Saint Lucia            | 2,301               | 12                   | 184,957       | 12441   | 64.88   | 0.92    | 1.33    |
| Gibraltar              | 1,053               | 0                    | 33,675        | 31269   | 0.00    | 2.32    | 0.00    |
| Kenya                  | 2,335               | 58                   | 55,645,701    | 42      | 1.04    | 0.00    | 0.02    |
| Curaçao                | 1,956               | 14                   | 165,156       | 11843   | 84.77   | 0.88    | 1.74    |
| New Zealand            | 517                 | 0                    | 5,002,100     | 103     | 0.00    | 0.01    | 0.00    |
| Mauritius              | 552                 | 0                    | 1,275,112     | 433     | 0.00    | 0.03    | 0.00    |
| Liechtenstein          | 831                 | 0                    | 38,301        | 21697   | 0.00    | 1.61    | 0.00    |
| Ghana                  | 1,893               | 29                   | 32,099,491    | 59      | 0.90    | 0.00    | 0.02    |
| Grenada                | 1,478               | 1                    | 113,349       | 13039   | 8.82    | 0.97    | 0.18    |
| Hong Kong              | 453                 | 0                    | 7,593,331     | 60      | 0.00    | 0.00    | 0.00    |
| Greenland              | 1,238               | 1                    | 56,926        | 21748   | 17.57   | 1.62    | 0.36    |
| Fiji                   | 1,919               | 33                   | 906,736       | 2116    | 36.39   | 0.16    | 0.75    |
| Haiti                  | 742                 | 3                    | 11,622,670    | 64      | 0.26    | 0.00    | 0.01    |
| Gabon                  | 793                 | 1                    | 2,308,835     | 343     | 0.43    | 0.03    | 0.01    |
| Monaco                 | 847                 | 0                    | 39,683        | 21344   | 0.00    | 1.59    | 0.00    |
| Nigeria                | 1,337               | 17                   | 214,223,246   | 6       | 0.08    | 0.00    | 0.00    |
| Dominica               | 770                 | 3                    | 72,269        | 10655   | 41.51   | 0.79    | 0.85    |
| Mauritania             | 1,790               | 23                   | 4,843,004     | 370     | 4.75    | 0.03    | 0.10    |
| Angola                 | 3,319               | 21                   | 34,483,018    | 96      | 0.61    | 0.01    | 0.01    |
| DRC                    | 1,776               | 0                    | 93,867,492    | 19      | 0.00    | 0.00    | 0.00    |
| Antigua and Barbuda    | 677                 | 1                    | 99,213        | 6824    | 10.08   | 0.51    | 0.21    |
| Senegal                | 1,279               | 21                   | 17,441,958    | 73      | 1.20    | 0.01    | 0.02    |
| Papua New Guinea       | 124                 | 1                    | 9,215,300     | 13      | 0.11    | 0.00    | 0.00    |
| Aruba                  | 1,186               | 7                    | 107,484       | 11034   | 65.13   | 0.82    | 1.34    |
| Malawi                 | 1,038               | 54                   | 19,911,995    | 52      | 2.71    | 0.00    | 0.06    |
| Rwanda                 | 2,245               | 20                   | 13,460,207    | 167     | 1.49    | 0.01    | 0.03    |
| Isle of Man            | 682                 | 0                    | 85,746        | 7954    | 0.00    | 0.59    | 0.00    |
| Kiribati               | 42                  | 0                    | 122,351       | 343     | 0.00    | 0.03    | 0.00    |
| Bermuda                | 1,118               | 4                    | 61,913        | 18058   | 64.61   | 1.34    | 1.32    |
| Namibia                | 764                 | 91                   | 2,613,749     | 292     | 34.82   | 0.02    | 0.71    |
| Caribbean Netherlands  | 854                 | 1                    | 26,609        | 32094   | 37.58   | 2.38    | 0.77    |
