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COVID-19 patients' interracial prevalence analysis: A statistically analysed distribution study

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ABSTRACT

The objective of this study is inspired from the immeasurable difference of COVID-19 incidence data between African & Indian population at peak prevalence month of its pandemic. Raw data analysis of Africa and India was schemed when COVID-19 situation as in peak on pandemic all over the world. The detected data distributions of inter-countries and other countries of Africa were comparatively studied on statistical basis of Correlation coefficient. The evaluation of p-values, ANOVA study with graphical representation on the comparative basis was carried out and interpreted. The screening of the large variation of data distribution has made uniform to get proper variation. The different mean±SD values are 67.142±69.91, 76.642±66.747 & 77.21±67.0215 and CV of these African countries shows 1.080, 0.90377 & 0.90076 respectively. Thus, ANOVA study showed no significance value, $p < .05$, where P-value is 0.913928 because of least variations. On the other hand, the % distribution of COVID-19 pandemic represents the wide difference of inter-continental difference of Africa from India, specifically of pie-chart. However, due to vast difference in COVID-19 intercontinental cases on restricted travellers interconnectivity tends to focus our attention to examine dietary roles in COVID-19.

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INTRODUCTION

This study will bring light on vector scale prevalence on the degree of COVID-19 deadly incident ratio. And also the research on the least partition coefficient ratio between morbidity and mortality rate. The interracial study could be worked out between African countries (Nigeria) and Asian race, i.e., India. If we consider the dietary style in both the continental, we can discover that the African population takes more carbohydrates like potatoes as a regular diet and gains 5 times more calories in comparison to Asian (INDIAN). But still, the average hyperglycemic case is very rare in Africa in comparison to India. In India, diabetes patients ratios increase 20 % every decade as per WHO. As we are familiar with, the next extension of hyperglycemia is diabetes and diabetes engulf the immunity and diminishes the individual to combat various disease conditions by lowering the body self-defense mechanism. Thus, this study scrutinizes the probability of worsening

COVID-19 intensity in both countries under comparison when it's connected with the immune system. The morbidity rate and mortality rate and the symptomatic/ asymptomatic parameters would be comparative studies in support of data analysis, which might obviously give the idea of a long term prevention mode and idea about making genetic strengthening design of dietary modules implementation.

This is an international race characteristics comparison project concentrated on immunity level for Pharmaco-epidemiology study to diabetic patients to investigate prevalence on COVID-19. The outcomes reflect the promising evidential notations regarding the identification of advance genetic codon preparation/ modification based dietary practice, optimization of selective antidiabetic drugs therapeutic regime for hyperglycemic patients in Africa, the best supportive implication of diets parallel to anti-diabetics comparatively and improvement in advanced pharmacotherapy modules targeting to diminish mortality and morbidity rate.

Literature Extraction

The literature review was completed in compliance with the criteria of the topic. The majority of the research was based on African and Indian dietary data. Calulu (dried fish with vegetables including onions, tomatoes, okra, sweet potatoes, garlic, palm oil, and gimboa leaves (similar to spinach); often eaten with rice, funge, palm oil beans, and farofa; Frejon is a Nigerian cuisine (During Holy Week, a variety of Christians, mostly Catholics, across the world enjoy Frejon (from Feijo, the Portuguese word for "beans"), a coconut bean soup.) High-calorie meals include wheat, fried yellow plantain with tomato sauce, kidney beans, Banga soup, potato, and eggs. A traditional West African dinner consists of starchy ingredients and may include meat, fish, and a variety of spices and herbs. Fufu, banku, kenkey (originating in Ghana), fatuous, couscous, tô, and garri are among the region's mainstays, which are served alongside soups and stews. However, the most frequent carbs in Indian cuisine are rice, potato, and wheat. (Oldewage-Theron and Kruger, 2008; Naude, 2013).

