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Post COVID 19 and the Challenge of Solid Wastes in Mangu Local Government Area of Plateau State, Nigeria

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ABSTRACT

This study looks at Post COVID 19 and the challenge of solid wastes in the Mangu Local Government Area of Plateau State, Nigeria. The study adopted a descriptive survey design with a population of residents in Plateau State. A simple random sampling technique was used to draw a sample size of 200 respondents from the population. A self-designed questionnaire: Post COVID 19 and the challenge of solid waste management in Mangu Local Government Area of Plateau State, Nigeria. Data was collected with the help of questionnaire and analyzed with charts. Also, the hypothesis was tested using a chi-square statistical technique to test the relationship. The findings revealed that an increase in plastics, an increase in disposable gloves, personal protection equipment, and an increase in aprons and gowns are some of the nature of solid waste management during COVID 19. It was established that an increase in household consumption, the accumulation of households' consumables, and lack of access to waste collections were some of the main causes of solid wastes during COVID-19. The study also revealed that the effects of solid wastes during COVID-19 were environmental pollution and health risk, an increase in organic waste, stress on the available waste management system, among others. Based on the findings, the study recommended among others that regular solid waste management, use of disinfectants, face masks, and provision of a proper solid waste disposal methods were among the solutions to the problems of solid waste generated during COVID-19.

Keywords: COVID-19, Challenge, Solid Waste Management.

1. INTRODUCTION

Solid waste management has long been a source of contention across the world, with the situation exacerbated in cities of developing countries. The current COVID-19 pandemic, which began in late December 2019 and was declared a global public health crisis by the World Health Organization (WHO) on January 30, 2020, and has spread to 213 countries, with over 20 million confirmed infected people and approximately 7,44,000 deaths as of August 13, 2020, the majority of which were due to community transmission (WHO, 2020). Nigeria had 11,166 confirmed cases as of June 3, 2020, scattered among 35 states and the Federal Capital Territory (FCT), Abuja (Nzediegwu & Chang, 2020). In the absence of a cure or vaccine, the Nigerian government has had to rely on non-pharmaceutical measures such as testing, contact tracing, isolation, and treatment to limit the spread of the virus and illness. It also included measures such as tight enforcement of hygienic standards such as hand washing, observing social distance, and restricting travel. In addition, the Nigerian government enforced full lockdowns in locations considered to have the highest proclivity for transmission.

On March 30, 2020, the Federal Government of Nigeria declared a 14-day lockdown of Lagos, Ogun, and the Federal Capital Territory (FCT). Following the expiration of the original lockdown and the rising number of cases throughout multiple states, the lockdown was further extended. The increasing output of solid wastes and wastewater, as well as its inappropriate treatment as a result of a growing population and human interactions and activities in developing nations, is problematic. According to Ajibade, Adelodun, and Lasisi (2021), the production of personal protective equipment (PPE) kits, such as hand gloves, facemasks, white gowns, and rubber boots, as well as other essential medical items such as specimen bottles and syringes, increased significantly, resulting in a significant amount being discarded in the environment after use. Furthermore, there is major worry about the long-term management of massive solid waste created in the course of combating the COVID-19 pandemic.

Solid waste management is an environmental issue that affects most Nigerians during and after COVID – 19. It is not only on dumping the unwanted things in a random way but has become a steady process that involves collection, transportation, and proper disposal of garbage, sewage and other waste products (Iheanacho, Mbah, Onwuaha, Eze & Nzeadibe 2018). Solid waste management is usually referred to as the process of collecting, treating solid wastes and provides solutions for recycling items that do not belong to garbage or trash. In the work of Mbah and Nzeadibe (2017), garbage arising from human or animal activities, that is abandoned as unwanted and useless is referred to as solid wastes and generally, it is mostly generated from industrial, residential and commercial environments. The nature of solid wastes can be categorized as paper, plastics, glass, metal and organic waste. It must be managed systematically to ensure friendly environment.