| French Polynesia       | 519                 | 0                    | 283,481       | 1831    | 0.00    | 0.14    | 0.00    |
| Taiwan                 | 460                 | 0                    | 23,885,078    | 19      | 0.00    | 0.00    | 0.00    |
| China                  | 447                 | 0                    | 1,448,129,940 | 0       | 0.00    | 0.00    | 0.00    |
| Ivory Coast            | 928                 | 19                   | 27,411,758    | 34      | 0.69    | 0.00    | 0.01    |
| Syria                  | 291                 | 21                   | 18,173,320    | 16      | 1.16    | 0.00    | 0.02    |
| Mayotte                | 1,063               | 1                    | 283,230       | 3753    | 3.53    | 0.28    | 0.07    |
| Burundi                | 388                 | 0                    | 12,450,875    | 31      | 0.00    | 0.00    | 0.00    |
| Bahamas                | 1,133               | 12                   | 399,196       | 2838    | 30.06   | 0.21    | 0.62    |
| Brunei                 | 191                 | 0                    | 444,114       | 430     | 0.00    | 0.03    | 0.00    |
| Tanzania               | 1,525               | 33                   | 62,425,392    | 24      | 0.53    | 0.00    | 0.01    |
| Cambodia               | 247                 | 0                    | 17,085,369    | 14      | 0.00    | 0.00    | 0.00    |
| Saint Pierre Miquelon  | 242                 | 0                    | 5,749         | 42094   | 0.00    | 3.13    | 0.00    |
| Turks and Caicos       | 375                 | 4                    | 39,546        | 9483    | 101.15  | 0.70    | 2.07    |
| Eritrea                | 305                 | 6                    | 3,624,146     | 84      | 1.66    | 0.01    | 0.03    |
| Lesotho                | 233                 | 2                    | 2,169,151     | 107     | 0.92    | 0.01    | 0.02    |
| St. Barth              | 355                 | 0                    | 9,925         | 35768   | 0.00    | 2.66    | 0.00    |
| Saint Kitts and Nevis  | 277                 | 4                    | 53,795        | 5149    | 74.36   | 0.38    | 1.52    |
| Benin                  | 273                 | 1                    | 12,625,546    | 22      | 0.08    | 0.00    | 0.00    |
| Togo                   | 316                 | 4                    | 8,585,747     | 37      | 0.47    | 0.00    | 0.01    |
| Burkina Faso           | 224                 | 0                    | 21,809,963    | 10      | 0.00    | 0.00    | 0.00    |
| Guinea-Bissau          | 344                 | 1                    | 2,041,601     | 168     | 0.49    | 0.01    | 0.01    |
| Djibouti               | 283                 | 0                    | 1,010,751     | 280     | 0.00    | 0.02    | 0.00    |
| Tajikistan             | 134                 | 0                    | 9,876,647     | 14      | 0.00    | 0.00    | 0.00    |
| Equatorial Guinea      | 240                 | 3                    | 1,475,866     | 163     | 2.03    | 0.01    | 0.04    |
| Chad                   | 186                 | 5                    | 17,171,372    | 11      | 0.29    | 0.00    | 0.01    |
| Liberia                | 122                 | 2                    | 5,245,781     | 23      | 0.38    | 0.00    | 0.01    |
| St. Vincent Grenadines | 58                  | 4                    | 111,498       | 520     | 35.88   | 0.04    | 0.74    |
| Comoros                | 43                  | 0                    | 898,918       | 48      | 0.00    | 0.00    | 0.00    |
| Sierra Leone           | 49                  | 0                    | 8,233,735     | 6       | 0.00    | 0.00    | 0.00    |
| Somalia                | 1,127               | 0                    | 16,594,596    | 68      | 0.00    | 0.01    | 0.00    |