Diabetes disease was also tested in the West African community. Their measurements, as well as their food habits, malaria parasite control antibodies, and serum IgG body concentrations, were all recorded. Whether cassava was ingested once a day, more than once a day, or less than once a day, the blood glucose levels were measured in the same way. This study suggests that a high carbohydrate and cassava intake (84 percent of a daily caloric supply of 1916 calories) combined with a low protein intake (8 percent of the caloric supply) does not lead to diabetes. The materials follow the guidelines set out by the African Palliative Care Association for providing high-quality palliative care. Out of 54 African countries, 55 papers were found. The final study includes fifteen papers from 15 nations, eight of which had recognisable PC suggestions in their COVID-19 management guidelines. The seven nations to the left have declarations of guidelines related to palliative care. To ensure that palliative care is prioritised under case management standards in Africa, governments and policymakers must prioritise it with COVID-19 have access (Teuscher *et al.*, 1987; Steyn *et al.*, 2004).

The COVID-19 pandemic is known for wreaking havoc on healthcare systems. Environments having a finite amount of resources are more susceptible. In South Africa, the gap between healthcare demand and supply precedes the COVID-19 epidemic. With extensive community transmission of the SARS-CoV-2 virus predicted in South Africa, preparation will rely on the deployment of fair and effective tactics based on the lessons learned from nations at the forefront of the COVID-19 struggle. In the nations worst impacted by the pandemic, increased morbidity and mortality from COVID-19 in diabetic patients have been observed, and this link, as well as the best care of infected diabetic patients, require further investigation. The poorest area of the world, Africa, with the most vulnerable people to infectious illnesses, is expected to bear the brunt of the COVID-19 epidemic. As a result, throughout this review, we gathered and reviewed the existing literature on the epidemiology, aetiology, vulnerability, preparation, and economic effect of COVID-19 in Africa, which may be relevant and provide critical information about COVID-19 pandemics that are currently affecting the region An also detailed the relationship between the COVID-19 epidemic and global warming (Afolabi *et al.*, 2020; Coetzee *et al.*, 2020).

The globe is gaining a better grasp of the COVID-19 outbreak, which is still mostly unknown in Africa. This research focuses on the time-space geography of COVID-19 infection in Africa, notably Nigeria. We assess the global-to-local scenario of confirmed cases, fatalities, and recoveries, as well as the pandemic response actions. According to the findings, South Africa accounted for 40% of all full confirmed cases in Africa, followed by Egypt (18%), Nigeria (6.8%), Ghana (4.6%), and Algeria (4.6%). (3.6). In Nigeria, the study found a strong link between population density and COVID-19 instances ($R2 = 0.76$; $y = 2.43x - 268.7$). This expression implies that COVID-19 dissemination is accelerated by high population density. Nigeria is failing to match demands from rising cases as a result of existing inequities in health care systems, despite the fact that the country has only documented approximately 25,964 cases at the time of writing. The whole globe is now dealing with the COVID-19 epidemic, which is the world's most catastrophic health catastrophe. All nations are working hard to combat this catastrophic epidemic, which has disastrous medical, economic, and social implications, with the help of national and international institutions. This pandemic affects everyone, but it is more dangerous in cases of diabetes, advanced age, and chronic or complex illnesses (Lone and Ahmad, 2020; Olusola *et al.*, 2020). COVID-19 cohorts were compared to assess the pooled estimate of diabetes prevalence in young (50 years) vs older (>50 years) people. The researchers found studies published between December 2019 and March 2020 that reported demographic and clinical features of COVID-19 patients. A total of 2084 COVID-19 participants were included in 11 investigations. The prevalence of diabetes in COVID-19 individuals with a mean age >50 years was 13.2 percent, compared to 9.0 percent in trials with comparatively younger patients (mean age 50 years). The total prevalence of diabetes among COVID-19 individuals was found to be 13.2%, with studies including elderly people revealing greater diabetes rates. Because diabetes and other cardiovascular diseases are intertwined, age-specific outcomes data, including the impact of continued anti-diabetic therapy, are needed (Belkhadir, 2020; John and John, 2020).

