



EFFECTS OF COVID-19 PANDEMIC LOCKDOWN ON CLINIC ATTENDANCE OF DIABETICS IN IFE-EAST LOCAL GOVERNMENT AREA OF OSUN STATE, NIGERIA

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ABSTRACT

Background: Diabetes represents one of the conditions that renders patient vulnerable and significantly increases morbidity and mortality in COVID-19 patients. This study aimed to examine the effects of COVID-19 lockdown on patients with Diabetes mellitus in Ife-East local government area of Osun-State, Nigeria. **Methods:** This was a cross-sectional study that involved the use of medical records of diabetic patients who attended the clinic of Osun State Hospitals Management Board Free Health Services (OSHMBFHS) in Ife-East local government area of the State, between the months of January to December, 2020 which period covered the pre pandemic, intra-pandemic and post pandemic periods. These records were gotten to harness the relevant information of patients. The participants were patients across Ife-East local government area between the ages of 18 and 80 years. A total number of 10,195 patients' records were employed for the study. Data included both independent and dependent variables which were generated from the medical records obtained from OSHMBFHS. **Results:** The result showed that, out of a total number of 10,195 patients seen over a period of one year from January to December, 204 (2%) were diabetic; out of which 41(20.1%) were males while 163 (79.9%) were females. In the month of January before the lockdown (12.3%) diabetic patients attended clinic, in February (9.3%), March (8.3%), April (3.5%), May (3.9%), June (7.4%), July (7.8%), August (12.3%), September (8.8%), October (7.8%), November (10.3%), December (8.3%). **Discussion:** Diabetes and its emergencies during the COVID-19 lockdown were found to be very significantly increased due to reduced clinic attendance which was occasioned by government restriction order on movements. The correlation between male and female diabetics showed that female recorded higher level of attendance when compared with the male counterparts. There were more (80%) patients of Yoruba ethnic group attending clinic in the chart, which was chiefly a reflection of the study area. The Islamic group has the highest percentage (45%) of clinic attendance over the year of study compared to other religion groups, followed by the Christian religion (38%) while others have the lowest (6%) clinic attendance. Also, the highest number of attendees were in the 61-70 years of age groups, appreciable number of diabetic patients in the study population were left unattended, during the COVID-19 lockdown with some unable to access health facilities probably due to the restriction on clinic appointments even in diabetic emergency. **Conclusion:** This study concluded that COVID-19 lockdown had adverse effects on the clinic attendance of the diabetic patients during the pandemic year, which further increased the morbidity and mortality of already vulnerable diabetic sufferers. The effect of the pandemic and its restriction to movement is a double tragedy on the already susceptible diabetic patients in this study area.

KEYWORDS: Diabetes mellitus, COVID-19, Lockdown, Ife-East local government, Patients.

INTRODUCTION

The foremost pneumonia cases of unidentified source were identified in Wuhan, in Hubei province in December, 2019. The Corona Virus Disease of 2019 (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) became a global public health challenge (Zhu *et al.*, 2020). Most patients developed mild to moderate flu syndrome, however other patients, especially those with co-morbidities, developed a more severe pneumonia

requiring mechanical ventilation and presenting a high risk of mortality (Li *et al.*, 2020). Moreover, the pandemic and subsequent lockdown order were averse to continuity of care and the prevention of risks related to pre-existing chronic diseases such as diabetes, which is also a slowly growing pandemic, being one of the main causes of death worldwide in 2019. At first, the outbreak was reported originating from a zoonotic spread in livestock and seafood marketplace. It was later obvious that efficient human to human transmission was also

