

Restraining COVID-19: Management of Hospital Waste in Post Pandemic Setting in West Africa

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Abstract

Emerged from the Chinese city of Wuhan, Coronavirus Disease 2019 (COVID-19) becomes the novel scenario to the face of the Earth where people must learn to live with. This paper reviewed some indispensable environmental management issues during the post-COVID-19 pandemic in Africa with specific reference to hospital waste management in Nigeria. Though not exhaustible, the study assesses how hospital waste and other environmental priorities will adversely help the restraining of the COVID-19 pandemic. In most West African communities where financial and technological challenges are evident, the management of these essential environmental issues requires a coordinated and prompt response from various authorities. Moreover, the provision of sufficient funding is central to every aspect of hospital waste management, therefore, this study suggests the need for thorough informative awareness programs as a panacea since the success of managing these key environmental issues is directly connected to the containment of this pandemic to a minimal level.

Keywords: COVID-19 Pandemic; Environmental management; Hygiene; Hospital waste management.

Introduction

Coronavirus Disease 2019 (COVID-19) is a viral infection that was first reported in the Chinese city of Wuhan in December 2019. This viral disease evolved into one of the greatest health emergencies that were subsequently declared as a pandemic by the World Health Organization [1]. Africa like any other continent in the World, it was anticipated to be worse hit the cases of

COVID-19 due to their generally weak healthcare system that are categorized as low and effective in terms of responding to necessary equipment needed in containing the outbreak effectively as compared to other continents [2]. It a fact that developing countries are generally facing constrains of proper management of hospital wastes, West African counties are

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not exempted. Most hospitals in these countries suffer from poor waste segregation, collection, storage, transportation and disposal. Consequently, these challenges mostly lead to results in a range of environmental and occupational menace.

In West Africa countries like Nigeria, Nigeria's Centre for Disease Control [3] is responsible for reporting updates and other related information regarding the COVID-19 pandemic within the country. NCDC reported the country's first index case of COVID-19 late February 2020 from a foreign national (an Italian) who come through Murtala Mohammed Airport Lagos, Lagos State, Nigeria. Thereafter, there has been a monumental increase of reported cases as well as fatalities. Though the reported cases of the pandemic in Nigeria are seen as low with a mere fatality rate of 2.7 percent as of 13th June 2020 [3], however, the cases are believed to be on the rise. Notably, a reputable international body like the WHO had anticipated that Africa may the worst hit on the effects of the pandemic [1].

Due to the dilapidated healthcare system of the country, Nigerians were known to be prominent for medical tourism; this includes both government officials as well as private individuals. Current Nigeria's healthcare system cannot effectively respond to the growing needs of already infected patients that may require admission into intensive care units for acute respiratory diseases and severe acute respiratory syndrome (SARSCOV-2) pneumonia [4]. This has grim implications for Nigeria, especially as increased cases loom that may require critical care. This increasing looming of this pandemic is a

legitimate source of concern and needs to be addressed as soon as possible for normalcy to resume. One of the key critical measures that may contribute immensely to the containment of this pandemic is essential environment management. The critical management issues include the efficient management of water resources, waste (hospital and municipal solid waste) as well as sanitation and hygiene among others.

Theoretical Framework

According to the World Health Organization (WHO), primary symptoms of COVID-19 range from cough, fever, respiratory symptoms, and breathing difficulties [5]. However, some fatal outcomes may also result in lower-respiratory tract illnesses such as bronchitis, pneumonia, severe acute respiratory syndrome (SARS) and acute respiratory distress syndrome (ARDS). COVID-19 complications are believed to be more pronounced in infants and elders patients suffering or having underlying health conditions, for instance, such as immuno-compromised individuals and cardiopulmonary disease (Centre for Disease Control Prevention (NCDC), 2020). With an average global fatality of about 3.41 percent, COVID-19 is believed to be among the deathliest disease that needed to be contained as a matter of urgency globally (COVID, 2020).

