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# SOCIOECONOMIC CORRELATES OF ADHERENCE TO PREVENTIVE MEASURES OF COVID-19 IN MAKURDI LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA

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**ABSTRACT**:
*Implementation of non-pharmaceutical interventions as preventive measures for COVID-19 has met serious hindrances, and socioeconomic status is the main correlate of adherence to these preventive measures. Understanding such correlations is essential for controlling COVID-19 transmission, especially in the absence of vaccination. This study examined assessed the socioeconomic correlates of adherence to the preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State. The research design for this study was a cross-sectional survey design. The Population of the study consisted of all the residents of Makurdi LGA of Benue State. A total of 400 participants were selected for the study using the multistage sampling technique. A structured questionnaire was used for data collection in this study. The data collected through the use of questionnaire was analysed using Binary Logistic Regression to investigate the association between the independent variables and adherence to preventive measures of COVID-19 in the study population at 0.05 level of significance. All the analyses were conducted using the Statistical Package for Social Sciences (SPSS version 23). Being in the middle and high income quintile was significantly associated with adherence to preventive measures of COVID-19 [N36,000–N438,000(aOR:2.09, 95%CI:0.05 – 5.17, p=0.00), N438,000 and above (aOR:3.13, 95%CI:0.62 – 12.25, p=0.00)]; Attending the primary, secondary and tertiary level of education was significantly associated with adherence to preventive measures of COVID-19 [Primary (aOR:1.03, 95%CI:0.10 – 3.10, p=0.00), secondary (aOR:1.05, 95%CI:0.23 – 5.12, p=0.00), Tertiary (aOR:2.13, 95%CI:0.06 – 12.31, p=0.00)]; Being an employee, being a contract worker and being self-employed were significantly associated with adherence to preventive measures of COVID-19 [Employee (aOR:4.91, 95%CI:2.11 – 14.89, p=0.00), Contract worker (aOR: 0.17, 95%CI:0.04 – 12.72, p=0.01), self-employed (aOR:2.22, 95%CI:0.70 – 7.69, p=0.00)]; Being in the age groups 31 - 40, 41 – 50 and 51 and above were significantly associated with adherence to preventive measures of COVID-19 [31 – 40: (aOR:1.89, 95%CI:0.45 – 6.77, p=0.04), 41 – 50: (aOR:2.02, 95%CI:0.01 – 4.05, p=0.00), 51 and above: (aOR:1.81, 95%CI:0.41 – 5.60, p=0.04)]. Non-adherence to preventive measures of COVID-19 was strongly associated with low levels of income, low*

*educational levels, unemployment and being a contract worker, and being below 40 above the age of 50 years in Makurdi Local Government Area of Benue State.*

**Keywords**: Socioeconomic, Correlates, Adherence, COVID-19, Preventive Measures.

## Introduction

Implementation of non-pharmaceutical interventions as preventive measures for COVID-19 has met serious hindrances, and socioeconomic status is the main correlate of adherence to these preventive measures. Understanding such correlations is essential for controlling COVID-19 transmission, especially in the absence of vaccination.

Globally, as of 5 June 2021, there have been 172,242,495 confirmed cases of COVID-19, with 3,709,397 deaths, reported to WHO including 449,332 new cases (WHO, 2021). In Nigeria, from 3 January 2020 to 5 June 2021, there have been 166,730 confirmed cases of COVID-19 with 2,117 deaths, reported to WHO with 48 new cases. In Benue State, however, 1,366 confirmed cases have been reported with 24 deaths and no new cases (NCDC, 2021). The COVID-19 pandemic has led to a dramatic loss of human life worldwide and presents an unprecedented challenge to public health, food systems, education and the world of work. The potential impacts of the COVID-19 pandemic on in all spheres of life, are numerous and diverse.