METHODOLOGY

Study Design

A brief discussion of protocol investigation as a flowchart summary to get the best target approaches.

Protocol Sequences

This is an observational study that purely relies on the intercontinental data between India and Africa. The data assembled from the various authenticable sources are directly and indirectly connected with the WHO. The sequences of data should be from health and diet related. The data would be initiated with diets, health conditions, especially diabetes, immunity level, communicable and non-communicable diseases, recurrence of diseases etc, of each country and its comparison factors associated.

1) Rapid findings of various literature and the articles was assembled as per segregated parts of topic contents, which is to be stacked as per the sequences of priority.

2) Careful investigation of literature has to be scrutinized, covering backgrounds, methodologies, results & discussions, conclusions, associated data, tables, figures, purpose etc. More stress has to be confined towards the correlation between the surveyed literature.

3) All similar data and correlated data has been studied to see any emerging innovated indications outcomes are denoting or not.

4) Data has to be observed, selected and collected from relevant authenticated sources like WHOs reports dissimilated in online internet as open data.

5) The data will be concerned with Intercontinental (African & Indian) Dishes & Dietary components, their health scenarios, diseased status, inpatient demographics details, prevalence and incidence of COVID-19 inpatients details.

6) The data associated with the innate immunity system of the population and its correlation with associated disease tolerance.

7) Recurrence of COVID-19 and its viability status.

8) The identification of normal diabetic patient's situations and its complications with or without any comorbid conditions.

9) Data associated with Diabetics inheritance epidemiology and associated COVID-19 and /or other immune-compromised diseased state or situation of patients on immunosuppressant drugs.

10) Comparative studies of Diabetes associated COVID-19 patient's prevalence as well as recovery times in both countries and continents at this pandemic time.

11) Statistical evaluation and understandings.

OBSERVATION & RESULT

Result Details				
Source	*SS*	*df*	*MS*	
Between-treatments	896.0476	2	448.0238	*F* = 0.09021
Within-treatments	193687.2857	39	4966.3407	
Total	194583.3333	41		

Diagram 1: One Way ANOVA Calculation result, including Tukey's HSD between different surveys of African incidence, epidemiological reports

Tables 1 and 2 was extracted from a countrywide report online dataset. This was counted from

Table 1: The comparative COVID-19 cases of African and India

Sl.No	Country/Region	Latitude	Longitude	4/6/2020	4/7/2020	4/8/2020
1	Egypt	26	30	276	276	276
2	Algeria	28.0339	1.6596	113	113	113
3	Nigeria	9.082	8.6753	35	44	44
4	Morocco	31.7917	-7.0926	93	97	97
5	Senegal	14.4974	-14.4524	92	105	113
6	Tunisia	34	9	5	25	25
7	South Africa	-30.5595	22.9375	95	95	95
8	Cameroon	3.848	11.5021	17	60	60
9	Togo	8.6195	0.8248	23	23	23
10	Burkina Faso	12.2383	-1.5616	108	127	127
11	Democratic Republic of the Congo	-4.0383	21.7587	5	9	9
12	Ivory Coast	7.54	-5.5471	41	41	41
13	Ethiopia	9.145	40.4897	4	4	4
14	Sudan	12.8628	30.2176	2	2	2
15	Kenya	9.9456	-9.6966	5	5	5
16	Guinea	-0.0236	37.9062	4	9	9
17	Ghana	7.9465	-1.0232	31	31	31
18	Namibia	-22.9576	18.4904	3	3	3
19	Seychelles	-4.6796	55.492	0	0	0
20	Eswatini	-26.5225	31.4659	4	4	4
21	Gabon	-0.8037	11.6094	1	1	1
22	Mauritania	21.0079	10.9408	2	2	2
23	Rwanda	-1.9403	29.8739	4	7	7
24	Madagascar	-6.27035	34.82345	3	5	5
25	Tanzania	1.37073	32.30324	0	0	0