possible (Jeong *et al.*, 2020). The COVID-19 has rapidly spread from origin of spread (Wuhan) to other parts of the world. WHO (World Health Organization) by March 11, 2020, declared the pandemic status of the novel disease (WHO, 2020). Across the world, till February 3, 2021, Center for Systems Science and Engineering (CSSE) at Johns Hopkins University had reported to COVID-19 Dashboard over 103 million confirmed cases of COVID-19, with more than 2 million mortalities (Huang *et al.*, 2021). In view of the swift spread and the high death rate of the disease, it became needful to investigate the possible link between COVID-19 lockdown and clinic attendance of diabetic patient before, during and after the restriction measure, which may be a probable risk factor affecting the progression of disease in COVID-19 patients. The pandemic affected millions of people including diabetic patients, who were more vulnerable to the disease due to the presence of comorbidity, to make the matter unbearable, the lockdown order by the government prevented the accessibility of diabetic patient to health care services hence, all these factors linked together presented prognostic and therapeutic implications. One of the important chronic conditions all over world is diabetes, for its impact on hospitalization, morbidity, mortality, and economic burden (IDF, 2020). Recently, about five hundred million people are living with diabetes globally and if unchecked the figure will rise by 25% in 2030 and 51% in 2045 (Singh *et al.*, 2020). The prevalence is projected to be 9.3%, rising to 10.2% by 2030 and 10.9% by 2045 (Chee *et al.*, 2020). Researches showed that, the prevalence of diabetes in COVID-19 patients ranged from 5% to 36% (Salvatore *et al.*, 2020). Considering the fact that diabetes is one of the most important comorbidities in COVID 19, which is common in patients with diabetes, hypertension and cardiovascular diseases (CVD) (Singh *et al.*, 2020).

PATHOPHYSIOLOGY

Angiotensin Converting Enzyme 2 (ACE2) acts as a route for the severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) in the host cell, and therefore diabetic patient has an increased expression of this enzyme in lung tissues making them more susceptible to COVID 19 (Salvatore *et al.*, 2021). It is also noteworthy that there is increase in inflammatory mediators and coagulation factors, as well as immune deficiency in diabetic patients (IDF, 2020). Also, hyperglycemia and insulin resistance were exacerbated during COVID-19. Thus, the endocrine associations between diabetes and COVID-19 demonstrated an important relationship in the pathophysiology between both. Infection by SARS-COV-2 arises chiefly through respiratory droplets that are discharged from an infected person or via primary and secondary contact of the mucous membranes with objects infested with SARSCOV-2 (Jeong *et al.*, 2020). After the infection when the virus has gained access, it seeks host cells through ACE2, found mainly in the cardiovascular system, kidneys, lungs and brain (Sandooja *et al.*, 2020).

Some factors mediate this entry, such as the serine transmembrane protease 2 (TMPRSS2) responsible for activating the spike (S) protein that is released by cleavage via the furin protease, enabling endosomal cell invasion (Huang *et al.*, 2020). The expression of both ACE-2 and furin is increased in diabetic individuals, possibly related to the glycosylation induced by uncontrolled hyperglycemia. Therefore, diabetic patients are likely to be infected and have a clinical course of the disease (Chee *et al.*, 2020).

The pathophysiology of COVID-19 comprises 3 stages: stage A includes initial viral infection with constitutional clinical features. Stage B is a severely progressive state that involves acute respiratory distress syndrome (ARDS) and hypoxia, which is a result of direct pulmonary cytotoxicity by the virus due to inflammatory activation. Stage C, is a severe state with organ and immune dysfunction (Jeong *et al.*, 2020).

Therefore, the association between diabetes and the worsening of COVID-19 needed to be analyzed in accordance with the factors prevalent in both states. Diabetes in its pathophysiology has a chronic low intensity pro-inflammatory factor (Barber, 2020). There is presence of increased cytokines, such as interleukin-6 (IL-6) and interleukin-8 (IL-8), C-reactive protein and ferritin in diabetic patients compared to the group without diabetes (Pal *et al.*, 2020). Moreover, increased oxidative stress and late hyperinflammatory reaction are regular findings of hyperglycemia (Barber, 2020). Thus, there may be inability in the physiological control of inflammatory mediators in these patients (Mazucanti *et al.*, 2020).

METHODOLOGY

The study was a descriptive cross-sectional survey, that involved the use of medical records of diabetic patients who attended clinic of Osun-State Hospitals Management Board Free Health Service (OSHMBFHS) in Ife-East local government area, Oke-Ogbo, Ile-Ife, of the State. The period spanned between the months of January to December, 2020 which period covered the pre pandemic, intra-pandemic and post pandemic periods, these records were gotten to harness the relevant information of patients attending this facility. They were Nigerian citizens across Ife-East local government area between the ages of 18 and 80 years. A total number of 10,195 patients' records were employed for the study. Data included both independent and dependent variables, which were generated from the medical records obtained from Medical records Unit of OSHMBFHS of Ife-East local government area, Oke-Ogbo, Ile-Ife. This is a study conducted in December, 2021. Inclusion Criteria: Diabetic individuals, Patients between ages of 18 and 80 years old, patients attending OSHMBFHS. Exclusion criteria: Pregnant individuals, , Individuals with multiple co-morbidities, People less than 18 or more than 80 years of age.