Coronavirus disease 2019 (COVID-19) is an illness caused by a novel coronavirus called Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2; formerly called 2019-nCoV), which was first identified amid an outbreak of respiratory illness cases in Wuhan City, Hubei Province, China (CDC, 2019).It was initially reported to the World Health Organization (WHO) on December 31, 2019. On January 30, 2020, the WHO declared the COVID-19 outbreak a global health emergency (Gallegos, 2020). On March 11, 2020, the WHO declared COVID-19 a global pandemic, its first such designation since declaring H1N1 influenza a pandemic in 2009 (Ramzy & McNeil, 2020).

Presently, Covid-19 has no permanent cure according to scientist but can be controlled and managed when reported promptly (Yang, Zheng, Gou, Pu & Chen, 2020). During the peak of the disease transmission, most countries enforced regulatory policies, preventive measures, and social and public health guidelines in line with WHO recommendation to curtail the spread of the disease (Omotoso, 2020). Adherence to preventive and public health guidelines (the use of alcohol-based hand sanitizers, washing of hands, respiratory etiquettes and other regulatory policies) is important in protecting oneself and inhibiting the spread of COVID-19 (WHO, 2020).

Nevertheless, there are observed disparities regarding behavioural adherence to precautionary measures of the pandemic. A multitude of social and economic criteria have been attributed as potential determinants for the observed variations in

adherence to these preventive measures. Socioeconomic factors are part of the most investigated independent variables in health promotion and health education intervention research because they predict a number of health behaviour indices and they have direct and indirect impacts on health over time more than some other biological factors. These factors are: income, education, employment, location and Age.

Considering income as a correlate of adherence to preventive measures for COVID-19, people from the lower income quantile are found to adhere less to preventive measures than people from higher income quantile. According to Ahmed, Zeinab, Maha, Hany, Mohamed, and Mohamed, (2020), and Zegarra-Valdivia, Chino-Vilca and Ames-Guerrero, (2020), having or not having resources, including access to information, may have been determined by income level. Since the disease is a novel disease and broke out suddenly, a lot of people are rushing to get a detailed insight from the Internet. Nevertheless, such information was not accessible to individuals with lower income and education level. It is also evident that individuals with low income are mostly involved in low-paying jobs. Moreover, for survival reasons, these individuals cannot afford to fully adhere to the preventive measures of COVID-19. Because of the scarcity of resources, they might be involved in COVID-19 risk behaviours and be unable to buy personal protective equipment. In addition, larger families may have more space constraints due to poor financial standing. Thus, living in overcrowded households and neighbourhoods makes adherence to preventive measures like physical distancing difficult. According to WHO (2020), the containment goals of the disease are met if all individuals are fighting together against the spread of the disease. Education presents a good avenue for the achievement of mass adherence to the preventive measures.

Research indicates that people with lower educational levels practice COVID-19 preventive measures to a lesser degree than those with higher levels of education (Nazli, Heena, Abdul, & Jugal, 2020; Ronald, Gaudencia, Godfrey, Dianah & Felix, 2020; Bhagavathula, Wafa, Jamal, Mohammadjavad & Deepak, 2020). It is evident that individuals with higher educational levels are more likely to understand sudden public problems like the COVID-19 outbreak. Moreover, these individuals are better equipped and make constructive efforts in managing complex issues related to the disease compared to individuals with lower educational level (Nazil et al., 2020). These factors may be responsible for the less educated people's involvement in COVID-19 risky behaviours because they lack information that could help them adhere to the stipulated preventive measures. The less educated are also, almost unemployed which also affects their ability or intention to adhere to the preventive measures.

Unemployment is probably the main factor leading to social exclusion. Studies which analysed health behaviour among unemployed people have reported a variety

of results, from poor to good health habits. It is suggested that the relationship between unemployment and health habits may be explained by causation, where unemployment precipitates poor health habits, perhaps through the combination of effects arising from loss of income, increased unhealthy lifestyle, loss of self-esteem, and psychological distress, and in some settings, reduced access to care. Pharr, Moonie and Bungum (2012) observed that unemployed persons were more likely to delay contact with healthcare services due to cost and were less likely to have access to healthcare than their employed counterparts. It is argued that the non-adherence to preventive measures of COVID-19 by unemployed persons might be related to the fact that as unemployment persists, economic resources dwindle and less money directly or indirectly worsens the prerequisites for good health (Janrlet, 2020). Less money occasioned by unemployment also affects one's choice of location of residence which is also a determinant of adherence to preventive measures of COVID-19.

