



IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY



VOLUME : 6 ISSUE : 11 Print / Issue Publication Date: 11-May-2022



ISSN : 2455-2143



DOI : 10.33564/IJEAST.2022.v06i11.002

Indexed In



WWW.IJEAST.COM

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THE IMPACT OF HEALTHY DIET ON COVID-19 PANDEMIC USING CONTINENTS, GROSS DOMESTIC PRODUCT AND POPULATION

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Abstract— Many researchers have focused on COVID-19 Pandemic which was a global phenomenon and has brought about by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) which started in late 2019, this disease has spread throughout all globes and has affected the entire world and is one of the most leading cause of death in countries and continents. The aim of the study is to ascertain the relationship that exist between COVID-19 Pandemic Continents, Gross Domestic Product and Population between November 2019 to September 2020.

Design: The researchers studied 170 countries and the dataset was extracted from the Kaggle database. The factors analyzed Qualitatively were data distribution of Continents Table 1., GDP per capita Table 2., and Population Category Table 3. Also Quantitatively data of COVID-19 variables (Confirmed, Death, Recovered, and Active cases) and Obesity Table 4., Correlation was also established to test the relationship between GDP per capita & COVID 19 Variables Table 5. Regression for the joint contributions of independent variables (GDP growth, Population, GDP per capita & Obesity) to the prediction of COVID 19 Death Table 6 and Relative effect of the independent variables (GDP growth, Population, GDP per capita & Obesity) to the prediction of COVID 19 Death Table 7 were also analyzed.

Results: Based on the period we considered 170 Countries. There were 27.1 % (46) out of 170 Countries which was allotted to Africa Participants and the p-value < 0.05 which shows that Africans are majority of the data collected, GDP per capita 31.2%(53) under \$ 0- \$2499, Population category showed highest category to be 35.9% (61) under 988,003-9,904,896, COVID-19 variables (Confirmed, Death, Recovered, and Active cases) and Obesity shows the outbreak of pandemic, a total of 331 cases was confirmed, 6 death cases, 238 recovered cases, active cases is 92, while 3124 of the sample across continents were found to be obese.. Correlation Test used show that the relationship between GDP per capita & COVID 19 Variables, GDP per capita is positively correlated with number of COVID Variables

Confirmed cases ($r = .477$, $p < 0.01$), number of Covid 19 Death cases ($r = .363$, $p < 0.01$), Covid 19 Recovered cases ($r = .272$, $p < 0.01$) and number of Covid 19 Active cases ($r = .416$, $p < 0.01$). Regression Analysis showed a coefficient of multiple regressions $R = 0.514$ and multiple R-square = 0.264, it means that 26.4% variation in dependent variables (COVID Death) is explained by the independent variables (GDP growth, Population, GDP per capita & Obesity) and their exist a joint contributions of independent variables to the prediction of COVID 19 Death and Regression Analysis performed reveals that (GDP per capita Beta = .201, $t = 2.751$, $p < 0.01$). and Obesity (Beta = .415, $t = 5.465$, $p < 0.01$) are potent predictors of COVID 19 Death among patients While GDP growth (Beta = .105, $t = 1.524$, $P > 0.01$) and Population (Beta = .020, $t = .288$, $p > 0.01$) are not significant predictors of Covid 19 Death.

Keywords—COVID-19pandemic, Continents, Gross domestic product, Population

I. INTRODUCTION

The World Health Organization (WHO) is a specialized organization of the United Nations in charge of international public wellbeing and has its goal as "the fulfillment by all people groups of the greatest conceivable degree of wellbeing". He characterizes wellbeing as "a condition of complete bodily, psychological along with social development and not just these nonappearances along with disease as well as infirmity. [1].