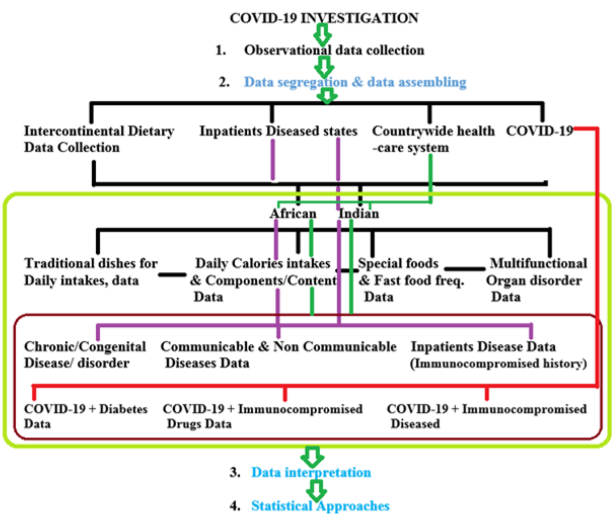

Figure 1: The study design flow chart inspired from literature evaluation to initiate the topic for research work

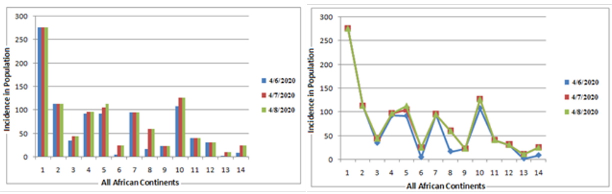

Figure 2: The graphical representation A (Histogram) & B (line chart) of all COVID-19 incidence data in three consecutive months to understand the epidemiological variation in the prevalence rate

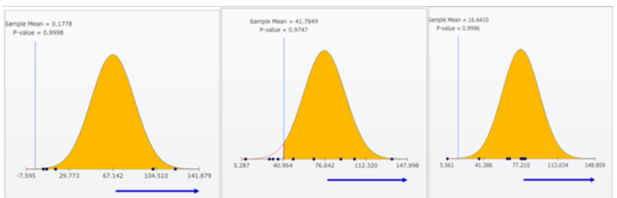

Figure 3: Graphical scanning illustration of P-values as per null hypothesis on significance test

Table 2: The comparative COVID-19 cases of African and India (Continued from Table 1)

Sl.No	Country/Region	Latitude	Longitude	4/6/2020	4/7/2020	4/8/2020
26	Uganda	-18.7793	46.83446	2	11	11
27	Somalia	5.163287	46.2037	1	1	1
28	Angola	-11.2135	17.877	2	2	2
29	Zimbabwe	-19.0169	29.1528	0	0	0
30	Zambia	-13.1404	27.8493	5	7	7
31	Niger	17.59688	8.082851	26	26	26
32	Liberia	6.4337	-9.42175	3	3	3
33	Mozambique	-18.6697	35.52734	1	1	1
34	Central African Republic	6.619407	20.9367	0	0	0
35	Chad	15.44611	18.735	0	2	2
36	Mauritius	-20.2067	57.6755	7	8	8
37	Benin	9.321721	2.310005	5	5	5
38	Eritrea	15.18797	39.78816	0	0	0
39	Djibouti	11.82267	42.58835	9	25	25
40	Equatorial Guinea	1.619514	10.31778	3	3	3
41	Gambia	13.44579	-15.3061	2	2	2
42	Cape Verde	15.12014	-23.6052	2	2	2
43	Libya	26.33471	17.26921	1	1	1
44	Mali	17.57393	-3.98611	1	2	2
45	Guinea –Bissau	11.77235	-15.1696	9	12	2
46	Sierra Leone	8.4606	11.7799	0	0	0
47	Botswana	-22.3428	24.6871	0	0	0
48	Burundi	3.3731	29.9189	0	0	0
49	Malawi	13.2543	34.3015	0	0	0
50	South Sudan	7.862685	29.69492	0	0	0
51	Sao Tome & Principe	0.199695	6.610564			
India						
1	India	20.5937	78.9629	9306	22771	52050