Solid waste disposal and management is a critical aspect of environmental hygiene and it needs to be taken serious considering the tones of solid waste generated during COVID 19. There were the increased generation of solid waste because of increased consumption, accumulation due to working from homes, increase in solid waste in most homes due to increased online shopping and, there was reduction in solid waste collection. Mass gatherings of solid waste were evidences which posed serious threat to public health and solid waste management (Nigerian Centre for Disease Control, 2020). It was also evident that solid wastes generated at homes increased during lockdown quarantine.

Nzeadibe and Ejike-Alieji, (2020) had it that the volume of wastes, especially household wastes, was higher; facemasks, PPE (personal protective equipment), and hazardous materials such as batteries and empty chlorine bottles were examples of extra waste that have arisen during the pandemic. The outbreak of COVID 19 had resulted in the use of personal protection equipment (PPE), i.e., facemasks and rubber gloves used by the general population.

Oluwasinaayomi and Donna-Marie, (2021) noted that many developing countries are facing serious environmental challenges and health risks due to the accumulation of wastes during the pandemic such as plastics, facemasks, disposable gloves, personal protection equipment, aprons and gowns. Also, the COVID19 pandemic, unlike earthquakes or tropical storms, will not be over in a matter of hours or days. It will be with us for another year at least, and possibly for several more years. National Environmental Standards and Regulations Enforcement Agency (2020) had it that a significant rise in plastic and fiber-based municipal solid waste materials was evident due to the widespread use of face masks and disposable gloves and other personal protection equipment during the COVID-19 pandemic.

Furthermore, Bashir, Fidelis, and Kyung-Sook (2021), noted that the emergence of the COVID-19 pandemic has contributed to a drastic increase in the production and use of healthcare and personal protective equipment, resulting in the release of a massive amount of hazardous medical and solid wastes into the environment. The ever-increasing use of resources generated massive volumes of solid waste from industrial and home activities, posing serious dangers to human health (Kaza 2020). The consequences of improper disposal of solid wastes are numerous, including health problems, accidents, floods, and environmental pressure. In many developing nations, solid waste disposal stations may be located on the outskirts of cities. Because of the incubation and multiplication of flies, mosquitoes, and rats, these sites represent a source of contamination for children. They, in turn, are disease transmitters that have an impact on the health of the population, which has organic defenses in formative and creative conditions.

Furthermore, changes in lifestyle, particularly in the provision of everyday essentials, such as the growing use of home delivery services, have increased paper and plastic wastes from packaging. These changes, as well as an increase in the ratio of utilizing home food to ready meals in the community, have resulted in a rise in municipal solid waste in various societies. According to the Department for International Development (2020), plastic use has increased as a result of its great capacity to create masks and disposable gloves, as well as packaging for health items and commodities delivery in homes and consumption areas.

Nzeadibe and Madu (2012) had it that some of the adverse effects of accumulation of solid wastes during COVID-19 were disease outbreaks with far reaching implications, having often resulted from uncollected piles of solid wastes and can be a serious health challenge through the spread of infectious diseases. In addition, unattended solid wastes scattered around the environments attracts flies, rats and other creatures that in turn, spread diseases. Normally, the wet waste decomposes and released bad odors, it affects the people who settled near ~~to~~ the affected areas. It further shows that dumpsites have serious effects on the people settling around them.

However, a critical observation shows that the solid waste management situation in Nigerian cities particularly collection, recycling and disposal has invariably become riskier for waste workers following the outbreak and spread of the COVID-19 pandemic over the past few years. To handle the challenging situation, Alabi, Kasim and Lasisi (2020) **noted that** state governments and communities have to engage waste management services to avoid risks to public health, safety risks and pollution associated with accumulation of waste.

According to Alhassan and Daniel (2020), issues linked to COVID-19 related air pollution may pose hazards to the human population since the health consequences of COVID-19 are largely related to breathing (Adanikin, 2020). Because of the danger of contamination, the increased use of masks and gloves has resulted in an increase in urban trash, which requires adequate control. Littering garbage is a serious environmental hazard because it increases the probability of the virus spreading through municipal solid waste. Because most masks and protective gloves are composed of plastics, the presence of these items in the environment might be considered a micro plastic source.