The pathways through which residential location predicts adherence are lack of information about COVID-19 and lack of unavailability of protective equipment and facilities. The poor and other vulnerable groups such as the elderly, mainly concentrated in rural areas, are the most affected by lack of information (Kiwanuka, Ekirapa, Peterson, Okui, Rahman, & Peters, 2018). Indeed, information coverage is greater in urban areas and there is less choice of health service provision in villages. Yet these vulnerable groups are known to be the most at need of these services. Thus, the lower urban areas and rural residents may be less compliance with preventive measures because of limited access to information about the types of protective measures in these remote settings, the unavailability of protective equipment, or the misconception that COVID-19 is a disease mainly observed in cities and metropolitans where people are overcrowded (World Health Organization, 2020). The lack of information leads to undesirable health behaviour like non-adherence to the preventive measures of COVID-19.

Before the pronouncement and incidence of Covid-19 in Nigeria by World Health Organization (WHO), more than half population of Nigerian at large and Benue State in particular, especially the poor, the less educated, the agrarian rural dwellers and petty market men and women opined, and even openly professed, that COVID-19 is a white man disease and cannot strive or survive in Nigeria because of the hot weather condition and so on (Reuben, Danladi, Saleh & Ejembi, 2020). Not until 27th February, 2020, when the first case of COVID-19 was reported by the Federal Ministry of Health in Lagos State, Nigeria (Nigeria Centre for Disease Control, 2020a) that some people attested to the reality of the pandemic. Despite this, Nigerians still perceive it as a rumour and also see it as a way to steal public fund by politicians and that it is only predominant among rich city dwellers who travel abroad by air that import it from foreign land. Between 29th

December 2019 and sometimes in middle July 2020, majority of Nigerians did not adhere to guidelines and directive from government and other agencies as regard Covid-19 preventive strategies. For instance, the government took certain measures through Radio, Television, Social Media, pamphlet among others to promote personal hygiene, hand washing, use of hand sanitizers, physical distancing among others. Still, Nigerians' poor adherence to those measures by government and other agencies enable Covid-19 cases to keep on increasing in Nigeria beyond measures.

Since the beginning of the pandemic, several international control measures had been instituted to reduce the spread of the disease, such as banning flights from and to infected countries, the lockdown of most countries, strict quarantine measures, application of social distancing measures for popular gatherings, strict personal hygiene such as frequent hand washing for the proper length of time, sanitization of surfaces and wearing face masks, avoiding close contact with probably infected or sick people, staying at home and isolated when feeling ill. So, accordingly, public adherence to these preventive measures is the main strategy to limit the spread of the disease especially in developing countries, where health systems have, at best, the moderate capacity to respond to outbreaks. Adherence to these recommended preventive behaviours can be useful for planning COVID-19 pandemic prevention especially by governments of developing countries like Nigeria.

However, due to the governments' unpreparedness to this unexpected and unprecedented situation, most governments have not been able to rely on the sole implementation of the strategies listed, essentially based on a high level of diagnosis capacities and isolation of infected patients. Instead, most governments implemented a population strategy based on the administration of non-pharmaceutical interventions designed to control the spread of the disease through social and health behaviour change. In practice, these social and public health behaviour interventions ranged from the non-coercive promotion of social distancing, facial mask use, hand sanitizer use, and regular hand washing. These social and behavioural containment measures are considered to be effective in suppressing the exponential growth in COVID-19 cases. Nevertheless, individual differences have been observed regarding behavioural adherence to precautionary measures.

Recent existing literatures on COVID-19 precautions identify that adherence to the preventive measures of the disease is primarily affected by variables such as knowledge, attitudes, and perception. Other related studies indicated that useful knowledge, positive attitude, and thinking in appropriate ways toward the disease were not sufficient to improve adherence and contain its transmission. Given the economic situation accentuated by the pandemic in the study area, the reasons for non-adherence to the preventive measures of COVID-19 could not be farfetched. Cognizant of such gaps in and the limited facts about the adherence to preventive measures in the study area, this research aimed to assess the socioeconomic

correlates of adherence to preventive measures for the disease.