CIL7DPM: Cases in the last 7 days/1M population and DIL7DPM: Death in the last 7 days/1M population

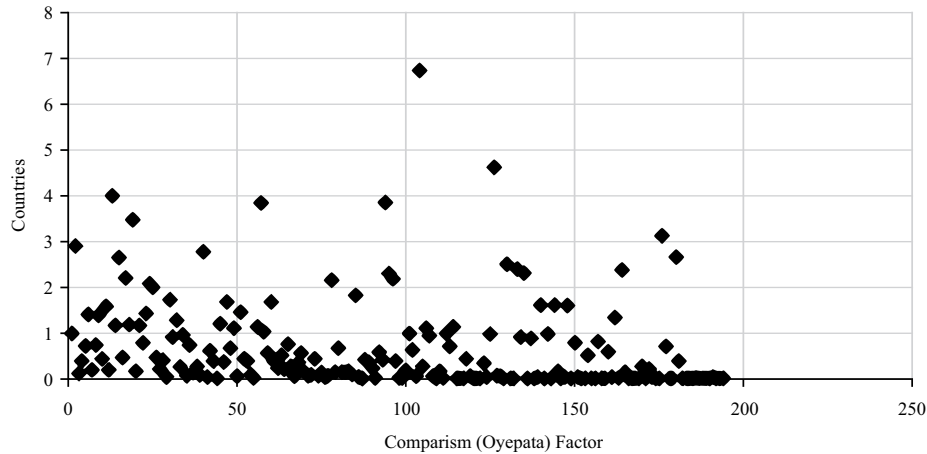


Fig. 1: Comparism Factor per country relative to USA, 19th-25th January, 2022  
X-axis: Comparism (Oyepata) Factor and Y-axis: Countries

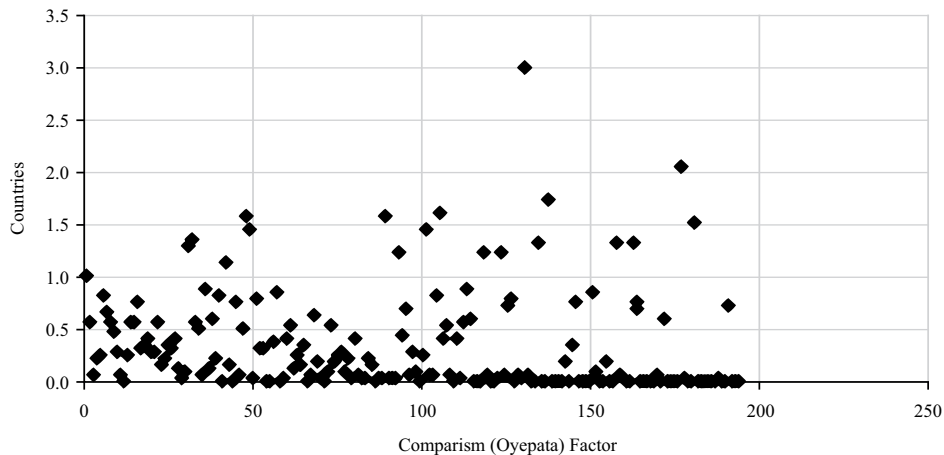


Fig. 2: Death Oyepata Factor caused by COVID-19 for each country relative to USA as at 19th-25th January, 2022  
X-axis: Comparism (Oyepata) Factor and Y-axis: Countries

Figure 1 and 2 obtained for USA were used in determining the Comparism Factor (CF) or Oyepata Factor which is a ratio of figure obtained to that of a particular country population divided by that of the USA.

Values of CF1 (or OF1) and CF2 (or OF2) represent case/incidence and mortality index. Factor of  $>1$  = Very high infection and mortality index, Factor of approximately  $1$  = High infection and mortality index, Factor of  $\leq 1$  but  $\geq 0.5$  = Moderately high infection and mortality index, Factor of  $\leq 0.5$  but  $\geq 0.1$  = Low infection and mortality index, Factor of  $< 0.1$  = Very low infection, mortality and recovery index.