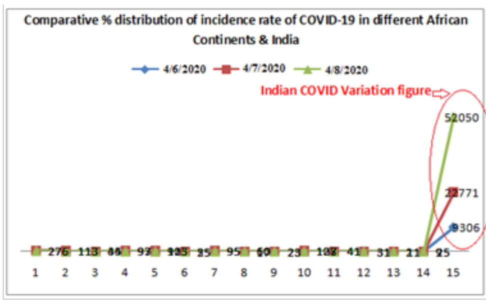

Figure 4: Comparative percentage distribution study of the incidence rate of COVID in various African countries with India

22/1/2020 to 4/8/2020, where the ratio of incidence of COVID-19 was scrutinized and the selection of a number of viable patients was identified & evaluated as per the sign and symptoms. Where it is represented in Tables 1 and 2, having 50 countries of Africa continents and India. The comparative scales

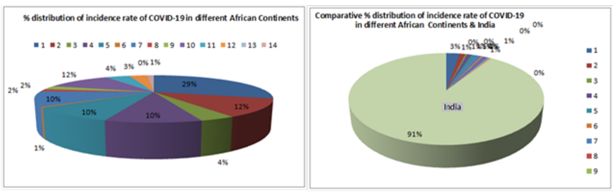

Figure 5: Comparative % distribution scale of COVID prevalence among two continents with a vast difference, in pie-chart A & B

Pairwise Comparisons		$HSD_{.05}$ = 64.8943 $HSD_{.01}$ = 82.3784	$Q_{.05}$ = 3.4455 $Q_{.01}$ = 4.3738
T_1:T_2	M_1 = 67.14 M_2 = 76.64	9.50	Q = 0.50 (*p* = .93241)
T_1:T_3	M_1 = 67.14 M_3 = 77.21	10.07	Q = 0.53 (*p* = .92437)
T_2:T_3	M_2 = 76.64 M_3 = 77.21	0.57	Q = 0.03 (*p* = .99975)

Diagram 2: Q indicates a significant result

Table 3: To trace the COVID-19 variation among the African population under the magnified graphical figure

Sl.No	Country/Region	Latitude	Longitude	4/6/2020	4/7/2020	4/8/2020
1	Egypt	26	30	276	276	276
2	Algeria	28.0339	1.6596	113	113	113
3	Nigeria	9.082	8.6753	35	44	44
4	Morocco	31.7917	-7.0926	93	97	97
5	Senegal	14.4974	-14.4524	92	105	113
6	Tunisia	34	9	5	25	25
7	South Africa	-30.5595	22.9375	95	95	95
8	Cameroon	3.848	11.5021	17	60	60
9	Togo	8.6195	0.8248	23	23	23
10	Burkina Faso	12.2383	-1.5616	108	127	127
11	Ivory Coast	7.54	-5.5471	41	41	41
12	Ghana	7.9465	-1.0232	31	31	31
13	Uganda	-18.7793	46.83446	2	11	11
14	Djibouti	11.82267	42.58835	9	25	25
$\sum$X				940	1073	1081
Mean± SD				67.142 ±69.91	76.642± 66.747	77.21 ± 67.0215
N				14	14	14
CV				1.080	0.90377	0.90076
Variance, σ^2				4887.693	4455.229	4491.882
India						
15	India	20.5937	78.9629	9306	22771	52050

shown below differentiate the earth and sky report. The COVID-19 viabilities of African countries range showing 0-276 and India has 52,050 as per the date mentioned.

Also, Nigeria shows 44 (Which is the 3^{rd} largest rank of COVID-19 viability), where Egypt is on Top with 276, followed by Algeria 113 cases. This shows a complete figure to switch on the investigation. Many factors were there which could be cleared with ongoing observation studies.