RESULTS

Table 1.

Sr. No	Months	Total Number of Patients	Diabetic	Non diabetic	Male	Female
1	January	1133	25	1108	5	20
2	February	1028	19	1009	6	13
3	March	922	17	905	3	14
4	April	268	7	261	2	5
5	May	463	8	455	0	8
6	June	786	15	771	3	12
7	July	744	16	728	2	14
8	August	896	25	871	3	22
9	September	935	18	917	6	12
10	October	871	16	855	3	13
11	November	996	21	975	3	18
12	December	1153	17	1136	5	12
Σ	Σ	10,195	204	9991	41	163

Table 1: Showed the total number of patients seen per month through the pandemic year (2020), with the number of patients living with diabetes, it also showed the gender ratio in the distribution of Diabetes Mellitus.

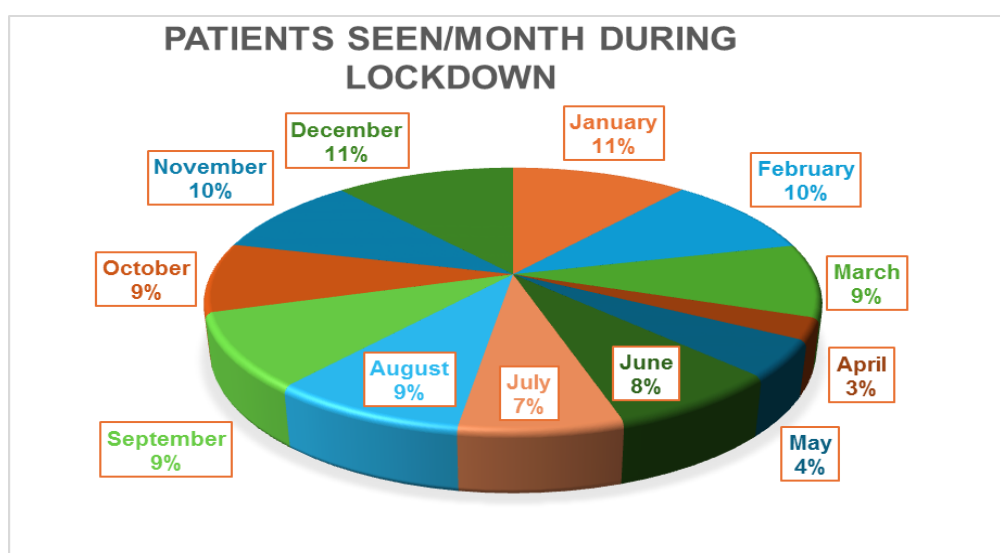


Figure 1: The pie chart showing the monthly percentage of clinic attendance over the pandemic year period.