According to Widad, Nor, and Hasmah's (2022) study, the majority of respondents believed that incorrect waste management might contribute to diarrhea and malaria. Environmental issues such as waste disposal mechanisms are linked to diarrhea and waste management. Typhoid, dysentery, cholera, respiratory infections, and injuries might all be linked to other diseases (Mamady, 2016). Proper waste management may contribute to improvements in environmental quality and public health, whereas improper waste management can lead to water, soil, and air pollution.

During the COVID-19 pandemic and subsequent lockdown in the second quarter of 2020 in Mangu LGA in Plateau State, in particular, and Nigeria in general, it was clear from transactions and observations that the pace of solid waste builds up was not amusing. Residents in the neighborhood discarded their waste at both legal and illegal dumpsites. The amount of controlled solid waste generation in Mangu LGA during the period spiked by leaps and bounds due to the fact that residents were restricted to their residences. The state administration issued a timely warning to residents to stock up on food for use during the lockdown, as markets were also closed to avoid the spread and transmission of the virus in the state.

The areas faced with improper disposal of solid wastes generated from COVID 19 *created unsanitary conditions, and these conditions in turn led to pollution of the environment and outbreaks of vector-borne diseases, that is, diseases spread by rodents and insects.* Solid Waste Management is the most pressing environmental challenge faced by most communities in Mangu Local Government area during and after COVID – 19 with its alarming proportions each passing day. However, solid waste management is now not about merely dumping the unwanted things in a random way but has become a systematic process consisting of collection, transportation, and proper disposal of garbage, sewage and other waste products.

Due to the current role of protective equipment like disposable masks and gloves, the COVID-19 pandemic appears to have increased plastic wastes in most of the surroundings and drainages especially Angwan - Madaki, Kwata - One, Angwan - Pyemawa and Angwan – Mata, with increased generation of plastics and face masks of different kinds. Most of the wastes generated during COVID–19 pandemics were caused partly by excessive delivery, panic buying, stockpiling and disposal. There were problems of increase in the use of gloves, masks, and aprons which were in high demand in the hospitals, churches and mosques. Furthermore, the closure of hotels, restaurants, and other food-related businesses as a result of the lockdown, as well as social distancing tactics, had driven outdoor rats indoors. Because there was less waste on the streets, there was a rise in indoor rat infestation in the majority of houses. The potential of rats carrying disease-causing germs and transmitting them to people is a developing health problem. The spread of COVID-19 and changes in people's lifestyles have had a detrimental impact on the number and content of solid wastes, with an increase in waste seen as a result of the virus' potential spread in recycling centers.

1.1 Purpose of the Study

The purpose of this study was to determine the post COVID-19 solid waste challenge in Mangu, a Local Government Area of Plateau State, Nigeria. Specifically, this study sought to:

1. Identify the types of solid wastes generated during COVID-19 in Mangu and environs of Plateau State, Nigeria, and
2. Examine the factors that contributed to the accumulation of solid wastes during COVID-19.

1.2 Research Questions

1. What are the types of solid wastes generated during COVID-19 in Mangu and environs?
2. What are the factors that contributed to the accumulation of solid wastes during COVID-19?

1.3 Hypothesis

H_{01}: There is a significant relationship between the types of solid wastes accumulated and the effects on the residents of Mangu Local Government Area.

2. METHOD

Descriptive research design was used for the study because it helped the collection of information from the population. The population comprised 600 people from the targeted area. The area was segmented into six (6) clusters of communities; Angwan - Madaki: - Piyemawa, Angwan - Quarter 1 and Angwan-Sabon-Gida. Angwan-Didep: Angwan Mata Angwan-Maigirji and Angwan-Ranpiya. Simple random sampling technique was used to select 200 people from the population. A self-designed four-Likert scale questionnaire was used, with the title: Post COVID 19 and the challenge of Solid Waste Management in Mangu Local Government Area of Plateau State, Nigeria. To validate the instrument, the questionnaire was given to two experts from Social Studies Education and Test and Measurement at the Federal College of Education in Pankshin.

3. PRESENTATION OF RESULTS

Research Question 1:
What are the types of solid wastes generated during COVID-19 in Mangu and its environs?