**Purpose of the Study**

The main purpose of the study is to investigate the socioeconomic correlates of adherence to preventive measures of COVID-19 in Makurdi Local Government Area of Benue State. Specifically, the study intends to find out if;

Level of income is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

Level of education is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

Employment status is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

Location of residence is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

Age is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

**Research Hypotheses**

The following hypotheses were postulated to be tested in the study.

Level of income will not be significantly associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

Level of education will not be significantly associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

Employment status will not be significantly associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

Location of residence will not be significantly associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

Age will not be significantly associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State.

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**Research Method**

The research design for this study was a cross-sectional survey design. Cross sectional studies are usually carried out to identify the relationship(s) between variables (Easterby-Smith, Jackson & Lave, 2008). It is particularly useful when examining the interrelationship among a number of variables. Thus, the research observed the study variables without any attempt to manipulating them. Thus, this design is considered most appropriate for this study as it attempts to examine the influence of socioeconomic variables on adherence to preventive measures of COVID-19.

Sample size: A total of 400 participants were selected for the study.

Subjects & selection method: The participants were recruited using the multistage sampling technique.

Stage 1: In the first stage, Makurdi Local Government was stratified based on the number of council wards in the local government.

Stage 2: in the second stage, six council wards were sampled out of the eleven (11) council wards for the study – three rural council wards and three urban council wards using simple random sampling technique.

Stage 3: in stage three, households were selected from each of the sampled council wards giving a total of 33 households.

Stage 4: Simple random sampling technique was then used to select the participants in each of the sampled households.

In order to select participants, the formula propounded by Taro Yamane (1967) was used. The population of the study was assumed to be normally distributed in terms of the parameters for assessing socioeconomic correlates of adherence to COVID-19 preventive measures. The Yamane formula could therefore be considered suitable for determining an appropriate sample size in this population. The estimated population of Makurdi Local Government is 422,159. Applying the Yamane formula;

$$\boldsymbol{n = \frac{N}{1 + N(e)^2}}$$

Where n = sample size

N = total population of the study area

e = margin or error which research is ready to allow

the total population of the study = N = 422,159.

Error allowed = 0.05

$$\boldsymbol{n = \frac{422,159}{1 + 422,159\ (0.05)^2}}$$

n = 399.621

However, for the purpose of the study, 400 participants were selected

Procedure methodology

Data for this research was obtained through the administration of the questionnaire on respondents selected from the various households in Makurdi. Hand delivery method was used for both the distribution and collection of the questionnaires. The researcher moved from one household to another seeking permission of the respondents in participating in the study. The respondents were required to fill the questionnaire and return the completed copies to the researchers. This will be done in order to minimise the time to retrieve the questionnaires on a later date.

**Statistical Analysis**

The data collected through the use of questionnaire was analysed using Binary Logistic Regression to investigate the association between the independent variables and adherence to preventive measures of COVID-19 in the study population at 0.05 level of significance. All the analyses were conducted using the Statistical Package for Social Sciences (SPSS version 23) at 0.05 level of significance. In testing the hypotheses, p-value was used to test for significance. The hypotheses were rejected if p value is < 0.05 and vice versa.

**Results**

Table 1: Summary of Binary Logistic Regression Analysis on Association between Level of Income and Adherence to Preventive Measures of COVID-19

| Variable | S.E. | Wald | df | aOR(95% CI) | P |
|---|---|---|---|---|---|
| Income | | | | | |
| Low (0 – 36,000) | Ref | Ref | | Ref | Ref |
| Middle (36,000 – 438,000 | 0.32 | 54.47 | | 2.09(0.05 – 5.17) | 0.00 |
| High (N438,000 or more) | 0.36 | 33.25 | | 3.13(0.62 – 13.25) | 0.00 |
| Constant | .29 | 24.32 | 2 | | 0.00 |