In Nigeria like many other West African countries, most gigantic infrastructures and other major developmental facilities such as major hospitals, roads, markets etc., were builds in an urban area so also the concentration of people for the urge to improve lifestyle or job among others. However, with the thunderous warning by

experts about the risks of spreading COVID-19 in Africa, the measures employed within most urban communities in Nigeria like the various West African societies range from strict lockdown to partial lockdown. Even though some people perceived these measures lockdowns violate the guaranteed constitutional rights to freedom of religion, peaceful assembly and association and freedom of movement. However, the Constitution contains a proviso which validates laws limiting the enjoyment of these rights in the interest of public safety or public health and to protect the rights of other persons. Moreover, other measures such as ordering people to stay at home, banning inter-state traveling, closure of schools, markets, and all public offices as well as banning the gathering of more than 20 persons.

In his commitment toward the protection of public health, the President of Nigeria, President Muhammadu Buhari adopted the Quarantine Act of 1926 (section 2 to 4) as statutory emergency backing in containing the post-COVID-19 in the country. It is also important to note that Nigeria is a country of about 200 million people where most of them reside in urban communities with about 3.1 percent of the population are characterized to be elderly. During post-COVID-19, it is important to note that the highest risk age groups within the population are the elderly; hence, this country is believed to be home of about 6.4 million persons aged 65 years and above. Though, comprehensive data regarding the number of persons with an underlying health concern cannot be found due to the countries' poor data bank as well as skewed healthcare system within the country. Therefore, this necessitates the

administration of crucial management of diverse environmental issues such as water resource management, waste management (explicitly, hospital, and municipal solid) as well as sanitation and personal hygiene.

Waste Management

Waste management is the actions and activities involve in managing waste from inception to final disposal [6]. These sets of activities include the collection, transportation, handling, storing treatment as well as disposal of waste under a legal regulatory framework. The generation of waste is an essential part of humans lately. As the human population increases, the rate at which waste is accumulated is increasing, therefore, the man was always up for scramble to find a way to sustainably manage these wastes. Waste is categorized to be either toxic or non-toxic waste depending on the content of the waste. Moreover, waste can also be categorized based on its origin, this division includes the municipal solid waste, hospital waste, agricultural waste and industrial waste [7]. Focusing on hospital waste, the present study demonstrated the pre-requisiteness of effective hospital waste management in lowering the curve of the pandemic in the West African region. However, this study affirmed that during the post-COVID-19 pandemic, the management of the hospital and municipal solid waste is crucial to the containment of the pandemic to avoid possible secondary impacts upon the healthcare system as well as actors.

Hospital Waste Management

Health care activities and services usually generate huge diverse waste of different kinds and sizes which were hazardous and

infectious which mismanagement can result in occupational as well as environmental health risks. Though there are wide variations in terms of hospital waste generation rates among various countries, however, the West African countries are anticipated to be facing similar challenges despite having other peculiar respective challenges. In many countries, the services of public hospitals grew in high and consequently the accumulation of waste within the hospital skyrockets. Most West African country's hospitals (both public and private) chiefly rendered skeletal services for the fear of the pandemic [8]. Hospital waste is the collection of hazardous and dangerous objects within the hospital, these objects are considered either used or no longer required.

hotspots of the influx of patients infected by the virus, health workers, rapid accumulation of hospital waste (e.g. syringes, needles, facemask, personal protective equipment, and other necessary medical accessories) used by patients, cleaners, medical personnel as well as waste managers. Hospital waste exists in various formats and is largely considered to be hazardous and infectious that cannot be recycled or reused without obligatory pretreatment [9,10]. Even though it was estimated that non-hazardous hospital waste accounted for about 75 to 90 percent [11], yet, during this pandemic era, every waste is a potentially hazardous waste, therefore, other management techniques like recycling must be classified as illegal and void.

