Genetic, demographic and virology study on active and mortality cases of COVID-19 across different countries of the world as at 12th October 17, 2022.

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Abstract

Introduction/aim: Since the first case of infection with a new Coronavirus was detected in China in December 2019, SARS-CoV-2 has killed more than 5 million people and infected hundreds of millions of others. It has since spread to almost every country. This project's goal is to conduct a study on COVID-19 death cases and current cases around the world as of October 12, 2022.

Materials and methods: The United Nations geoscheme provided data for 132 nations and regions around the globe. After compiling the findings, they were compared to those discovered for the USA.

Results: The majority of the American continent has close active case and death values to those of the USA when considering that country as a comparism point. The mortality value in the majority of American nations is higher than the active case value. Some European nations have incidence values that are significantly greater than those of the USA. Additionally, the majority of European nations have a greater active case value than a death value. African and Asian nations are less valuable. Africa's worth is the lowest of the two.

Conclusion: Genetic variation may have played a role in infectability and mortality of COVID-19 virus. Further study need to be done to determine the significance of various contributing factor that may be a lead to development of more robust vaccine now and in the future.

Keywords: Africa, USA, COVID-19, America, Nigeria, Europe, Continent

Introduction

Genetic mutations or viral recombination may occur during genome replication [1-4]. An assemblage of genetically different viral strains with a common ancestor is referred to as a lineage [5,6]. One or more mutations in a particular strain of the SARS-CoV-2 virus distinguish it from other varieties. When the genetic material of two distinct variations is joined, a recombinant is created [7]. Throughout this pandemic, many SARS-CoV-2 mutations have been discovered globally and in the United States [8-9]. In order to enlighten local outbreak investigations and comprehend national trends, scientists analyze the genetic differences between viruses to uncover variants (including recombinants) and how they are related to one another [10-14].

The United States has 16% of the pandemic's cases while having only 5% of the world's population [15]. Many have assumed and conjectured that Africa will be the area most severely afflicted [16-19]. Even while it appears that this is not the case, there is still a great deal of worry and apprehension over the likelihood of a fresh outbreak with African origins. The Coronavirus family of viruses can cause respiratory illnesses in people [20-23]. The term "Coronas" refers to the spikes that cover the surface of the virus and look like crowns [24]. The common cold, Middle Eastern Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) are a few examples of Coronaviruses that can infect people [25]. A brand new strain of the Coronavirus known as COVID-19 was first identified in Wuhan, China, in December 2019 [26-29]. A recent variety from South Africa is called the omicron variant. Compared to the original virus that causes COVID-19 and the delta variation, it spreads more quickly and easily [30-33]. Even if individuals have had vaccinations or are asymptomatic, the CDC anticipates that anyone with an omicron infection, like the original, can spread the virus to others. People who have the omicron form of the virus may exhibit symptoms similar to those of earlier variants [34,35]. Age, other medical conditions, prior infection history and COVID-19 vaccination status can all have an impact on the presence and severity of symptoms [36].

Omicron infections often cause a milder sickness than early infections do. Omicron may cause relatively minor disease, but some people may still experience major illness, need hospitalization, and pass away from the infection brought on by

this variant [37-39]. Even if just a tiny portion of patients with omicron infection require hospitalization, the huge number of cases could overwhelm the healthcare system, which is why it's imperative to take preventative steps [40-43].

Numerous studies have examined the characteristics, nature and power of the virus; however, controlling and advancing the trend will also profit from monitoring the most recent information in real time [44-46]. The objective of this study is to conduct an update study on COVID-19 death cases and active cases worldwide as of October 12, 2022.

Literature Review

Methodology

132 nations from different continents and parts of the world were selected for this study. Information was obtained from the United Nations geoscheme. The information gathered on active and fatal cases up to October 12, 2022, per 100,000 persons for these countries were assessed and the results were directly compared to that gathered for the USA. Given that it has one of the greatest healthcare systems and the highest COVID-19 case rates across nations with comparable sized populations, the USA was employed as a Comparism Factor (CF) or Oyepata Factor (OF).

Statistical analysis

In this study, markers such as total cases and total deaths per 1,000,000 people were compared to US values. To compare the proportions of all the variables, the *Chi-square* test and bivariate analysis were also utilized. In summarizing this study, country observations are scaled to compare two nations that are otherwise comparable. Therefore, rate ratios below one suggest that lower levels of a certain trait are linked to lower rates of infection or mortality, and vice versa.