The World Health Organization (WHO) pronounced COVID19 a worldwide wellbeing crisis around January,2020; around March11, it reported the growing episode occurred formally as a pandemic, a most critical stage of health crisis. At that point, as a result of these crises, the \$90 trillion global economy was affected in a way that hasn't been seen in over a century. Every part of the globe has been affected by the spread of the viral sickness, which has been identified in every country. This shows the interrelated existence of the worldwide economy, because the disease was already found throughout each part of the world, by early March 2020, the



central focus of contaminations had started to shift from China to Europe, specifically Italy; however, by April, the convergence point had shifted to the United States, where the number of illnesses was increasing at an alarming rate. Per the World Health Organization, by April 2021, India, Brazil, parts of Africa, and parts of Asia had surfaced as viral issue regions, with the multitude of infectious diseases and deaths attempting to reach record levels. [2].

COVID-19 Pandemic is a global phenomenon that was first found in Wuhan, China in December 2019 and since the inception of this virus it has shook the entire world and many are suffering from it and it has caused more hurtful consequences for the citizens of various countries than the other infection that has at any point come to being. The Coronavirus pandemic is a virus that is brought about by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and because of this on Thursday, 30th January, 2020 the World Wellbeing Association affirmed the episode a General Wellbeing Crisis of Worldwide Concern and on Wednesday, 11th March, 2020 a Pandemic and is portrayed as a disease or any issue from common down to earth state in a human, animal or a plant and this is credited to a specific aftereffects. [2-3].

As the Coronavirus plague started, the worldwide economy was looking to restore an expansive based recuperation. The holding up impact of creating trade protectionism, trade banter among significant exchanging accomplices, falling item and energy costs, and monetary weaknesses in Europe over the effect of the Assembled Realm's exit from the European Association were all placing tension on worldwide money related turn of events. Every one of these worries, all alone, introduced a reasonable test for the worldwide economy. In any case, the worries debilitated the worldwide economy and decreased the accessible plan adaptability of different public pioneers, eminently in the most evolved countries. While the monetary effect has developed less certain, the blend of methodology approaches might keep on affecting how firms sort out their work powers, on worldwide stock chains, and on government reactions to a worldwide prosperity emergency. [4].

According to worldometer Coronavirus Cases, As at Tuesday 15 February, 2022, more than 414,770,047 absolute instances of pandemic have been accounted for in various countries, and nations, more than 5,848,116 passings, in excess of 336,74,213 people have recuperated and in excess of 72,147,213 are dynamic people all over the planet. SARS-CoV-2 is basically spread through respiratory drops including sprayers from a contaminated person who wheezes, hacks, talks or talks, in closeness to other people. [5].

COVID pandemic impacts has caused financial interference worldwide and socially and including the greatest overall slump inside ongoing memory as it impacts around

414 million people amounting to around 5.25 % of the whole absolute people of 7.9 billion people which is current complete people as evaluated as at February 2022 by Joined together Countries and it is responsible for some deaths across various continents of the world since it is an irresistible infection it has furthermore provoked the deferral or withdrawal of worldwide endeavors, social affairs, displaying, severe, political, and far reaching improvements, endless stock and insufficiencies and reduced releases of toxins and ozone hurting substances. Misinformed judgment about the contamination has similarly spread through friendly and wide correspondences. There have been episodes of xenophobia and exploitation Chinese people and against those clear as being Chinese or as being from locales with high illness rates. [6].

The contamination for the COVID Pandemic for the most part spread between people in closeness, oftentimes through little beads delivered by hacking, sniffing, and talking. The drops for the most part going through air over critical distance additionally communicated through more modest beads that can stay suspended perceptible all around for longer time spans in encased spaces, as generally ordinary for airborne disorders. Less normally, human could be spoiled through reaching the soiled surfaces as well thereafter reaching their faces. It is for the most part irresistible during the underlying three days later the start of signs, though spread is possible before aftereffects appear, and from people who don't show indications. [7,11].

Typical incidental effects consolidate fever, hack, weariness, windedness, and loss of sensation of smell. Entrapments might incorporate pneumonia and intense respiratory agony condition. The clinical outcomes say the agonizing season of the pandemic might go from two to fourteen (2-14) days later contamination and hatching time period commonly wraps up around four to five (4-5) days and starting there appears to be a clinical indications and the world wellbeing association said the recuperation cycle for gentle cases is around fourteen (14) days and extreme cases to be three(3) to six (6) weeks that is a month and a half. [7].