Screening

Tables 1 and 2 should be screened out to get the exact figure of data that could be interpreted. The requirement arises because the Indian data for COVID-19 patients are quite very high compared to African to establish graphical representation.

That literally shows the huge difference of the COVID affected intercontinental variations on an epidemic scale.

So in Table 3, we are going to deduce all other states of African continents with very low initiation of COVID-19, ranges (0-10) on consecutive 3 times surveys in different days & months.

Margin of Error (Confidence Interval) for African continents on dated, 4/6/2020

The sampling mean most likely follows a normal distribution. In this case, the standard error of the mean (SEM) can be calculated using the following equation,

$\sigma_x = \sigma/\sqrt{}$N=18.684779668319

Based on the SEM, the following are the margins of error (or confidence intervals) at different confidence levels. Depending on the field of study, a confidence level of 95% (or statistical significance of 5%) is typically used for data representation.

Margin of Error (Confidence Interval) for African continents on dated, 4/7/2020

The sampling mean most likely follows a normal distribution. In this case, the standard error of the mean (SEM) can be calculated using the following equation,

$\sigma_{x=\sigma}\ /\sqrt{}\ N{=}17.839021417421$

Based on the SEM, the following are the margins of error (or confidence intervals) at different confidence levels. Depending on the field of study, a confidence level of 95% (or statistical significance of 5%) is typically used for data representation.

Margin of Error (Confidence Interval) for African continents on dated, 4/8/2020

The sampling mean most likely follows a normal distribution. In this case, the standard error of the mean (SEM) can be calculated using the following equation,

$\sigma_{x=\sigma} / \sqrt{N}=17.912251699129$

Based on the SEM, the following are the margins of error (or confidence intervals) at different confidence levels. Depending on the field of study, a confidence level of 95% (or statistical significance of 5%) is typically used for data representation.

There are vast variations among the 3 dates of incidence as per Figure 2 represents the least variation in total except 5^{th} marked (within these 3-month survey) country, i.e., Senegal. Other than that, Burkina Faso, Cameroon & Uganda shows a jump of epidemiological cases from 1^{st} month to 2^{nd} & 3^{rd} months. But, overall moreover its remains equilibrium among the same country with little bit interrelated difference from rest of those African countries. So, for that validation one way, ANOVA tests were accessed on the statistical ground and which shows no significance value, $p < .05$, where P-value is 0.913928 because of least variations. But, a remarkable change in values found if the survey extends beyond Africa towards INDIA. Figure 3 shows the sudden COVID prevalence rate from the range of 100s (Africa) to 1000 and more, India.

From Diagram 1 the *f*-ratio value is 0.09021. The *p*-value is 0.913928. The result is *not* significant at $p < .05$. Because there are least variations among these 3 different data variables of incidence rate in 3 different dates of survey for African Continents.

Post Hoc Tukey HSD (beta)

The Tukey's HSD (honestly significant difference) procedure facilitates pairwise comparisons within your ANOVA data. The F statistic (above) tells you whether there is an overall difference between your sample means. Tukey's HSD test allows you to determine between the various pairs of means - if any of them - there is a significant difference.

From Diagram 2, a blue value for Q (below) indicates a significant result. Second, it's worth bearing in mind that there is some disagreement about whether Tukey's HSD is appropriate if the F-ratio score has not reached significance. T_1, T_2, T_3 are the 3 different data variables of incidence rate in 3 different survey dates for African Continents.

This illustrates the P-value of a test of significance. Here we're testing a hypothesis about the mean of a normal distribution whose standard deviation we know, but the concepts are essentially the same for any other type of significance test. The normal curve shows the sampling distribution of the sample mean when your null hypothesis is true, Figure 3. The blue arrow shows what kinds of values count as evidence against H_0 in favor of your alternative H_a. Try changing H_a to see how the arrow changes. Once you have a value from data, the graph will show you the P-value for this: it is the probability—calculated taking H_0 to be true—of getting a value at least that far away from H_0 in the direction of the arrow.