Results

The majority of the American continent has close active case and death values to those of the USA when considering that country as a comparison point. The mortality value in the majority of American nations is higher than the active case value. Some European nations have incidence values that are significantly greater than those of the USA. Additionally, the majority of European nations have a greater active case value than a death value. African and Asian nations are less valuable. Africa is the region with the lowest value (Table 1).

Table 1. *Cases and death of COVID-19.*

S/N	Country, other	Total cases	Total deaths	Active cases	Active cases/ 1 M pop (A)	A/5103 (OF1)	Deaths/1M pop (B)	B/3247(OF2)
1	USA	98,572,011	10,87,976	17,10,125	5,103	1.00	3,247	1.00
2	India	44,616,394	5,28,822	27,374	19	0.00	375	0.12
3	France	35,875,626	1,55,535	9,02,207	13,753	2.70	2,371	0.73
4	Brazil	34,766,204	6,86,928	1,53,158	709	0.14	3,180	0.98
5	Germany	34,121,168	1,50,720	12,69,348	15,041	2.95	1,786	0.55
6	S. Korea	24,995,246	28,708	4,30,215	8,375	1.64	559	0.17
7	UK	23,735,273	1,90,888	1,50,251	2,187	0.43	2,779	0.86
8	Italy	22,896,742	1,77,650	5,20,919	8,644	1.69	2,948	0.91
9	Japan	21,564,995	45,538	10,85,461	8,642	1.69	363	0.11
10	Russia	21,232,963	3,88,404	3,74,007	2,560	0.50	2,659	0.82
11	Turkey	16,896,522	1,01,179	6,494	75	0.01	1,171	0.36
12	Spain	13,441,941	1,14,468	84,894	1,814	0.36	2,446	0.75
13	Vietnam	11,488,685	43,154	8,48,395	8,542	1.67	434	0.13
14	Australia	10,278,831	15,383	46,548	1,779	0.35	588	0.18
15	Argentina	97,13,594	1,29,958	9,656	209	0.04	2,817	0.87
16	Netherlands	84,65,022	22,702	65,973	3,831	0.75	1,318	0.41
17	Iran	75,52,812	1,44,498	80,162	927	0.18	1,672	0.51
18	Mexico	70,97,264	3,30,208	3,98,193	3,016	0.59	2,501	0.77
19	Taiwan	69,45,018	11,620	8,54,658	35,738	7.00	486	0.15
20	Indonesia	64,48,220	1,58,235	16,392	59	0.01	565	0.17

21	Poland	63,18,840	1,17,801	8,65,099	22,915	4.49	3,120	0.96
22	Colombia	63,08,087	1,41,807	30,465	585	0.11	2,721	0.84
23	Portugal	55,01,103	25,075	57,982	5,724	1.12	2,475	0.76
24	Austria	52,73,660	20,857	1,39,503	15,291	3.00	2,286	0.70
25	Ukraine	51,77,217	1,09,206	44,137	1,023	0.20	2,532	0.78
26	Greece	49,75,067	33,200	31,358	3,042	0.60	3,221	0.99
27	Malaysia	48,56,217	36,403	22,167	666	0.13	1,093	0.34
28	DPRK	47,72,813	74	0	0	0.00	3	0.00
29	Thailand	46,85,047	32,829	4,943	70	0.01	468	0.14
30	Israel	46,69,749	11,710	3,762	403	0.08	1,256	0.39
31	Chile	46,56,842	61,345	12,799	657	0.13	3,148	0.97
32	Belgium	45,75,519	32,746	73,112	6,247	1.22	2,798	0.86
33	Canada	42,70,891	45,394	65,288	1,696	0.33	1,179	0.36
34	Peru	41,48,691	2,16,788	5,573	164	0.03	6,373	1.96
35	Switzerland	41,44,447	14,203	93,173	10,590	2.08	1,614	0.50
36	Czechia	41,31,060	41,281	20,945	1,948	0.38	3,839	1.18
37	South Africa	40,21,386	1,02,194	6,686	110	0.02	1,675	0.52
38	Philippines	39,71,455	63,329	25,004	221	0.04	561	0.17
39	Romania	32,77,020	67,097	14,099	744	0.15	3,541	1.09
40	Denmark	31,22,154	7,151	13,505	2,313	0.45	1,225	0.38
41	Sweden	26,01,153	20,243	25,503	2,490	0.49	1,976	0.61
42	Iraq	24,60,868	25,356	464	11	0.00	600	0.18
43	Serbia	23,81,680	17,099	36,009	4,159	0.82	1,975	0.61
44	Hungary	21,07,907	47,576	35,039	3,648	0.71	4,953	1.53
45	Bangladesh	20,30,550	29,386	29,961	178	0.03	174	0.05
46	Singapore	19,57,916	1,632	86,783	14,574	2.86	274	0.08
47	Slovakia	18,47,728	20,485	5,702	1,043	0.20	3,748	1.15
48	Hong Kong	18,11,344	10,237	2,18,915	28,673	5.62	1,341	0.41
49	New Zealand	18,00,602	3,013	10,227	2,045	0.40	602	0.19
50	Georgia	17,80,691	16,900	1,26,498	31,849	6.24	4,255	1.31
51	Jordan	17,46,997	14,122	1,868	179	0.04	1,354	0.42
52	Ireland	16,66,048	7,922	6,282	1,241	0.24	1,565	0.48
53	Pakistan	15,73,115	30,620	3,806	17	0.00	133	0.04
54	Norway	14,63,093	4,121	1,180	214	0.04	747	0.23
55	Kazakhstan	13,94,028	13,692	970	50	0.01	710	0.22
56	Finland	13,12,634	6,149	26,614	4,786	0.94	1,106	0.34
57	Bulgaria	12,66,241	37,758	11,475	1,680	0.33	5,528	1.70
58	Morocco	12,65,115	16,278	125	3	0.00	429	0.13
59	Lithuania	12,58,521	9,347	18,283	6,935	1.36	3,546	1.09