These COVID viral pandemic is a remarkable worldwide peculiarity that is additionally a profoundly private involvement in wide-running impacts. The pandemic has upset lives across all nations, domains and networks and adversely impacted worldwide financial development in 2020 past anything encountered in almost a century. According to indicators, the illness slowed worldwide economical growths in 2020 at an annual regression of roughly -3.2percent, as per an agreement of gauges, the financial slump in 2020 was not quite as negative as at first assessed, due to some degree to the monetary and money related approaches states embraced in 2020. [9,10].

Assessing the effect of the sickness has been particularly difficult because of its quick spread and



developing impacts for worldwide and public paces of money related turn of events. In the beginning phases of the worldwide monetary droop, money related numbers were exacerbated by a critical decrease in the expense of crude oil. From that point on, oil costs recuperated from a low of nearly \$20 per barrel in April 2020 to a scope of \$40 to \$45 per barrel before the finish of 2020, to some extent mirroring the decrease in worldwide money related movement. By early June 2021, the worldwide cost of Brent crude petrol had above \$70 per barrel, a level it kept up with until early October, when it outperformed \$80 per barrel. [8,13].

COVID-19 Coronavirus is a worldwide peculiarity which is putting a strain on the shortcoming of medical services frameworks. The absence of a set up treatment against Pandemic contamination and the apportioning of care brought about an emotional situation. Patients with COVID-19 with heterogeneous manifestations from asymptomatic structures to extreme intense respiratory pain and the greater part of the contaminated patients are bound to have raised degrees of provocative markers. The most noticeably awful hit populace includes more established individuals particularly heftiness (generally estimated with weight record, BMI) is over and over announced as a significant danger factor for extreme complexities of COVID-19. [11,12].

II. EXPERIMENT AND RESULT

In this paper the methodology for the experiment describer here would be Research design, Source of the data, and Techniques of the data

Research designs

This research design included an observational review and a cross-sectional study that took place around the world from November 2019 to September 2020. The choice of a cross-sectional research was justified by the nature of the investigation, which covered a diverse population owing to differences in culture and viewpoint throughout the world.

The dataset encompasses Six continents namely Africa-46, Asia-42, Europe-38, North America-22, Oceania-10, South America-12 amounting to 170 nations, and their populations, with the goal of eliciting data that is generalizable, since Covid 19 spans all continents.

Source of the data

This research used secondary data; the Covid 19 healthy diet dataset was retrieved from the Kaggle website. ([https://www.kaggle.com/mariaren/covid19-healthy-diet-dataset?select=Fat Supply Quantity Data.csv](https://www.kaggle.com/mariaren/covid19-healthy-diet-dataset?select=Fat+Supply+Quantity+Data.csv)), which was a platform managed by the (United States of America) government that included 170 countries and their populations, and the following data was compiled from several databases. The following is a breakdown of the data compilation:

The Food and Agriculture Organization of the United Nations FAO website contains data on food group supply quantities, nutrition values, obesity, and undernutrition percentages.

The Population Reference Bureau PRB website contains data on population counts for each country.

The Johns Hopkins Center for Systems Science and Engineering CSSE website contains data on COVID-19 Confirmed, Death, Recovered, and Active cases.

Techniques for data analysis

For analysis, the raw data extracted from the Kaggle electronic database was converted to an Excel spreadsheet. Prior to the statistical analysis procedure, missing data and outliers were identified and addressed. This research largely used univariate and multivariate regression analysis of data. The frequency and percentage data were analyzed qualitatively, while the mean, median, standard deviation, as well as the minimum and maximum statistics, were analyzed quantitatively. was utilized to compare the mean values of COVID 19 variables (Confirmed, Death, Recovered and Active cases). Due to the continuous nature of the COVID instances, the total mean rank differences were calculated. To evaluate determinants of COVID data death by continent, population, GDP per capita, and obesity, a multivariable linear regression analysis was done. All hypotheses were evaluated for significance at the 5% level. The Statistical Package for the Social Sciences (SPSS) version 26 was used for descriptive and inferential statistical analysis.