The discussion evaluates that among the Top affected African countries, there are vast variations on prevalence rate, but the ranges are nearly the same in scale predictions. The prevalence rate is between 20-50, 60-100, 100-150 and on the other side, it's above 200 to 300. On the other side, India shows a record break incidence of COVID-19 prevalence ranges (9000-53000) on these different dates of the survey, Figure 4.

So, comparative data interpretation in the same graphical scale is not possible. So, the Correlation coefficient on statistical platforms is essential. Thus, this is illustrated clearly from the Pie-chart distribution Figure 5.

So, on scanning comparative data under the pie-chart, 6 countries of African continents limit it to 0%s. These huge differences might be due to genetic inheritance characters, immunity level, and population density and transportation limitations.

So, the hypothetical prediction seems to move towards conventional dietary health. There might be population variation, but in India, antiviral and anti-protozoa were ongoing tremendously in every hospital and clinic.

CONCLUSIONS

The huge intercontinental data collection for COVID-19 prevalence through surveys on peak months (June, July & August) of pandemics represents the least variation among the same countries but somewhat remarkable variations among other countries of the same continents (Africa). But, the scenario completely differs with huge incomparable variations like sky-earth in other continents (INDIA), while transportation was frozen everywhere. Thus, the probability tends to investigate dietary involvement against COVID-19.

Conflict of interest

The authors declare that they have no conflict of interest for this study.

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REFERENCES

Afolabi, O. A., Abboah-Offei, M., Namisango, E., Chukwusa, E., Oluyase, A. O., Luyirika, E. 2020. Do the clinical management guidelines for Covid-19 in African Countries reflect the African quality palliative care standards? A rapid review. *Bull World Health Organ*, 61(5):e17–e23.

Belkhadir, J. 2020. COVID-19 and diabetes from IDF MENA region. *Diabetes Research and Clinical Practice*, 166:108277. ISSN: 0168-8227.

Coetzee, A., Taljaard, J. J., Hugo, S. S., Conradie, M., Conradie-Smit, M., Dave, J. A. 2020. Diabetes mellitus and COVID-19: A review and management guidance for South Africa. *South African Medical Journal* , 110(8):761–766.

John, J. E., John, N. A. 2020. Imminent risk of COVID-19 in diabetes mellitus and undiagnosed diabetes mellitus patients. *Pan African Medical Journal*, 36(158).

Lone, S. A., Ahmad, A. 2020. COVID-19 pandemic – an African perspective. *Emerging Microbes and Infections*, 9(1):1300–1308.

Naude, C. 2013. Would an increase in vegetable and fruit intake help to reduce the burden of nutrition-related disease in South Africa? An umbrella review of the evidence. *South African Journal of Clinical Nutrition*, 26(3):104–114. ISSN: 1607-0658, 2221-1268.

Oldewage-Theron, W. H., Kruger, R. 2008. Food Variety and Dietary Diversity as Indicators of the Dietary Adequacy and Health Status of an Elderly Population in Sharpeville, South Africa. *Journal of Nutrition For the Elderly*, 27(1-2):101–133. ISSN: 0163-9366, 1540-8566.

Olusola, A., Olusola, B., Onafeso, O. 2020. Early geography of the coronavirus disease outbreak in Nigeria. *Geo Journal*. Published on: 13 August 2020.

Steyn, N. P., Mann, J., Bennett, P. H., Temple, N., Zimmet, P., Tuomilehto, J., Lindström, J., Louheranta, A. 2004. Diet, nutrition and the prevention of type 2 diabetes. *Public Health Nutrition*, 7(1a):147–165. ISSN: 1368-9800, 1475-2727.

Teuscher, T., Rosman, J. B., Baillod, P., Teuscher, A. 1987. Absence of Diabetes in a Rural west African Population with a High Carbohydrate/Cassava Diet. *The Lancet*, 329:765–768. ISSN: 0140-6736.