60	Croatia	12,38,556	16,986	4,045	999	0.2	4,196	1.29
61	Lebanon	12,16,638	10,684	1,18,367	17,520	3.43	1,581	0.49
62	Slovenia	12,06,990	6,842	35,134	16,895	3.31	3,290	1.01
63	Guatemala	11,29,542	19,836	158	8	0.00	1,063	0.33
64	Cuba	11,11,238	8,530	78	7	0.00	754	0.23
65	Bolivia	11,08,702	22,237	29,369	2,440	0.48	1,848	0.57
66	Costa Rica	10,72,807	8,913	2,03,183	39,076	7.66	1,714	0.53
67	UAE	10,31,500	2,346	18,613	1,832	0.36	231	0.07
68	Ecuador	10,06,070	35,900	2,442	134	0.03	1,967	0.61
69	Nepal	9,99,946	12,018	575	19	0.00	396	0.12
70	Belarus	9,94,037	7,118	1,327	141	0.03	754	0.23
71	Panama	9,88,280	8,505	872	195	0.04	1,903	0.59
72	Uruguay	9,86,446	7,495	996	284	0.06	2,141	0.66
73	Mongolia	9,83,610	2,179	884	260	0.05	641	0.20
74	Azerbaijan	8,22,278	9,931	526	51	0.01	960	0.30
75	Saudi Arabia	8,18,033	9,372	3,849	107	0.02	260	0.08
76	Paraguay	7,17,039	19,595	83	11	0.00	2,673	0.82
77	Bahrain	6,83,773	1,521	2,454	1,337	0.26	828	0.26
78	Sri Lanka	6,70,884	16,768	107	5	0.00	776	0.24
79	Kuwait	6,60,667	2,564	990	224	0.04	581	0.18
80	Myanmar	6,25,497	19,464	8,135	147	0.03	352	0.11
81	Palestine	6,20,757	5,404	439	82	0.02	1,006	0.31
82	Estonia	6,04,380	2,713	76,677	57,714	11.31	2,042	0.63
83	Cyprus	5,90,783	1,187	8,402	6,846	1.34	967	0.30
84	Moldova	5,90,752	11,858	74,752	18,629	3.65	2,955	0.91
85	Venezuela	5,44,966	5,818	476	17	0.00	206	0.06
86	Egypt	5,15,645	24,613	48,850	458	0.09	231	0.07
87	Libya	5,07,010	6,437	45	6	0.00	909	0.28
88	Ethiopia	4,93,698	7,572	14,121	116	0.02	62	0.02
89	Qatar	4,59,122	682	3,011	1,072	0.21	243	0.07
90	Armenia	4,44,482	8,700	2,971	998	0.20	2,924	0.90
91	Bosnia and Herzegovina	3,99,227	16,155	6,220	1,923	0.38	4,994	1.54
92	Oman	3,98,424	4,260	9,495	1,758	0.34	789	0.24
93	North Macedonia	3,43,391	9,548	339	163	0.03	4,583	1.41
94	Kenya	3,38,506	5,678	18	0	0.00	101	0.03
95	Zambia	3,33,624	4,017	63	3	0.00	205	0.06
96	Albania	3,32,503	3,589	1,686	587	0.12	1,250	0.38
97	Botswana	3,26,344	2,790	599	244	0.05	1,134	0.35