Table -1: Data distribution: Continents

Continents		Frequency	Percent (%)
Valid	Africa	46	27.1
	Asia	42	24.7
	Europe	38	22.4
	North America	22	12.9
	Oceania	10	5.9
	South America	12	7.1
	Total	170	100.0

Table 1 reveals the percentage distribution of data by Continents 170 COVID dataset as a valid data and no missing data and out of which 27.1% of them are from Africa, 24.7% are from Asia, 22.4% are from Europe, 12.9% are from North America 7.1% of them are from South America, while 5.9% of them are from Oceania. This indicates that majority of the data was collected from the continent of Africa



Table -2: Data distribution: GDP Per-capita

GDP Per-capita		Frequency	Percent (%)
Valid	\$ 0- \$2499	53	31.2
	\$ 2500 - \$ 4999	26	15.3
	\$ 5000 - \$ 9999	31	18.2
	\$ 10000 - \$ 19999	25	14.7
	\$20000 and above	35	20.6
	Total	170	100.0

Table 2 reveals percentage distribution of dataset by GDP Per-capita and shows that out of 170 dataset recorded during the Covid 19 era, 31.2% of the GDP per-capita recoded ranged between \$ 0- \$2499, 20.6% of them ranged between \$20000 and above, 18.2% of them are ranged between \$ 5000 - \$ 9999, 15.3% of them are ranged between \$ 2500 - \$ 4999 while 14.7% of them ranged between \$ 10000 - \$ 19999. This depicts that majority of the GDP per-capita recorded during the Covid 19 range between \$ 0- \$2499.

Table -3: Data distribution: Population category

Population Category		Frequency	Percent (%)
Valid	52,045-988,002	26	15.3
	988,003-9,904,896	61	35.9
	9,904,897-19,653,969	26	15.3
	19,653,970-60,673,701	36	21.2
	60,673,702-1,421,021,791	21	12.4
	Total	170	100.0

Table 3 reveals percentage distribution of dataset by Population Category and shows that out of 170 dataset recorded during the Covid 19 era, 35.9% of the population recorded during the Covid 19 era ranged between 988,003-9,904,896, 21.2% of them ranged between 19,653,970-60,673,701, 15.3% of them ranged between 52,045-988,002, 15.3% of them ranged between 9,904,897 – 19,653,969, while 12.4% of them ranged between 60,673,702-1,421,021,791. This implies majority of the category of

Population recorded during the Covid 19 era ranged between 988,003-9,904,896.

Table - 4: Descriptive Statistics of Covid 19 Variables & Obesity

Quantitative data	Confirmed	Death	Recovered	Active	Obesity
Mean	2.022	.0394	1.45	.57	18.708
Median	1.14	.014	.517	.10	20.70
Std. Dev.	2.360	.0487	1.928	1.385	9.634
Min.	.0003	.000	.000	0	2.1
Max.	10.408	.185	9.0399	8	45.6
Sum	331.603	6.457	238.186	92	3124.2

Table 4 reveals the Mean of Covid Confirmed cases to be 2.022, Death cases to be .0394, Recovered cases 1.45, Active cases .57 and Obesity was 18.708, Standard deviation of Covid Confirmed cases to be 2.360, Death cases to be .0487, Recovered cases 1.928, Active cases 1.385 and Obesity was 9.634, Maximum of Covid Confirmed cases to be 10.408, Death cases to be .185, Recovered cases 9.0399, Active cases 8 and Obesity was 45.6. Also Covid number cases (Confirmed, Death, Recovered, Active & Obesity) shows the outbreak of pandemic, a total of 331 cases was confirmed, 6 death cases, 238 recovered cases, active cases is 92, while 3124 of the sample across continents were found to be obese. An average of Covid 19 Confirmed cases per-day was 2, Death cases recorded per-day was less than 1, average of Recovered case was 1, while less than 1 Active case was found perday. However, an average of Covid 19 cases found to be Obese is 18.



Table -5: Correlation matrix showing the relationship between GDP per capita & COVID 19 Variables .