Table 1 presents the summary of Binary Logistic Regression analysis on association between level of income and adherence to preventive measures of COVID-19. Results available indicate that being in the middle and high income quintile was significantly associated with adherence to preventive measures of COVID-19 [N36,000–N438,000(aOR:2.09, 95%CI:0.05 – 5.17, p=0.00), N438,000 and above (aOR:3.13, 95%CI:0.62 – 12.25, p=0.00)]. Thus, people who earn between 36,000 and 438,000 are 2.09 times more likely to adhere to preventive measures of COVID-19 than people in the low income quintile while people who earn from 438,000 and above are 3.13 times more likely to adhere to preventive measures of COVID-19 than those who earn below N36,000. People in the high income quartile (438,000 and above) have the highest possibility of adhering to preventive measures of COVID-19. This shows that adherence to preventive measures of COVID-19 increases with increasing level of income.

Table 2:Summary of Binary Logistic Regression Analysis on Association between Level of Education and Adherence to Preventive Measures of COVID-19

| Variable | S.E. | Wald | Df | aOR(95% CI) | P |
|---|---|---|---|---|---|
| Education | | | | | |
| No formal Education | Ref | Ref | | Ref | Ref |
| Primary Education | 0.59 | 34.34 | | 1.03(0.10 – 3.10) | 0.00 |
| Secondary Education | 0.42 | 50.34 | | 1.05(0.23 – 5.12) | 0.00 |
| Tertiary Education | 0.42 | 22.77 | | 2.13(0.06 – 12.31) | 0.00 |
| Constant | 0.38 | 23.16 | 3 | | 0.00 |

Table 2 presents the summary of Binary Logistic Regression analysis on association between level of education and adherence to preventive measures of COVID-19. Results available indicate that attending the primary, secondary and tertiary level of education was significantly associated with adherence to preventive measures of COVID-19 [Primary (aOR:1.03, 95%CI:0.10 – 3.10, p=0.00), secondary (aOR:1.05, 95%CI:0.23 – 5.12, p=0.00), Tertiary (aOR:2.13, 95%CI:0.06 – 12.31, p=0.00)]. This means that people with primary education are 1.03 times likely to adhere to preventive measures of COVID-19, people with secondary education are 1.05 times likely to adhere to preventive measures of COVID-19 while people with tertiary education are 1.13 times likely to adhere to preventive measures of COVID-19 than those with no formal education. People with tertiary level of education had the highest odds (aOR: 2.13) of adhering to preventive measures of COVID-19. This shows that adherence is directly related to level of education. People with higher levels of education adhered more to the preventive measures of COVID-19 in Makurdi Local Government Area.

**Table 3:Summary of Binary Logistic Regression Analysis on Association between Employment Status and Adherence to Preventive Measures of COVID-19**

| Variable | S.E. | Wald | Df | aOR(95% CI) | P |
|---|---|---|---|---|---|
| Employment | | | | | |
| Unemployed | Ref | Ref | | Ref | Ref |
| Employee | 0.58 | 6.81 | | 4.91(2.11 – 14.89) | 0.00 |
| Contract Worker | 0.43 | 95.50 | | 0.17(0.04 – 12.72) | 0.01 |
| Self Employed | 0.53 | 51.49 | | 2.22(0.70 – 7.69) | 0.00 |
| Constant | 0.29 | 46.39 | 3 | | 0.00 |

Table 3 presents the summary of Binary Logistic Regression analysis on association between employment status and adherence to preventive measures of COVID-19. Results available indicate that being an employee, being a contract worker and being self-employed were significantly associated with adherence to preventive measures of COVID-19 [Employee (aOR:4.91, 95%CI:2.11 – 14.89, p=0.00), Contract worker (aOR: 0.17, 95%CI:0.04 – 12.72, p=0.01), self-employed (aOR:2.22, 95%CI:0.70 – 7.69, p=0.00)]. This means that people that are gainfully employed are 4.91 times more likely to adhere to preventive measures of COVID-19 than the unemployed, people who are contract workers are 0.17 times likely (less likely) to adhere to preventive measures of COVID-19 than the unemployed. Meanwhile, people who are self-employed are 2.22 times more likely to adhere to preventive measures of COVID-19 than those who are unemployed. However, since p<0.05, this implies that those who are contract workers are also significantly associated with adherence to

preventive measures of COVID-19 though they less likely to do so than those who are unemployed. This shows that people who are gainfully employed adhered more to preventive measures of COVID-19 while contract workers had the least adherence.