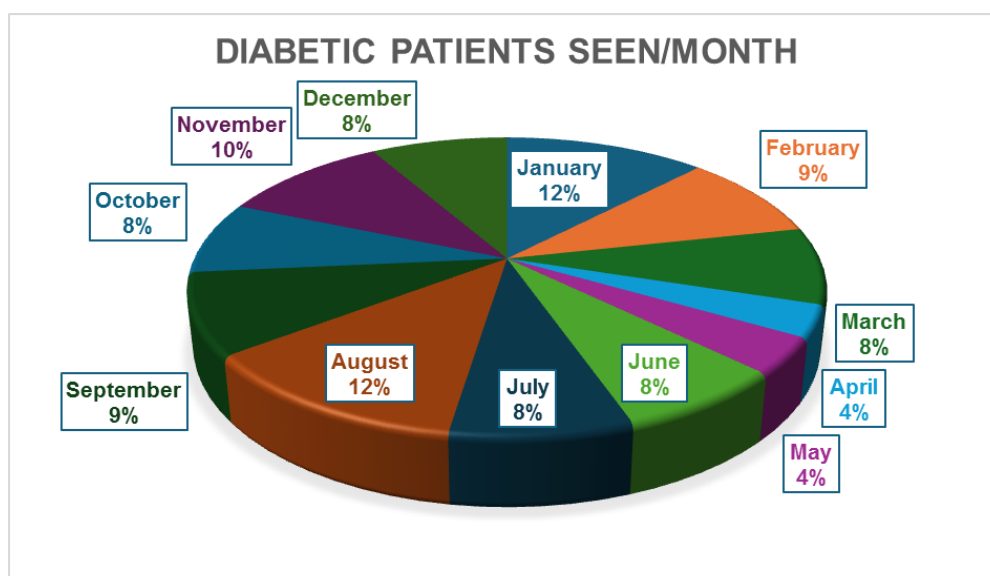


Figure 2: The pie chart showing the monthly percentage of diabetes clinic attendance over a year period (2020).

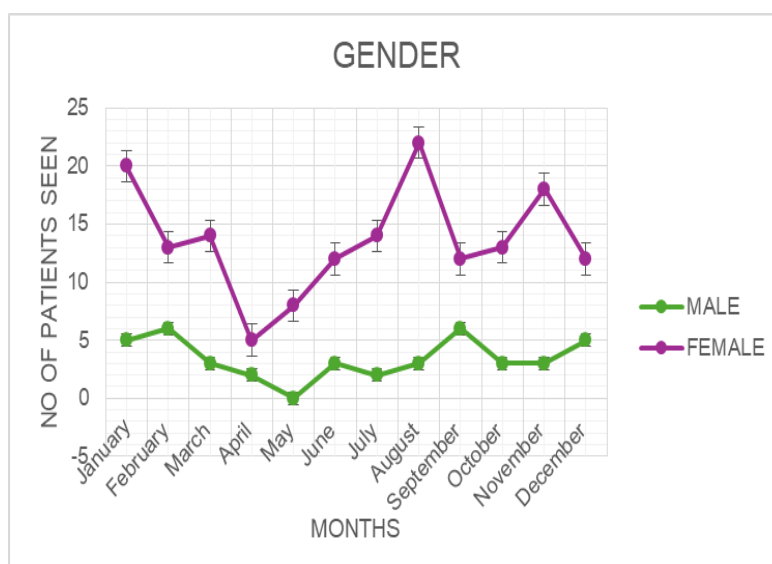


Figure 3: The line graph representing the gender difference in monthly clinic attendance of diabetic patients over the year of the pandemic.

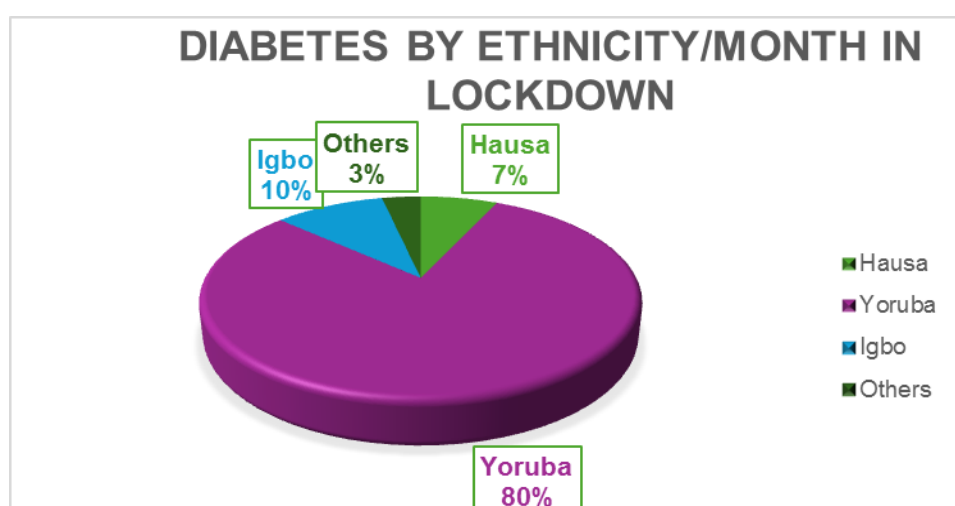


Figure 4: The pie chart representing the ethnic difference in monthly clinic attendance of diabetic patients over the year of the pandemic (2020).