Variables	Mean	Std. Dev	1	2	3	4	5
GDP per-capita	13447.4	18354.2	1				
Covid 19 Confirmed	2.02	2.36	.477**	1			
Covid 19 Death	.039	.049	.363**	.861**	1		
Covid 19 Recovered	1.45	1.93	.272**	.821**	.672*	1	
Covid 19 Active	.57	1.39	.416**	.516**	.486*	-.032	1

*Correlation is significant at 0.01 (2-tailed)

Table 5 revealed the significant relationship between independent variable (GDP per capita) with the dependent variables (Covid 19 Confirmed, Death, Recovered, and Active cases); GDP per capita is positively correlated with number of COVID Variables Confirmed cases ($r = .477, p < 0.01$), number of Covid 19 Death cases ($r = .363, p < 0.01$), Covid 19 Recovered cases ($r = .272, p < 0.01$) and number of Covid 19 Active cases ($r = .416, p < 0.01$). The coefficient of determination (r^2 values) of the variables indicated that the increase in the influence of GDP per capita will increase the number of Covid 19 Confirmed ($r^2 = 0.228$), Death ($r^2 = 0.132$), Recovered cases ($r^2 = 0.074$) and Active ($r^2 = 0.173$), by 22.8%, 13.2%, 7.4% and 17.3% respectively.

Table - 6: Summary of regression for the joint contributions of independent variables (GDP growth, Population, GDP per capita & Obesity) to the prediction of COVID 19 Death.

R =.514 R Square =.264 Adjusted R square =.246 Std. Error = .0415437						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.102	4	.026	14.790	.000 ^b
	Residual	.285	165	.002		

Total	.387	169			
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Table 6 reveals significant joint contribution of the independent variables (GDP Growth, Population, GDP per capita & Obesity) to the prediction of COVID 19 Death. The result yielded a coefficient of multiple regressions $R = 0.514$ and multiple R-square = 0.264, it shows that 26.4% variation in dependent variables (COVID Death) is explained by the independent variables (GDP growth, Population, GDP per capita & Obesity). The table also suggests that the five factors combined accounted for 26.4% ($Adj.R^2 = .246$) variance in the prediction of COVID 19 Death. The other factors accounting for the remaining variance are beyond the scope of this study. The ANOVA result from the regression analysis shows that there was a significant effect of the independent variables on the COVID 19 Death, $F(4, 165) = 14.790, p < 0.01$.

Table - 7: Relative effect of the independent variables (GDP growth, Population, GDP per capita & Obesity) to the prediction of COVID 19 Death.

Model	Unstandardize Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.011	.008		-1.288	.200
GDP Growth	.001	.001	.105	1.524	.129
Population	6.095E-12	.000	.020	.288	.774
GDP per capita	5.230E-7	.000	.201	2.751	.007
Obesity	.002	.000	.415	5.465	.000

Table - 7 shows that two out of five predictors (GDP per capita and Obesity) are potent predictors of COVID 19 Death among patients. The strongest factor was Obesity (Beta = .415, $t = 5.465, p < 0.01$), and GDP per capita (Beta = .201, $t = 2.751, p < 0.01$). While, GDP growth (Beta = .105, $t = 1.524, p > 0.01$), and Population (Beta = .020, $t = .288, p > 0.01$) are not significant predictors of Covid 19 Death. This implies that Obesity and GDP Per capita accounts for increase in patients' COVID 19 Death by 41.5%, and 20.1% respectively.



III. CONCLUSION

The COVID 19 variables seems to be spreading at an alarming rate across the countries up till now, this study discovered that we have Confirmed cases to be high on average amidst the variables, It also shows there exists a correlation and a relationship between independent variable (GDP per capita) and the dependent variables (Covid 19 Variables Confirmed, Death, Recovered, and Active cases, so there is need for corporate bodies to support the government fight against the menace in order to combat the spread of the disease by abiding strictly by COVID19 rules and protocol and also government across the globe must see how to increase the Gross Domestic Products of their country in order to boost the standard of living of citizens.

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2455-2143