



examination of human or animal body after death with the aim of determining and establishing the cause of death, character and extent of changes produced by the disease [11].

Post mortem, overtime, has become a major game changer providing valuable information on deaths resulting from not so well



### **Formalin-fixed specimen preparation**

Preparation of formalin-fixed specimen for the purpose of post-mortem examination include: specimen collection, tissue dehydration, tissue embedding, tissue slicing and tissue staining.

### **Specimen collection**

Fixed specimens can be retrieved in a well-ventilated laboratory in which surfaces and floors are sterilized with 2000 mg/L chlorine-containing disinfectant and air is disinfected by ultraviolet radiation [37].

### **Tissue dehydration**

Once dehydrated, tissues are removed from the area, the surface of

caused the death or not or what contribution does COVID-19 has to the cause of the death? [39,40].

Identified challenges associated with post-mortem examination which are peculiar to the Nigeria settings include: 1) Non-availability of Standard Operating Procedure (SOP) for post-mortem examination, as well as, 2) lack of basic minimum bench mark/guidelines for histopathology laboratory doing autopsy. 3) There are equally poor working unsafe environment with no biosecurity in most autopsy rooms across the country. 4) Few trained molecular Histoscientists and Histopathologists having the technical-know-how to handle the autopsy and fewer willing to take risks in performing autopsy on suspected or confirmed COVID-19 positive cases. This may be due to poor hazard allowances and insurance packages, 5) Non-availability of the required tools for autopsy [40]. 6) Another challenge is poor adherence to the approved guidelines for disposal of remains of COVID-19 patients resulting in potential exposure of both the healthcare workers and the general public to the deadly virus [41-44].

In our own opinion, the identified way forward will include: 1) Standard Operating Procedure (SOP) for post-mortem examination, as well as basic minimum bench mark/guidelines for histopathology laboratory doing autopsy must be made available and updated periodically as the need arises. 2) Personnel and working environment for COVID-19 post-mortem examination must have the required biosecurity and protection to contain escalation of the virus. 3) More molecular Histo-Scientists and Histo-Pathologists with the required expertise should be trained and re-trained according to global best practices. 4) The morale of health professionals involve in COVID-19 post-mortem examination should be renewed and sustained through improved hazard allowances and insurance packages. 5) There will be need for regulatory bodies to bring in policy documents peculiar to the Nigeria environment on procedure matters, pre- and post- autopsies of COVID-19 patients. 6) Finally, the Nigerian government should demonstrate much more political will and commitments by investing more in the health sector especially in the histopathology department saddled with role of post-mortem examination of emerging infectious disease like COVID-19.

## Conclusion

The post mortem examination of COVID-19 patients is the statutory role of the Histopathology laboratory. However, in addition to the aforementioned, the histopathology laboratory can support the fight against the pandemic by: making autopsy results available in an organized, easily accessible, and timely manner, provide training/re-training on both basic and advanced techniques in histopathology for her staff, also monitor and report autopsy results for unusual findings amongst others. Amidst the COVID-19 pandemic, it is very important for the histopathology laboratory to be actively involved in all aspects of the infection control program, particularly in the hospital's infection surveillance system and in assisting the infection control program to effectively and efficiently use laboratory services for epidemiologic purposes. Finally, it is very important for personnel working in the histopathology laboratories (particularly those involve in post mortem examination of COVID-19 cases) to understand why infection control is very necessary in deescalating the spread of the virus. They must maintain good personal hygiene and take personal protection very seriously. Protective wears such as gloves, gowns/aprons masks, respirators goggle and face shields are mandatory before handling dead bodies of suspected or confirmed COVID-19 patients. In addition, they must adhere to the hospital policy on direct contact with

patient and patient's clinical specimens. Adequate methods for routine cleaning, disinfecting and sterilizing must be put in place. Written policies and procedures on handling health hazards within and outside the laboratory must be developed and adhered to amidst the fight against the pandemic.

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