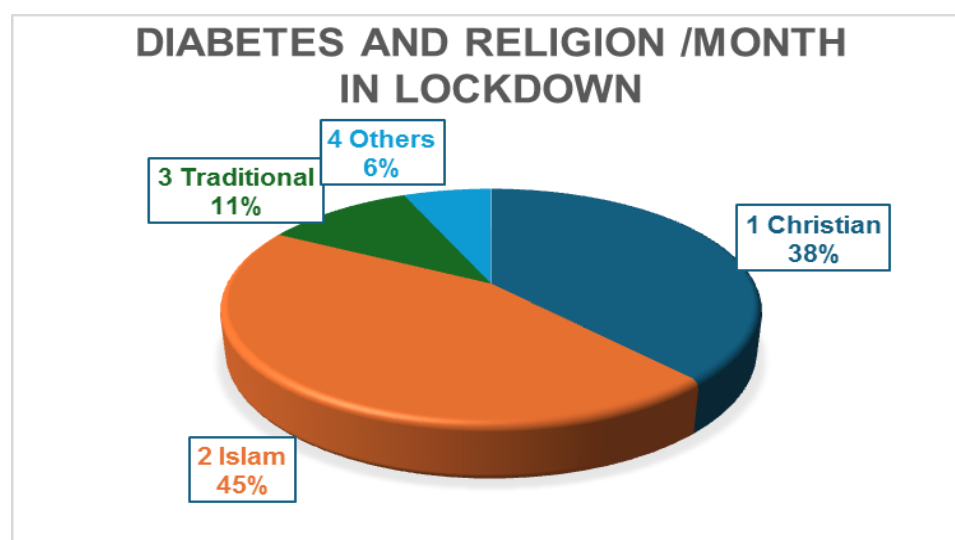


Figure 5: The pie chart representing the difference in monthly clinic attendance of diabetic patients among different religion over the year of pandemic.

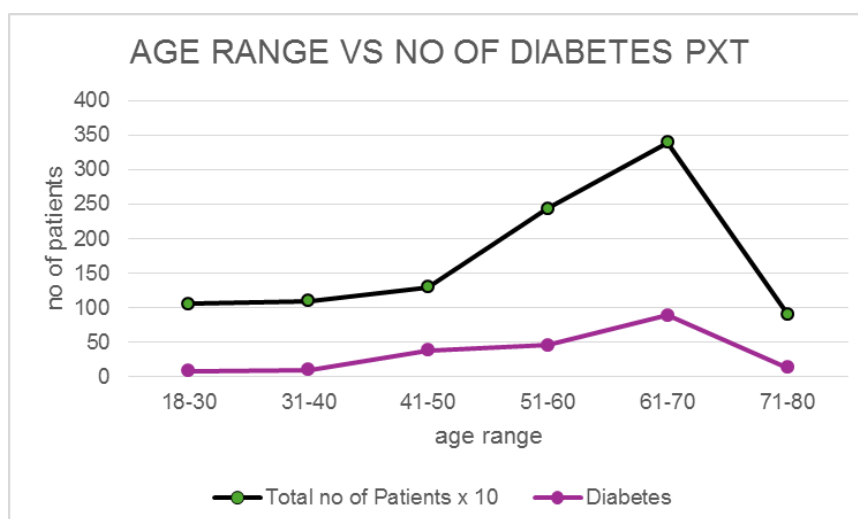


Figure 6: The line graph representing total no of patients attending the facility (OSHMBFHS) and the diabetic patients among different age groups in monthly clinic attendance of diabetic patients over the year of the pandemic.