## DISCUSSION

From analyzed data, American continent had higher mortality Comparism Factor to infection cases, while European

continents had higher infectious comparism value than mortality value. African continents, with exception of South Africa and Botswana, has an unbothered value of mortality and infectivity when compared to the rest of the world. Recently, there has been new mutated strain of the virus from the original strain, with many possible strain unfortunately expected to keep reshaping our understanding of the situation<sup>37</sup>. This has caused unprecedented burden to public health, food and world workforce. Various variant have been identified in several countries and it could potentially affect thousands to millions of deaths if not properly handled<sup>38</sup>.

Africa is known to be an acceptable home to several infectious diseases such as dengue fever, small pox, measles chicken pox, Ebola and polio disease<sup>39-41</sup>. In many cases, vaccination has been developed against some of this infection or the body immune system has successfully found a way to

defend against this pathogens<sup>42-44</sup>. This may have had a beneficial effect against exposure to same or related organism. There is the likelihood of the virus spreading fast across African populations within a minimal period of time causing a large proportion to have been exposed to the virus without manifesting obvious symptoms and may have even recovered.

America continent appears to have more infectivity and higher reports of mortality from the new variant of COVID-19. Africa has been least plagued by the all variant at all phases. Also, most European countries have lesser mortality ratio when compared to American continents. These observations interesting compared previous works on the cumulative effect of the virus<sup>45-47</sup>. Africans appear to be unaffected from this seemingly uncontrollable and lethal unleash. Apart from fewer cases of the infection, Africans have shown potential to have much lesser mortality even when compared to case of the infection<sup>45-48</sup>. This suggested that Africans body system have over time developed a more progressive, robust and faster immune response that reduces chances of the virus causing disease related health complication. Compared to previous cumulative observation, though mortality rate remained higher than other western countries, USA has made remarkable stride in preventing and reducing the cases of infection compared to several other countries that suffered same fate from the virus. From available data, Africa which generally is classified as third world or clearly underdeveloped do not have severe medical consequences of the infection and when infected they tends to recover faster with lower chance of complications and mortality.

As previously noted, Africans lives as a community and in dense clusters which is obviously different to most western countries that exist in solitary system<sup>49</sup>. Thus, it is expected that most individuals in Africa may have been exposed to the virus without knowing or developing major symptoms. This has made several observers around the world to speculate that Africa may consequentially become a graveyard. Reasons for this fortunately unexpected result has puzzled many analyst around the world. Studies have shown, that because of poor health and environment, the immune systems of African children tends to develop faster and more robust compared to Dutch children<sup>50</sup>. Childhood exposure to pathogenic organism may have boasted the immune system and protect children from developing certain allergies and other infectious diseases, on later exposure to the similar allergen or pathogen<sup>51</sup>. This view is also supported with data and Comparism Factor obtained from Haiti. Haiti is currently the poorest country in the Latin America and Caribbean Region and among least developed countries in the world<sup>52,53</sup>.

They have one the least case of infection and mortality resulting in little to no significant value of Comparism Factor. Thus, childhood or early exposure to some diseases in poor countries may have encouraged a more robust immune response to same or related infection. Therefore, several African countries be both vulnerable and potentially more defensive against the corona virus.

## **CONCLUSION**

Many underdeveloped countries, particularly Africans and Haiti, have developed an unexpected survival mechanism. While there appears to be a conflicting approach on how best to manage and live with the virus, the virus and its apparently unending variants suggests that understanding and utilizing Africans biological survival mechanism may be the best way to regain near normal freedom.

## **SIGNIFICANCE STATEMENT**

The study discovered that America and Europe, two of the most developed continent in the world are ironically still the most affected by the pandemic. Africa, against public expectation has shown little sign of been affected by the pandemic. This may be due to environmental exposure or vaccination against related microorganism, which may have resulted to some kind of biological immunity that became beneficial against subsequent exposure. The study also revealed that Africa, like every other continents needs vaccine but not on a relatively desperate demand.