Table 4:Summary of Binary Logistic Regression Analysis on Association between Location of Residence and Adherence to Preventive Measures of COVID-19

| Variable | S.E. | Wald | Df | aOR(95% CI) | P |
|---|---|---|---|---|---|
| Location | | | | | |
| Rural | Ref | Ref | | Ref | Ref |
| Urban | 0.21 | 0.84 | | 1.21(0.81 – 1.81) | 0.36 |
| Constant | 0.15 | 13.21 | 1 | | 0.00 |

Table 4 presents the summary of Binary Logistic Regression analysis on association between location of residence and adherence to preventive measures of COVID-19. Results available indicate that living in rural area was not significantly associated with adherence to preventive measures of COVID-19 [Rural (aOR:1.21, 95%CI:0.81 – 1.81, p=0.36)]. This means that though people living in urban areas are more likely to adhere to preventive measures of COVID-19, the difference is not significant.

Table 5: Summary of Binary Logistic Regression Analysis on Association between Age and Adherence to Preventive Measures of COVID-19

| Variable | S.E. | Wald | df | aOR(95% CI) | P |
|---|---|---|---|---|---|
| Age | | | | | |
| 18 - 30 | Ref | Ref | | Ref | Ref |
| 31 - 40 | 0.35 | 0.10 | | 1.89(0.45 – 6.77) | 0.04 |
| 41 – 50 | 0.58 | 49.79 | | 2.02(0.01 – 4.05) | 0.00 |
| 51 and above | 0.35 | 0.36 | | 1.81(0.41 – 5.60) | 0.04 |
| Constant | 0.28 | 3.55 | 3 | | 0.03 |

Table 5 presents the summary of Binary Logistic Regression analysis on association between age and adherence to preventive measures of COVID-19. Results available indicate that the age groups 31 - 40, 41 – 50 and 51 and above were significantly associated with adherence to preventive measures of COVID-19 [31 – 40: (aOR:1.89, 95%CI:0.45 – 6.77, p=0.04), 41 – 50: (aOR:2.02, 95%CI:0.01 – 4.05, p=0.00), 51 and above: (aOR:1.81, 95%CI:0.41 – 5.60, p=0.04)]. This means that people in the age group of 41 - 50 are 2.02 times more likely to adhere to

preventive measures of COVID-19 than people in 18 – 30 age group, people who are between 31 – 40 years are 1.89 times more likely to adhere to preventive measures of COVID-19 than people in 18 – 30 age group while, people who 51 years and above are 1.81 times likely to adhere to preventive measures of COVID-19 than people in 18 – 30 age group. This shows that adherence to preventive measures increases with increasing age and diminishes at higher ages. People who were 41 – 50 years adhered more to the preventive measures than those within other age ranges. The least adherence was however, among people who were 51 years and above.

**Discussion**

The first objective of the study was to find out if level of income is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State. Results available indicate that level of income was significantly associated with adherence to preventive measures of COVID-19 [N36,000–N438,000(aOR:2.09, 95%CI:0.05 – 5.17, p=0.00), N438,000 and above (aOR:3.13, 95%CI:0.62 – 12.25, p=0.00)]. The study found that level of income had a direct positive association with adherence to preventive measures of COVID-19. This result is expected since it supports evidence from other studies that low socioeconomic status and expenditure may increase the risk of COVID-19 infection. A potential explanation may be that the lower compliance of lower-income people in applying protective measures, such as wearing masks, physical distancing, and washing hands is due to lack of finances to purchase the necessary items required for adherence. Low income groups also face higher barriers to compliance with social distancing rules, such as staying at home or avoiding public transport, due to economic hardship and the fear of losing income. This finding provide further nuance to the study by Feyisa (2021) who investigated the factors limiting youths' practice of preventive measures toward the outbreak of COVID-19 in Oromia Special Zone surrounding Finfinnee, Ethiopia. The results of the study revealed that youths who had higher income (aOR = 1.34; 95% CI: 1.02, 1.78) were more likely to practice preventive measures. The similarities in the population of the study and the present study could likely have a bearing on the similar outcomes of the two studies. However, Nivette, et al. (2021) found that non-compliance, especially with hygiene-related measures, was more prevalent in people with higher SES.