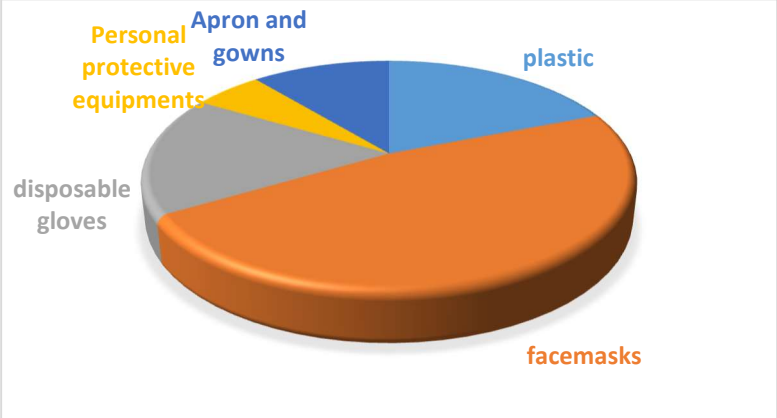

Fig1: Types of Solid Wastes generated during COVID-19
Source: Field study 2021

The above pie chart shows that plastic generation during COVID 19 pandemic as indicated with a total of 48. The total of 115 agreed that availability of face masks of different kinds contributed to the nature of solid wastes during COVID 19. The study further revealed that there was presence of disposable hand gloves as indicated with a total of 34 respondents. While 11 responded that personal protection equipment were scattered. Lastly, 22 responded that aprons and gowns were not easily seen around during COVID 19 pandemic.

Research Question 2:
What are the factors that contributed to the accumulation of solid wastes during COVID-19?

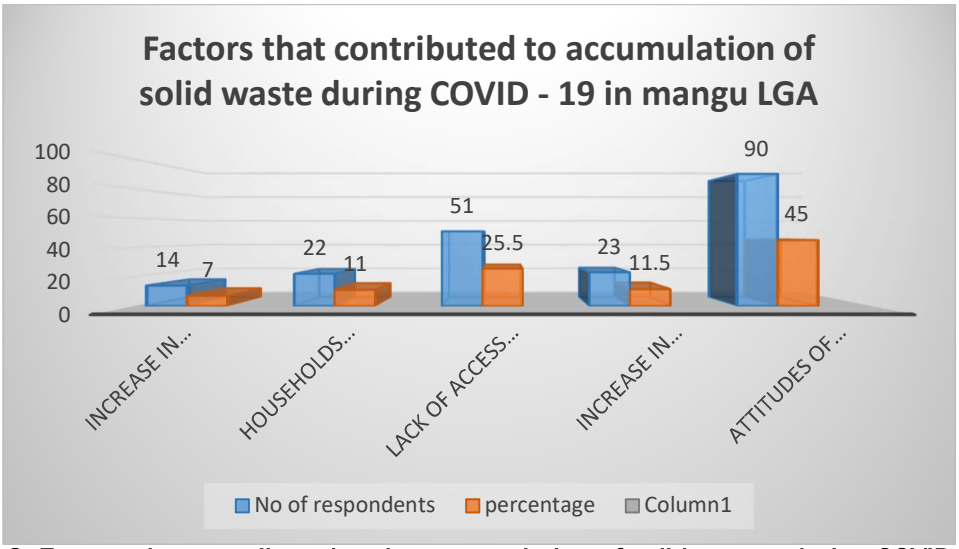

Fig 2: Factors that contributed to the accumulation of solid wastes during COVID-19
Source Field study 2021

From the graph above, 14 respondents accepted that increase in household consumption was one of the causes of solid wastes during COVID-19 pandemic in Mangu and its environs while accumulation of household consumables had a total of 22 respondents. In addition, a total of 51 respondents indicated that lack of access to waste collections during COVID 19 was a major cause of accumulation of solid wastes. 23 respondents indicated that increase in online shopping was another cause of solid waste. Lastly, 90 respondents massively indicated that negative attitude of people towards solid wastes was another major cause of solid waste accumulation in Mangu during COVID 19.