## **ACKNOWLEDGMENTS**

The authors wish to thank everyone who has contributed to the collation and analysis of data. Special recognition to United Nations geoscheme and WHO granting access to information.

## **REFERENCE**

1. Fan, Y., K. Zhao, Z.L. Shi and P. Zhou, 2019. Bat coronaviruses in China. *Viruses*, Vol. 11. 10.3390/v11030210.
2. Aniszewski, T., 2007. *Alkaloids-Secrets of Life: Alkaloid Chemistry, Biological Significance, Applications and Ecological Role*. Elsevier Science, Amsterdam, Netherlands, ISBN: 978-0-444-52736-3, Pages: 316.
3. Iretila, B.M., J.S. Oyepata and B.P. Usman, 2020. A survey of wound care practices by nurses in a clinical setting. *Int. J. Health Med. Sci.*, 6: 74-81.

4. Simeon, J.O., M. Builders and J.O. Tosin, 2020. Effect of caffeine on diazepam-induced sedation and hypnosis in Wister rat. *Global Sci. J.*, 8: 451-466.
5. Simeon, J.O., B. Modupe, J.O. Tosin and S.A. Zubairu, 2020. Assessing differential impacts of COVID-19 on African countries: A comparative study. *Int. J. Res. Innovation Appl.*, 5: 197-203.
6. Simeon, J.O., M.T. Lubo, J.O. Tosin and I. Irabor, 2020. The dynamics of differential impacts of COVID-19 on African countries compared to other parts of the world. *Int. J. Multidiscip. Res. Anal.*, 3: 185-198.
7. Islam, M.A., S.S. Alam, S. Kundu, T. Hossan, M.A. Kamal and C. Cavestro, 2020. Prevalence of headache in patients with coronavirus disease 2019 (COVID-19): A systematic review and meta-analysis of 14,275 patients. *Front. Neurol.*, Vol. 11. 10.3389/fneur.2020.562634.
8. Solomon, I.P., S.A. Oyebadejo, E.M. Ukpo and O.S. Joseph, 2015. Changes in serum electrolyte, creatinine and urea of fresh *Citrus limon* juice administered to growing rabbits (*Oryctolagus cuniculus*). *Int. J. Agric. Sci. Res.*, 4: 180-183.
9. Aprioku, J.S., O.S. Joseph and A.W. Obianime, 2016. Quantification of antinociceptive and anti-inflammatory potentials of different *Ocimum gratissimum* Linn. leaf extracts in male Wistar albino rats. *Eur. J. Med. Plants*, Vol. 17. 10.9734/EJMP/2016/30150.
10. Okokon, J.E., J.O. Simeon and E.E. Umoh, 2017. Hepatoprotective activity of the extract of *Homalium letestui* stem against paracetamol-induced liver injury. *Avicenna J. Phytomed.*, 7: 27-36.
11. Tamara, A. and D.L. Tahapary, 2020. Obesity as a predictor for a poor prognosis of COVID-19: A systematic review. *Diabetes Metab. Syndr.: Clin. Res. Rev.*, 14: 655-659.
12. Joseph, O.S. and O.T. Joseph, 2018. Hepatoprotective activity of ethanolic stem extract of *Homalium letestui* against thioacetamide-induced liver injury. *Niger. J. Pharm.*, 52: 67-74.
13. Wu, X., R.C. Nethery, M.B. Sabath, D. Braun and F. Dominici, 2020. Air pollution and COVID-19 mortality in the United States: Strengths and limitations of an ecological regression analysis. *Sci. Adv.*, Vol. 6. 10.1126/sciadv.abd4049.
14. Joseph, O.S., J.E. Okokon and O.T. Joseph, 2018. Hepatoprotective activity of extract of *Homalium Letestui* stem against carbon tetrachloride-induced liver injury. *Adv. Herb. Med.*, 4: 1-11.
15. Joseph, O.S., J.E. Okokon and O.T. Joseph, 2018. Effect of ethanol stem extract of *Homalium letestui* on gentamicin-induced kidney injury in rat. *Adv. Herb. Med.*, 4: 51-64.