98	Algeria	2,70,713	6,881	81,489	1,785	0.35	151	0.05
99	Nigeria	2,65,816	3,155	3,618	17	0.00	14	0.00
100	Zimbabwe	2,57,749	5,604	408	27	0.01	365	0.11
101	China	2,54,066	5,226	4,104	3	0.00	4	0.00
102	Mozambique	2,30,312	2,222	126	4	0.00	67	0.02
103	Brunei	2,29,665	225	7,300	16,332	3.20	503	0.15
104	Rwanda	1,32,518	1,467	24	2	0.00	107	0.03
105	Cameroon	1,21,652	1,935	1,101	39	0.01	69	0.02
106	Malta	1,14,910	806	701	1,578	0.31	1,814	0.56
107	Angola	1,03,131	1,917	59	2	0.00	54	0.02
108	Barbados	1,02,580	560	208	722	0.14	1,943	0.60
109	French Guiana	94,073	410	82,409	2,60,576	51.06	1,296	0.40
110	DRC	92,934	1,443	7,970	83	0.02	15	0.00
111	Senegal	88,506	1,968	121	7	0.00	111	0.03
112	Malawi	88,047	2,682	399	20	0.00	132	0.04
113	Ivory Coast	87,438	826	46	2	0.00	30	0.01
114	Fiji	68,244	878	1,061	1,164	0.23	964	0.30
115	Madagascar	66,687	1,410	10	0	0.00	48	0.01
116	Sudan	63,344	4,962	945	20	0.00	107	0.03
117	Mauritania	62,920	995	106	22	0.00	202	0.06
118	Cabo Verde	62,389	410	63	111	0.02	720	0.22
119	Bhutan	62,200	21	615	778	0.15	27	0.01
120	Syria	57,325	3,163	21	1	0.00	171	0.05
121	Gabon	48,713	306	100	43	0.01	130	0.04
122	Andorra	46,275	155	67	864	0.17	1,999	0.62
123	Papua New Guinea	45,133	668	483	52	0.01	72	0.02
124	Mauritius	40,519	1,027	635	497	0.10	805	0.25
125	Somalia	27,223	1,361	12,680	750	0.15	81	0.02
126	Burkina Faso	21,631	387	101	5	0.00	17	0.01
127	South Sudan	17,823	138	350	30	0.01	12	0.00
128	Tajikistan	17,786	125	397	40	0.01	12	0.00
129	Equatorial Guinea	17,040	183	150	99	0.02	121	0.04
130	Monaco	14,717	63	63	1,580	0.31	1,580	0.49
131	Gambia	12,508	372	108	42	0.01	145	0.04
132	Niger	9,931	312	729	28	0.01	12	0.00

Key: Data used were obtained from WHO/World meter's as at 17th February, 2022. Figures 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 (Figures 1 and 2).

Values of CF1 or OF1 and CF2 or OF2 represent case/ incidence and mortality index.

- Factor of more than 1=Very high infection and mortality index.
- Factor of approximately 1=High infection and mortality index.
- Factor of ≤ 1 but ≥ 0.5=Moderately high infection and mortality index.
- Factor of ≤ 0.5 but ≥ 0.1=Low infection and mortality index.
- Factor of <0.1=Very low infection, mortality and recovery index.

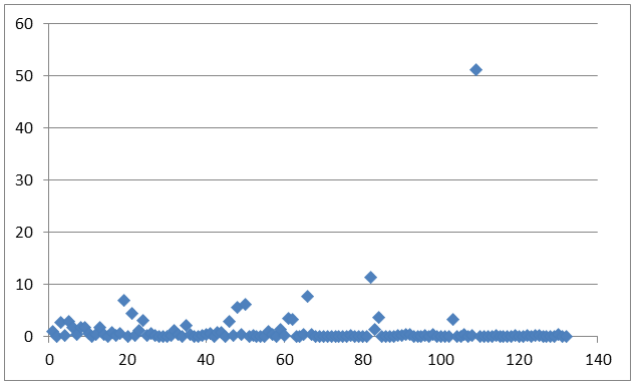

Figure 1. *Graph showing oyepata or comparism factor of active cases per country relative to USA as at 12th October, 2022.*