The second objective of the study was to find out if level of education is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State. Results available indicate that level of education was significantly associated with adherence to preventive measures of COVID-19 [Primary (aOR:1.03, 95%CI:0.10 – 3.10, p=0.00), secondary (aOR:1.05, 95%CI:0.23 – 5.12, p=0.00), Tertiary (aOR:2.13, 95%CI:0.06 – 12.31, p=0.00)]. The study found that people with

lower educational levels practice COVID-19 preventive measures to a lesser degree than those with higher levels of education. This could be because individuals with higher educational levels are more likely to understand sudden public problems like the COVID-19 outbreak. Moreover, these individuals are better equipped and make constructive efforts in managing complex issues related to the disease compared to individuals with lower educational level. This finding is in congruence with that of Im, Ahn, Wang, and Chen (2020) who carried out an early examination into the psychological, health, and economic correlates and determinants of social distancing amidst COVID-19. Their results indicate that educational attainment and political partisanship were the most consistent correlates of social distancing. Also, Tesfaye, Asefa, Gebremeskel Washo and Muche (2021) investigated adherence with COVID-19 preventive measures and associated factors among Residents of Shashemane, Central Ethiopia. Their results revealed that the practice of COVID-19 preventive measures was significantly associated with educational status (Diploma and above) (aOR = 5.5, 95% CI: 2–9.39). The less educated, for instance, in light of their lower level of health literacy may be less prone to adhere to institutional recommendations disseminated in the first instance to avoid contagion, such as wearing protective masks and gloves and maintaining social distancing. People who have a higher level of education also tend to have a better practice of preventive measures compared to those who have no formal education. This might be because more educated people can access information from different sources like the internet easily and discuss openly, usually more educated are working at different types of organizations where there is strict rule and provision of different Covid-19 prevention materials and information.

The third objective of the study was to find out if employment status is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State. Results available indicate that employment status was significantly associated with adherence to preventive measures of COVID-19 [Employee (aOR:4.91, 95%CI:2.11 – 14.89, p=0.00), Contract worker(aOR:0.17, 95%CI:0.04 – 12.72, p=0.00), self-employed(aOR:2.22, 95%CI:0.70 – 7.69, p=0.01)]. The study found that unemployment and being a contract worker precipitate poor adherence, perhaps through the combination of effects arising from loss of income, increased unhealthy lifestyle, and psychological distress, and in some settings, reduced access to logistics. This finding is in line with that of Delgado, Quintana, Perez, Liprandi, Ponte-Negretti, Mendoza et al., 2020) whose study found that few contract workers reported staying at home as a personal protective measure. Hagan, Javed, Cainzos-Achirica, Sostman, Vahidy, Valero-Elizondo, Acquah, Yahya, Kash, Andrieni, Dubey, Hyder and Nasir, (2021) also found a statistically significant disparities in measures that promote social distancing, including work-from-home opportunity and

being unemployed have also been reported. The less-adherence to preventive measures of COVID-19 by contract workers might be related to the fact that as the pandemic persists, economic resources dwindle and less money directly or indirectly worsens the prerequisites for adherence. Employed workers are found to be significantly more compliant to personal protective and travel measures compared to unemployed people. This could be due to workplaces being forced to implement protective measures (social distancing and mask wearing), or otherwise face closure. Increased ORs of COVID-19 in self-employed areas may have emerged also as a consequence of the kind of jobs (personal services, logistics, cleaning, retail) in which the most people are typically contracted, putting them at higher odds of non-adherence compared to people who are gainfully employed in skilled jobs.