16. Tosin, J.O., O.A. Wolfe, S.M. Iyeopu, J.O. Simeon, A. Chinwe and M.T. Lubo, 2019. Clinical study on the effect of *Moringa oleifera* on serum level of glucose and tryglyceride in subjects taken tenofovir, lamivudine and efavirenz combination regimen. *Eur. Sci. J.*, 15: 280-293.
17. Petrakis, D., D. Margină, K. Tsarouhas, F. Tekos and M. Stan *et al.*, 2020. Obesity-A risk factor for increased COVID-19 prevalence, severity and lethality (Review). *Mol. Med. Rep.*, 22: 9-19.
18. Simeon, J.O., M. Builders, W.C. Haruna, J.O. Tosin, S.A. Zubairu, M.T. Lubo and M.A. Sadiq, 2019. Effect of administration ethanol leaf extract of *Terminalia chebula* on liver of Wister rat. *Int. J. Res. Sci. Innovation*, 6: 91-97.
19. Simeon, J.O., B. Modupe, W.C. Haruna, S.A. Zubairu, M.T. Lubo and J.O. Tosin, 2019. Histological study of effect of ethanol stem extracts of *Homalium letestui* on thioacetamide-induced injury in albino rat, using various staining techniques. *Int. J. Res. Sci. Innovation*, 6: 77-85.
20. Zubairu, S.A., M.T. Lubo, J.O. Simeon, B. Modupe and J.O. Tosin, 2019. Histological study of effect of ethanol stem extracts of homalium letestui in paracetamol induced injury in albino rat, using various staining techniques. *Am. J. Biomed. Sci. Res.*, 4: 82-89.
21. Joseph, S.O., M. Builders, O.T. Joseph, E.C. Ariahu, S.A. Zubairu, T. Musa and P.J. Oyepata, 2019. Toxicity study of ethanol leaf extract of *Ocimum canum* on heart and lipid profile of Wister rats. *Int. J. Curr. Adv. Res.*, 8: 18799-18803.
22. Wang, L., Y. Wang, D. Ye and Q. Liu, 2020. Review of the 2019 novel coronavirus (SARS-CoV-2) based on current evidence. *Int. J. Antimicrob. Agents*, Vol. 55. 10.1016/j.jantimicag.2020.105948.
23. Oyebadejo, S.A., O.S. Joseph, S.O. Adesite and E.R. Abia, 2019. Effect of citrus limon juice and tamoxifen on the oxidative stress activities of MCF-7 cell induced breast cancer in Sprague Dawley rats. *World J. Pharm. Pharm. Sci.*, 8: 76-92.
24. Oyebadejo, S.A., O.S. Joseph, S.O. Adesite and A.O. Omorilewa, 2019. Effect of citrus limon juice and tamoxifen on the tumour growth mass indices, cell proliferation, cell viability and cytogenetic (mitotic index) of Sprague Dawley rats induced MCF-7 breast cancer cells. *Saudi J. Biomed. Res.*, 4: 216-225.
25. Builders, M.I., O.S. Joseph and A.R. Vhritherhire, 2019. Effect of *Parkia biglobosa* extract on open skin wound healing in dexamethasone-induced hyperglycaemia and histological assessment in rats. *Afr. J. Pharm. Pharmacol.*, 13: 84-89.
26. Joseph, O.S., M. Builders, O.T. Joseph, A.Z. Sabastine, T.L. Musa and P.J. Oyepata, 2019. Sub-acute toxicity study of ethanol leaf extract of *Ocimum canum* on the kidney of Wistar rats. *Afr. J. Pharm. Res. Dev.*, 11: 1-7.
27. Domingo, J.L., M. Marquès and J. Rovira, 2020. Influence of airborne transmission of SARS-CoV-2 on COVID-19 pandemic. A review. *Environ. Res.*, Vol. 188. 10.1016/j.envres.2020.109861.
28. Joseph, O.S., M. Builders, O.T. Joseph, A.Z. Sabastine, T.L. Musa and P.J. Oyepata, 2019. Sub-acute toxicity study of ethanol leaf extract of *Ocimum canum* on brain, lungs, stomach and spleen of Wister rats. *Afr. J. Pharm. Res. Dev.*, 11: 35-42.