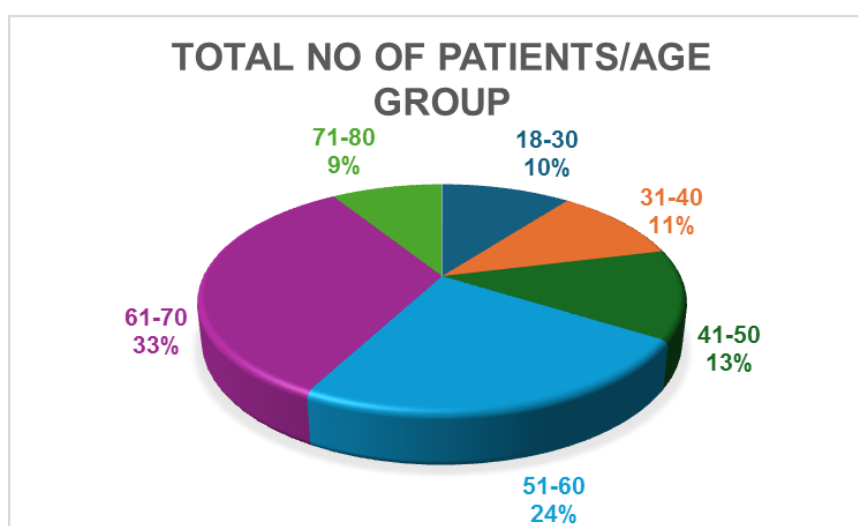


Figure 7: The pie chart representing the total number of patients (diabetic and non-diabetic) by age groups in monthly clinic attendance over the year of the pandemic (2020).

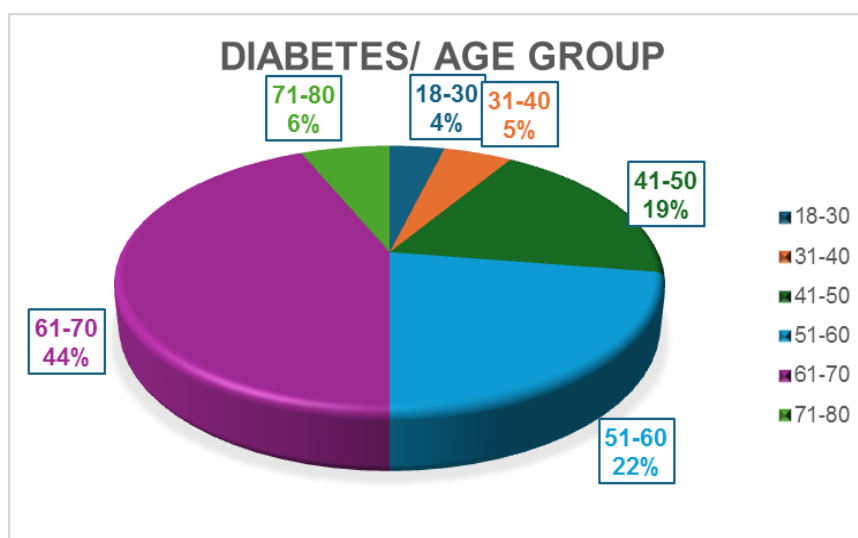


Figure 8: The pie chart representing the total number of patients (diabetic) by age groups in monthly clinic attendance over the year of the pandemic (2020).

DISCUSSION

The COVID-19 pandemic which etiological agent is known as Severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) became a global public health challenge especially among the Diabetic individuals meanwhile, Diabetes Mellitus (DM) is also a gradually evolving pandemic, hence the burden of these phenomena in 2020 had double ripple effects on individuals living with diabetes. Survival of these two pandemics has made it necessary to discuss the impact of COVID-19 on the diabetic population of Ife-East local government area of Osun- State. We investigated clinic attendance of diabetic patients during SARS-Cov-2 infection pandemic in the study facility (OSHMBFHS).

Over the pandemic period which spanned a year, according to Table 1, a total of 10,195 patients attended the facility between January and December, the latter month had the highest number (1153) of attendees, while April which was at the peak of lockdown, when restriction was in full force, had the lowest (268) turnout. The total number of diabetic attendees were 204, the month of January and August recorded the highest clinic attendance (25) and April had the lowest turn-out (7), which was low for the same reason of COVID-19 lockdown. It is apparent from the study that the restriction order was very effective in the first 2 months, as reflected in the number of individuals attending or accessing health facility. In general, the clinic attendance was gradually negatively affected from the time of declaration of restriction order till the point the lockdown was lifted, which was between the months of March and October.