Hospital as the theatre of the fight against mighty COVID-19 is undoubtedly the

Table 1: Categories of Hospital Waste

Category		Constituents
Hazardous waste	Pathological Waste	Tissues, organs, body parts, fetuses, blood and body fluids
	Infectious Waste	Waste contaminated by pathogens from labs, surgeries and autopsies.
	Sharps	Needles, syringes, scalpels, infusion sets, saws & knives, blades, broken glass and any other related items.
	Pharmaceutical Waste	Expired or unused pharmaceutical products, surplus drugs, vaccines, bottles, boxes, gloves, masks, tubes or vials.
	Genotoxic Waste	Cytotoxic drugs and outdated materials, vomitus, feces or urines from patients.
	Chemical Waste	Chemicals from diagnostic/experiments, cleaning/disinfecting materials, broken, discarded and spillage clinical equipment.
	Radioactive Waste	Liquid, solid and gaseous waste contaminated with radionuclides.
Non-Hazardous Waste	Infrastructures and administrative tools	Paper, pens, broken benches and desks, cardboard, packaging, food waste, aerosols, etc.

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The generation of hospital waste within usually includes is calculated in Kilograms

per patient per day, though this not always feasible due to lack of hospital beds within most of West African country's hospitals [12]. The rate of waste generation within the West African States is slightly lower than their respective developing countries rates as found in various studies [4,5,13,14,15,16,17]. According to a study by Longe (2006) conducted in Lagos State of Nigeria, every patient has about 0.57Kg/bed/day (i.e. 19-37% for risk waste, 7-10% for sharp waste and 50-66% for non-risk waste). Interestingly, other developing outside the West Africa were found to be of about 0.87 Kg/bed/day for Sudan [4], 0.85 Kg/bed/day for Egypt [13], 1.58 Kg/bed/day for Bangladesh [14], 2.0 Kg/bed/day for Pakistan [15], 0.08-1.04 Kg/bed/day for India [5], 4.45 Kg/bed/day for Iran [16], 1.25-2.6 Kg/bed/day Turkey [17], etc. The comparing of these various results is challenging due to the variations in the categorization of results differently among these studies as well as various classification of hospital waste into two-three categories. Other important issues involved in hospital waste management in West Africa include waste segregation (lacking proper segregation techniques), waste storage (lacking properly labeled waste containers and storerooms, waste transportation (lacking personal protective equipment during waste transportation) and waste disposal and resale (incineration is the most widely used, waste are burned in open fill sites, also disinfection is only

limited to few hospitals) [10]. Therefore, comprehensive waste management is essential in hospitals because any shortcoming can lead to grave compromises in safety, health and environmental risks to all stakeholders and user-groups.

It is a fact that the management of the hospital required careful handling as well as disposal, however, with the current pandemic, the management and disposal of the hospital waste are highly crucial to the containment of the virus and lower the curve. The management of hospital waste at the point of collection, storage as well as disposal requires careful handling, transportation as well as storing. The management of the hospital whether on-site or off-site require some form of transportation of the waste, the movement should be done through less busy and at times where less crowd is observed and through a prescribed road. During post-COVID-19, the incineration of hospital waste from both clinics and isolation centers can be regarded as the most effective and crucial technique of hospital waste disposal. Though, the incineration of pathogenic materials has it owned hiccups, especially incineration close to the residential region as well as taking of care of the incinerated residue after disposal.

Interestingly, other diverse technologies ideal for the management of hospital waste includes stream treatment, microwave treatment and chemical treatment [10,8]. Moreover, a supplementary essential measure that contributes to the environmentally sound management of hospital waste is the adoption of special precaution measures in the collection,

handling, storing and disposal of waste generated. Furthermore, this is in addition to the required periodic fumigation of key areas, collection centers and provisions of support to all stakeholders involved in the management of this waste. Though the Federal government of Nigeria has passed Environmental Act law, however, the law is yet to take effect due to policy execution deficiencies.

Other Post COVID-19 Management Priorities

The COVID-19 crisis has been emotionally challenging for many people, changing day-to-day life in unprecedented ways [18,19]. For companies, business, as usual, is not an option. They can start by drawing up and executing a plan to support employees that is consistent with the most conservative guidelines that might apply and has trigger points for policy changes. Some companies are actively benchmarking their efforts against others to determine the right policies and levels of support for their people. Leaders must communicate with employees with the right level of specificity and frequency.