29. Pansini, R. and D. Fornacca, 2021. Early spread of COVID-19 in the air-polluted regions of eight severely affected countries. *Atmosphere*, Vol. 12. 10.3390/atmos12060795.
30. Joseph, O.S., M. Builders, E.U. Emem and O.T. Joseph, 2019. Effect of ethanol leaf extract of *Cassia angustifolia* extract on liver of Wister rats. *Global Sci. J.*, 7: 343-359.
31. Joseph, O.S., M. Builders, E.U. Emem and O.T. Joseph, 2019. Effect of ethanol leaf extract of *Cassia angustifolia* extract on kidney of Wister rats. *Global Sci. J.*, 7: 106-122.
32. Haruna, W.C., J.O. Simeon, M. Builders and J.O. Tosin, 2020. Effect of ethanol leaf extract of *Cassia angustifolia* extract on heart and lipid profile of Wister rats. *Afr. J. Pharm. Res. Dev.*, 21: 48-55.
33. Izzo, A.A., 2004. Drug interactions with St. John's Wort (*Hypericum perforatum*): A review of the clinical evidence. *Int. J. Clin. Pharmacol. Ther.*, 42: 139-148.
34. Simeon, J.O., S.A. Zubairu and J.O. Tosin, 2021. Clinical evaluation of the potential benefits of taking *Moringa oleifera* on blood triglyceride and cholesterol level in patient taking tenofovir/lamivudine/efavirenz (TLE) combination. *J. Pharm. Sci. Res.*, 13: 623-629.
35. Oyepata, J.S., 2021. The earth: A lost planet from another universe. *Int. J. Multidiscip. Res. Anal.*, 4: 1795-1797.
36. Simeon, J.O., J.O. Tosin and A.D. Adegbeniga, 2021. The relative global consequences of cumulative distribution of COVID-19, using the USA as comparism factor and cumulative COVID-19 data of 31st October 2021. *Int. J. Multidiscip. Res. Anal.*, 4: 1906-1916.
37. Builders, M.I., J.O. Simeon, T.O. Ogundeko and P. Builders, 2020. Antimalarial drugs and COVID-19. *Sumerian J. Med. Healthcare*, 3: 111-116.
38. Zubairu, S.A., J.O. Simeon and J.O. Tosin, 2021. Effect of ethanol leaf extract of *Terminalia chebula* extract on kidney of Wister rats. *Global Sci. J.*, 9: 514-526.
39. Simeon, J.O., B. Modupe, J.O. Tosin, F.T. Ibukun, O.J. Ogwuche, M.F. Daniel and M.T. Lubo, 2021. Effect of the demographic of COVID-19 on different countries; using the USA for comparism. *Int. J. Multidiscip. Res. Anal.*, 4: 193-201.
40. Joseph, S.O. and J.T. Opeyemi, 2020. Effect of clinical study of *Moringa oleifera* on body mass index, low density lipoprotein and triglyceride level in patients on tenofovir/lamivudine/efavirenz combination therapy. *Adv. Herb. Med.*, 6: 14-27.
41. Zubairu, S.A., O.A. Festus, J.O. Simeon, I. Irabor and J.O. Tosin, 2021. Effect of *Anacardium occidentale* fruit juice extract on haematological parameters and spleen of paracetamol induced injury in albino rats. *Global Sci. J.*, 9: 1640-1654.
42. Zubairu, S.A., J.O. Simeon, J.O. Simeon, F.T. Ibukun and O.A. Festus, 2021. Effect of cashew apple juice (*Anacardium occidentale* L.) on hematology and spleen of gentamicin induced injury in albino rats. *Global Sci. J.*, 9: 3686-3698.