The fourth objective of the study was to find out if location of residence is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State. Results available indicate that location of residence was not significantly associated with adherence to preventive measures of COVID-19 [Rural (aOR:1.21, 95%CI:0.81 – 1.81, p=0.36)]. This finding is surprising as residents dwelling in rural areas are expected to be less likely to engage in a number of adherence behaviours, including wearing a mask, physical distancing, sanitizing homes and workspaces, and working from home. This finding disagrees with that of Callaghan, Lueck, Trujillo and Ferdinand (2021) who found that rurality was a negative and significant predictor of a count-based measure of participation in COVID-19 prevention behaviours. A possible explanation for the results obtained could be that as Makurdi Local Government is the capital of Benue State, the capital status eliminates or blurs the rural urban lines which could have brought out the disparities in adherence between these locations. This might have been because the government applied an enhanced level of preventive measures in the capital which covered both urban and rural areas.

The last objective of the study was to find out if age is associated with adherence to preventive measures of COVID-19 among residents of Makurdi Local Government Area of Benue State. Results available indicate that age was significantly associated with adherence to preventive measures of COVID-19 [31 – 40 (aOR:2.02, 95%CI:0.01 – 4.05, p=0.00), 41 – 50 (aOR:1.81, 95%CI:0.41 – 5.60, p=0.04), 51 and above (aOR:1.89, 95%CI:0.45 – 6.77, p=0.04)]. The study found that adherence to preventive measures of COVID-19 was more significant at the 31 – 40 age group. This result is expected because this is the age group that is mostly employed. Previous studies have also found that increased age was a predictor of protective health behaviours, with adolescents and young adults less likely to consider the consequences of their behaviour on their health, and therefore more willing to engage in risky behaviour. This finding supports that of Feyisa (2021) who investigated the factors limiting youths' practice of

preventive measures toward the outbreak of COVID-19 in Oromia Special Zone surrounding Finfinnee, Ethiopia. The results of their study revealed that older adults (aOR = 1.33; 95% CI: 1.13, 1.56), were more likely to practice preventive measures. The findings also agrees with that of Nivette, Ribeaud, Murray, Steinhoff, Bechtiger, Hepp, Shanahan and Eisner (2021) who carried out a study titled non-compliance with COVID-19-related public health measures among young adults in Switzerland. They found that non-compliance was higher in young adults. Padidar et al (2021) also found that overall compliance significantly increased with age ($p<0.01$), and the youngest age group 18–29 were less compliant with personal protection and the types of activities carried out whilst away from home.

## Conclusion

The study exposed the facts that non-adherence to preventive measures of COVID-19 was strongly associated with low levels of income, low educational levels, unemployment and being a contract worker, and being below 40 above the age of 50 years. Rather than being just a methodological exercise to assess the presence of possible contextual effects on health outcomes, this study has relevant implications. Decision-makers often neglect policies aimed at reducing inequalities and this may lead to even more deleterious consequences especially in the case of an infectious diseases like COVID-19. Disregarding the effect of socioeconomic and demographic correlates on behaviors such as adherence to preventive measures may foster the spread of the virus, with consequences not limited to the production of health inequities, but also involving higher disease rates among the overall population.

## Recommendations

The following recommendations were made based on the findings of the study.

The Governments at all levels should support citizens, in the provision of protective materials. This will aid people from low income quintile to adhere more to the preventive measures by utilizing those protective materials.

Educational institutions like the Benue State University, religious institutions and non-governmental organisations should join hands to increase the awareness campaign especially at the religious and social gatherings. This will enlighten people more on the need for adherence to the preventive measures of the disease.

The law enforcement agencies should be mandated to implement stringent measures against people in public places that go against stipulated measures for the prevention of COVID-19.

The Ministry of Health should organise sensitisation programmes in urban and rural areas to step up the level of adherence to COVID-19 paying greater attention to the

population living in rural areas, town slums and villages.

The elderly people should pay more attention to adherence to measures of prevention of COVID-19 since the pandemic has more effect on the elderly due to their weakened immunity.

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