Figure 1, is the chart representing the distribution of the total attendees in the study, which revealed highest percentage (11%) in the month of December with April being the lowest (3%), the reason for the low turn-out is the said month is the lockdown order. Figure 2, is the pie chart showing the monthly percentage of diabetes clinic attendance over a year period of 2020, this also showed the encumbrance foisted by COVID-19 lockdown on people living with diabetes in accessing health care facility. In Figure 3, the line graph showing the correlation between male and female diabetics was represented, female diabetic recorded higher level of attendance when compared with the male counterparts, this is an indication of the health seeking habit of the female which is better than that of male as also depicted in the line graph above, the findings of this research corroborates the work of Rata-Mohan *et al.*, 2019 who found in his work that women were more likely to adhere to public health measures due to their risk-averse nature, which underscores the need for gender-sensitive health policies also male are seen as the household head and masculine, these entrenched beliefs prevent men from showing their vulnerability or seeking health advice even when they are unwell. Figure 4, is the chart representing the ethnic differences in monthly clinic attendance of diabetic patients over the year of the pandemic (2020),

there were more patients of Yoruba ethnic group attending the clinic (80%) in the chart which was chiefly because of the study area, Ife East local government area of Osun-State in the south western region of Nigeria, which is the domain and core Yoruba town. This is similar to the work done by Budianto *et al.*, 2023 who posited that ethnicity, cultural values and self-health awareness are important predictors of health-seeking behavior. Figure 5, is the chart representing the difference in monthly clinic attendance of diabetic patients among different religion over the pandemic year, it showed higher number of Islamic faithfuls have highest percentage (45%) of clinic attendance over the year of study compared to other religion groups, followed by the Christian religion (38%) while others have the lowest (6%) clinic attendance. This is in keeping with the study by (Pawlikowski *et al.*, 2019) who stated that religiosity plays an important role in public health, particularly in both communicable and non-communicable diseases.

Figure 6 is the line graph representing total no of patients attending the facility (OSHMBFHS) and the diabetic patients among different age groups in monthly clinic attendance of diabetic patients over the year of the pandemic, it revealed highest number of attendance in the 61-70 years of age groups, this category of age are the retirees and the vulnerables and this may be the reason for the higher health seeking behavior even around the COVID -19 pandemic, this is contrary to the study done by (Rata *et al.*, 2019) which showed that the majority of the elderly had poor health-seeking behavior due to educational and economic factors. Making the free or subsidized cost of health care for the elderly in rural communities and the provision of monthly financial support to the aged by the government to promote and encourage good health-seeking behavior of old people as seen in this study. Figure 8 showed the pie chart representing the total number of diabetic patients by age groups in monthly clinic attendance over the year 2020, the above showed highest record of attendance among the diabetics in the age range of 61-70 years of age.

It was noticeable that reducing the number of staff in diabetes clinics in OSHMBFHS centers in the State, led to spacing of patients' appointments at clinics and this eventually led to a decrease in the number of patients visiting the clinics. Another reason for having low turn-out of patients at the diabetes clinic was reducing the number of clinics due to closing some health centers of PHC under the COVID-19 lockdown order issued by the federal Ministry of health, to reduce the number of the workforce in health centers. Moreover, changing the roles of some health facilities and converting them to centers for managing patients with Covid-19 had effects on the clinic attendance of patients at the facilities.

Furthermore, it was noteworthy, that part of the reasons for the decrease in the turn-out of patients at the clinic was the risk of close personal contact in clinics due to the ravaging Covid-19, and keeping to social distancing rule

by staying indoor and preventing interpersonal contact as much as possible. Unless it became necessary as in the case of emergency, that may require stepping out of the houses for risk contracting Coronavirus infection, which might adversely affect diabetic patients' health due to low or no level of immunity as a result of the chronicity of diabetes mellitus. Also, the general laws had impact on the number of patients that visited the clinic, such as the laws of total, partial and regional curfews which began in March, 2020.

This study concluded that COVID-19 lockdown had negative effects on the clinic attendance of the diabetic patients during the pandemic year, which ripple effect might have led to morbidities and mortalities due to inability of the people living with diabetes to access health facility. It is therefore imperative for the government at all levels to put into consideration and provide alternatives for the diabetic patients in any such situation, considering diabetes and COVID-19 as a double tragedy for this sect of patients.

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