However, in an event municipal solid waste management which is simply regarded as a collection of waste generated from cosmopolitan lifestyle from houses, institutions and sewages which are mainly considered to be non-hazardous. This type of waste is normally a collection of refuse, organic and recyclable materials. The management of municipal solid waste like any other waste must follow the principles of clean to the dirtiest disposal center. Various domestic waste that comes in contact with an infected person will consequently get infected and will dump

on collections without any sign or stamp like any other type of waste.

Lately, cosmopolitan lifestyles have put unprecedented pressure on the global finite water resources. With a fast-growing world population, it is estimated that the gap between global water demand and supply will face about 40 percent shortfall in the next ten years (2030). However, with a recent emphasis on washing hands as a

the measure of containing the COVID-19, the West Africa communities where clean water is for the most of the year scarce coupled with hydrological uncertainty and extreme weather events. Therefore, responsible water resource management of global finite freshwater has consequential impacts of feeding the anticipated global population of 9 billion people by 2050. Moreover, this population will require an increase of about 60 percent of agricultural activities besides the increase of about 15 percent of overall water withdrawals. Besides this increasing demand, the resource is already scarce in many parts of the world. Therefore, sustainable water management remained a priority during the post-pandemic scenario.

Moreover, this study identifies the need for a stable supply of equipment for day to day activities and other management facilities as well as stringent sensitization programs that can support the fight against the COVID-19 pandemic since within the most West Africa communities no visible measures in place for the protection of most vulnerable most workers yet; for instance, casual, self-employed as well as employees of the informal sector [20]. There is also no comprehensive social welfare scheme within most of the West African countries, therefore, in an event of any mistake, termination of employment can only be sought under the pre-existing labor law and the framework can be adjusted. This call for further strengthening West African countries' preparedness to suit the existing ongoing sensitization of communities, training of healthcare workers and strengthening of surveillance mechanisms in communities.

Conclusion

Despite evidence proving that lockdown measures put to contain the spread of COVID-19 is largely successful in some Africa countries such as South Africa. However, the case is believed to be different in most West African communities like Nigeria where the lockdown measure is differently imposed and characterized by individualized perception about the virus as well as mediums of spread. Nonetheless, the recent collaborative efforts from the World Health Organization, Federal and State government in Nigeria is indeed commendable. The Africa Center for Disease Control (Africa CDC) has been at the frontline of leading the continent's response to the COVID-19 outbreak, but the most effective is the diverse respective Centre for Disease Control in every country [21]. The West African States seems to be doing nothing new towards the management of hospital waste besides fully understanding the hazardous nature of this waste. With already existing engraved challenges of funding, technical skills and technological resource within this region, the management of hospital waste during the post-COVID-19 pandemic setting requires expanding local healthcare infrastructure. Moreover, other issues such as proper training all hospital waste stakeholders, adoption of systematized measure of hospital waste management (through the development of a management information system) and outsourcing of third party specialists in waste management can consequently result to poverty reduction and job creation besides its primary role of containing the COVID-19 pandemic in the region.

During the COVID-19 pandemic, managing through landfills must be discouraged, case of exceptional scenario special requirement are met just like the case of encapsulation in the cytotoxic waste [22,23]. There is a need for a predictive approach is eminent in post-COVID-19 pandemic scenarios especially in urban cities with already stretched healthcare system even before the emergence of the pandemic. This study affirmed the need for intensifying large scale surveillances and coherent understanding of limiting factors that minimize the spread of the virus spreading, though, in the region like Nigeria which only recorded her first death on the late March 2020 but have only recorded a total

reported fatality of about 420 as of mid-June, 2020. Other issues needed is the re-strategize in expanding its current case detection, protection of all major actors in environmental management at all level, more robust collaboration with global and regional partners will be very crucial to fast-track the acquisition and utilization of available resources and potential interventions (such as African Development Bank and the Africa Finance Corporation), setting up of cross-functional COVID-19 response team, and urgent need to put into perspective these realities peculiar to Africa including Nigeria and explore available collective measures and interventions to address the COVID-19 pandemic.

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