3.1 Test of hypothesis

HO_1: There is a significant relationship between the types of solid wastes accumulated and the effects on the residents of Mangu Local Government Area.

Table 1: Chi-square showing relationship between the types of solid wastes accumulated and the effects on the residents

S/N	*Fo*	*Fe*	*Df*	*X2 - cal*	*X2 – crit*	*Level of significance*	*Decision*
1	38	40.2					
2	95	40.2					
3	34	40.2	4	7.26	9.49	0.05	Accepted
4	11	40.2			13.28	0.01	Accepted
5	22	40.2					

Source: field survey (2021)

From the test of hypothesis above, the calculated value of 7.26 was less than the table at both levels of significance of 0.05 (9.49) and 0.01 (13.28), respectively. If the chi-square calculated value is less than the chi-square critical values at both 0.05 and 0.01 levels of significance, the null hypothesis is accepted. In conclusion, there is no significant difference between the types of solid wastes accumulated during COVID-19 and the effects on the residents of Mangu Local Government Area.

4. DISCUSSION OF FINDINGS

The findings revealed that the types of solid wastes accumulated during COVID-19 were an increase in plastics, an increase in facemasks, an increase in disposable gloves, personal protection equipment, and an increase in aprons and gowns. This finding was in line with Ajibade, Adelodun, and Lasisi (2021), who found that plastics, facemasks, disposable gloves, personal protection equipment, aprons, and gowns were among the solid wastes littered during the COVID-19 pandemic.

Atamu, Nazrul, and Asim (2021) also agreed with the study that the volume of wastes, especially household wastes, was higher. Facemasks, PPE (personal protective equipment), and hazardous materials such as batteries and empty chlorine bottles were examples of extra wastes that had arisen during the pandemic. The outbreak of COVID-19 has resulted in the use of personal protection equipment (PPE), i.e., facemasks and rubber gloves used by the general population.

Furthermore, factors that aggravated solid wastes during COVID-19 were an increase in household consumption and the accumulation of household consumables. Others are the lack of access to waste collections and the increase in online shopping. The study was in line with Alhassan and Daniel (2020), that increase in home cooking led to rising household waste generation in some countries due to concerns about virus transmission through ready-to-eat foods. These areas became children's sources of contamination due to the incubation and proliferation of flies, mosquitoes, and rodents. They, in turn, are disease transmitters that affect the population's health, which has its organic defenses in a formative and creative state, which supports the work of (Kaza, 2020).

From the hypothesis tested, it was clearly revealed that the types of wastes accumulated during COVID 19 in Mangu Local Government Area of Plateau State had a significant relationship with the effects on the residents of the area. It was in agreement with the work of Widad, Nor and Hasmah (2022), who said that most of the respondents thought that improper waste management could lead to diarrhea and malaria. Other diseases could be related to typhoid, dysentery, cholera, respiratory infections, and injury. Mamady (2016) also agreed with the findings that proper waste management can lead to improvements in the quality of the environment and public health while mismanagement of wastes can have implications on water, soil, and air pollution.

5. CONCLUSION

Solid waste management is an environmental issue whose effects can be dangerous during and after COVID 19. It has significantly affected the collection and treatment of solid wastes, and providing solutions for recycling items that do not belong in garbage or trash. Often overlooked is the danger of the solid waste disposed of by individuals diagnosed with the virus. The generation of solid wastes increased as cases increased. The pandemic has caused a surge in solid waste material stemming from the widespread use of personal protective equipment (PPE) kits, including hand gloves, facemasks, white gowns, and rubber boots, and other essential medical items such as specimen bottles and syringes, among many others, have increased considerably, leading to a significant amount being discarded in the environment after use.

5. RECCOMENDATIONS

1. Municipal and home waste management systems must be improved to avoid disease transmission in communities by environmental health officials.
2. To manage and reduce the danger of virus transmission, the sanitary dumping technique should be replaced with waste incineration.
3. The government must promote knowledge about how to manage the massive amount of garbage that was generated during the COVID-19 outbreak.
4. People's attitudes toward accumulating and storing things or waste should be changed so that they are not wasted.

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