43. Tosin, J.O., S.A. Zubairu and J.O. Simeon, 2021. Clinical effect of *Moringa oleifera* on body mass index, triglyceride and high density lipoprotein in subjects taken tenofovir combination regimen. *Eur. J. Biol. Med. Sci. Res.*, 9: 6-19.
44. Simeon, J.O., J.O. Tosin, S.A. Zubairu and J.S. Oyepata, 2022. Studying the trend and progress on COVID-19 pandemic from 29th January to 4th of February 2022 across different countries of the world. *Int. J. Res. Innovation Soc. Sci.*, 6: 499-505.
45. Simeon, J.O., O.A. Festus, S.A. Zubairu, J.O. Tosin and S.B.S. Sunday, 2022. Update report and analysis on the global trends and progress of COVID-19 pandemic on 18th January, 2022 across different countries of the world. *Int. J. Res. Innovation Appl. Sci.*, 7: 58-66.
46. Tosin, J.O., O.A. Festus, S.A. Zubairu, S.B. Sunday and J.O. Simeon, 2022. Understanding the cumulative distribution, implication and progress on COVID-19 pandemic as at 7th of February 2022 across different countries of the world: An update report. *Int. J. Res. Innovation Soc. Sci.*, 6: 691-699.
47. Simeon, J.O., J.O. Tosin and S.A. Zubairu, 2022. Cumulative evaluation of demography and distribution of COVID-19 around the globe: An update report of COVID-19 until 17th February, 2022. *Int. J. Epidemiol. Health Sci.*, Vol. 3. 10.51757/IJEHS.3.6.2022.251435.
48. Etuk, I.C., J.A. Udobang, A.O. Daniel, O. Ekong, J.E. Okokon and O.S. Joseph, 2023. Effect of leaf extract and fractions of *Solanum anomalum* on oxidative stress markers, kidney function indices and histology of alloxan-induced diabetic rats. *J. Curr. Biomed. Res.*, 3: 783-799.
49. Chen, N., M. Zhou, X. Dong, J. Qu and F. Gong *et al.*, 2020. Epidemiological and clinical characteristics of 99 cases of 2019 novel Coronavirus pneumonia in Wuhan, China: A descriptive study. *Lancet*, 395: 507-513.
50. Woo, P.C.Y., Y. Huang, S.K.P. Lau and K.Y. Yuen, 2010. Coronavirus genomics and bioinformatics analysis. *Viruses*, 2: 1804-1820.
51. Simeon, J.O., B. Modupe, D.R. Isinkaye, S.A. Zubairu and M.T. Lubo *et al.*, 2019. Sub-acute toxicity study of ethanol leaf extract of *Terminalia chebula* on brain, stomach and spleen of Wister rats. *Am. J. Biomed. Sci. Res.*, 3: 277-282.
52. Saniasiaya, J., M.A. Islam and B. Abdullah, 2021. Prevalence and characteristics of taste disorders in cases of COVID-19: A meta-analysis of 29,349 patients. *Otolaryngology Head Neck Surg.*, 165: 33-42.
53. Joseph, O.S., M. Builders, O.T. Joseph, S.A. Zubairu, T. Musa and P.J. Oyepata, 2019. Sub-acute toxicity study of ethanol leaf extract of *Ocimum canum* on liver of Wister rats. *Int. J. Res. Sci. Innov.*, 6: 364-369.