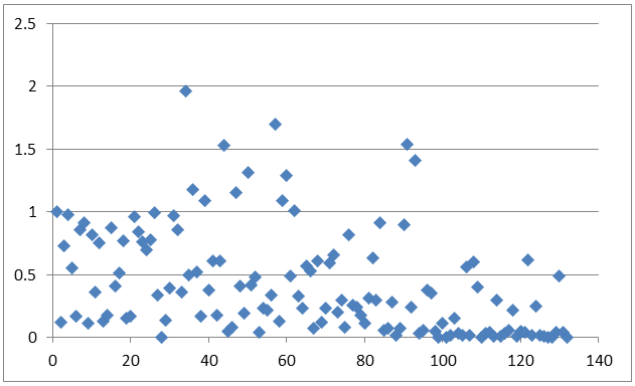

Figure 2. *Graph showing death comparism or oyepata factor caused by COVID-19 as at 12th of October, 2022.*

Discussion

The pandemic is still being controlled over the globe. COVID-19 mortality is frequently estimated using a range of indicators. These numbers fluctuate over time and by region, based on the number of tests performed, the efficiency of the healthcare system, the therapies available, the length of time since the outbreak started, and the age, sex and general health of the population [47-50]. The mortality rate is determined by dividing the overall death rate for a certain demographic group by the group's overall population. As a result, the death rate in a particular group reflects both the prevalence and the severity of the disease. There is a strong correlation between age and death rates, with younger people experiencing relatively low rates and elderly people experiencing very high rates.

The results show that the majority of American countries have about the same numbers of current cases and fatalities as the USA. The mortality value in the majority of American nations is higher than the active case value. Some European nations have incidence values that are significantly greater than those of the USA. Additionally, the majority of European nations have a greater active case value than a death value. African and Asian nations are less valuable. Africa's worth is the lowest of the two. Genetic, environmental, personal health state, vaccine response, and seasonal variation could all have a role in this distribution's variation [51-56].

Despite having one of the highest standards of life and most modern technology, the USA is nonetheless one of the most severely affected nations. The virus has a comparatively small impact on the poor and underdeveloped nations of Africa. It was anticipated that the virus would have a greater impact in Africa, but the exact opposite has happened. Therefore, it is plausible that because of their socioeconomic, genetic or pre-exposure backgrounds, nations like Haiti and Africa may have built a more potent defense to the virus.

The evidence now available indicates that infections in Africa, a region that is regarded as undeveloped do not have significant medical consequences and when contracted, people tend to recover more rapidly with a lower risk of complications and fatality [57-60].

As was already mentioned, Africans live in densely populated areas, which are clearly distinct from the vast majority of western countries, which rely on a solitary system [61]. The majority of people in Africa may therefore have been exposed to the virus without being aware of it or displaying any serious symptoms. According to some analysts, these events could cause Africa to resemble a cemetery [62-67]. Many experts throughout the world are baffled by the causes of this pleasantly unexpected catastrophe. According to studies, African children's immune systems tend to develop more quickly and robustly than those of Dutch children due to their poor health and surroundings [68-71]. When exposed to the same allergy or infection later on, exposure to the pathogenic organism may have boosted children's immune systems and protected them from catching certain infectious diseases and allergies [72,73]. Additional supporting data for this claim comes from statistics and a comparison factor from Haiti. Haiti is currently both the least developed nation in the world and the poorest nation in all of Latin America and the Caribbean**.** Their low rates of disease and mortality have little to no impact on the importance of the comparism factor. A higher immune reaction to the same or a comparable illness may have resulted from early or childhood exposure to particular diseases in developing countries.

Several African nations are thus both susceptible to the Coronavirus and possibly more equipped to defend themselves from it. African immigration to or inundation of other continents, which has allowed for the establishment of cross human immunity, may be connected to higher vaccination rates and lower infection mortality globally. The most effective

immunization must therefore be created using an antibody or serum from an African source.

Conclusion

Genetic variation may have played a role in infectability and mortality of COVID-19 virus, resulting in Africa, with the least vaccination and medical facility, have the least infection and mortality value. Further study need to be done to determine the significance of various contributing factor that may be a lead to development of more robust vaccine now and in the future.

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Conflicts of Interest

There is no conflict of interest.

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