

## Current practice of histopathology in Pakistan: Difficulties, challenges and solutions

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### Abstract

Histopathology is the gold standard for diagnosis of cancers as well as many non-neoplastic diseases. Pakistan is a country of more than 220 million people and the fifth most populated country of the world. Unfortunately, it has a weak healthcare system in general and poor pathology services in particular. Till date, only 338 histopathologists have passed their fellowship examination in Pakistan; this has led to a very alarming situation considering the marked increase in the prevalence of cancer cases and other diseases which need histopathological interpretation. There are only 18 big histopathological labs in the country, the majority of which are located in major cities which further delays the diagnosis of patients who live in rural areas. Immediate steps are required for better histopathology services in the country. Adoption of digital tools may bridge the gaps of histopathology-practice and ensure consistency across the country.

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### Introduction

Pakistan is a country of more than 220 million people, and is the fifth largest country in the world. According to World Health Organisation (WHO), 180,000 new cancer cases are detected in Pakistan annually, and this is increasing every year as the prevalence of cancer is increasing alarmingly around the world.<sup>1</sup> All cancers are diagnosed and confirmed by a histopathologist. So, histopathology is the backbone for confirmation, grading and staging of cancer and optimal treatment of cancer patients. The role of histopathologists is not limited to cancer and, in fact, encompasses most non-neoplastic lesions which constitute the bulk of biopsies and surgical specimens for histopathological interpretation. Pakistan, like the rest of

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the developing world, is also a hub of many endemic diseases which often need a pathologist for confirmation. These include tuberculosis (both pulmonary and extra pulmonary), malaria, cutaneous leishmaniasis, leprosy, and many more. The endemic diseases are more prevalent in rural areas of the country where 70% of the population is concentrated but most of the big laboratories are situated in big cities. Thus patients, specimens, and slides have to travel a long way for histopathological examination and interpretation. This often results in delayed diagnosis which further increases the agony of the patients.

In this short write up, we highlight the current practice of histopathology in Pakistan with reference to the number of histopathology laboratories, their location, and number of practicing histopathologists in the country.

The shortage of histopathology workforce is alarming, with one histopathologist for approximately 450,000 people and less than 500 histopathologists for 220 million people, according to data from College of Physicians and Surgeons Pakistan.<sup>2</sup> This is the total number of pathologists who have passed their fellowship examination from 1960 to date. Keeping in mind that there is increasing trend of brain drain for better lifestyle opportunities and secure future among young fellows, one can say that the number of working histopathologists in the country is actually decreasing. Those who have done M.phil and Ph.D in histopathology also work in the laboratories but it is an academic not clinical qualification. It compares starkly with 1 for 15,000 in the developed countries and 1 for 100,000 in Africa, according to WHO<sup>2</sup> Besides, Pakistan ranks 154th among 195 countries in terms of quality and accessibility of healthcare ranking, even behind its South Asian counterparts Bangladesh, India, and Sri Lanka, according to a study published in *The Lancet* in 2016.<sup>3</sup> According to WHO, Pakistan ranks among the top five countries where cancer is one of the common causes of premature mortality with annual prevalence of new cases of cancer around 180,000.<sup>4</sup> Pakistan is one of the five countries with the highest burdens of tuberculosis (TB). Every year around half a million new cases are diagnosed and 70,000 people die from TB.<sup>3</sup>

According to the WHO Labour Force Survey 2018, Pakistan has a total of 37,613 medical and laboratory technicians

(technologists).<sup>1</sup> Most laboratories do not offer histopathology services, which are the gold standard to analyse the disease and its nature by studying its biology through human tissues and cells.

As far as histopathology laboratories are concerned, there are a total of 18 big and around 50 small histopathology labs in the country. Small histopathology labs perform primary diagnosis on haematoxylin and eosin (H&E) stained slides, but have to send over the samples to big labs for further testing that involves immunohistochemistry (IHC), frozen section consultation, Immunofluorescence, fluorescence in situ hybridization (FISH), and in situ hybridization (ISH). Big labs are mostly in the major cities of Sindh, Punjab, and Islamabad. Only one big laboratory is located in Khyber Pakhtunkhwa (KP), and none in Baluchistan and Gilgit Baltistan. Even more alarmingly, none of these laboratories are equipped for digitizing the precious data of human tissue and cells, which can be used to drive health care research and can be a great source for developing novel technologies for modernising the health care system in the country.

### Difficulties

- The major difficulty is delayed histopathological diagnosis that results in increased morbidity and mortality which could have been reduced if diagnosed in time.
- Global healthcare and other key performing indicators, where Pakistan ranks 154th among 195 countries in terms of quality and accessibility of healthcare.<sup>3</sup>
- Poor health economics, health job market, and health industry resulting from a broken healthcare system.
- Lack of quality health education, research, and capabilities to develop indigenous health care products and services.
- Lack of expert histopathologists in respective sub-specialties, like renal pathology,<sup>5,6</sup> results in delayed and sometimes incorrect diagnosis particularly in smaller labs.
- Second opinion is very important in histopathology particularly if a junior histopathologist is working in a remote area. Transportation of slides is a major challenge which is both time and money consuming.
- Unequal training opportunities for residents across the country which causes inconsistency in training standards and difficulty in passing the final examination.
- Lack of digitalised data which is considered the fuel of modern era. Despite having a bulk of endemic diseases and tumours, we do not have digitalised data which results in loss of precious information which could be used for making disease models, constructing disease trends, and predicting disease outcomes which can open the doors for precision medicine.<sup>7-9</sup>

### Challenges

- Number of pathologists showing decreasing trend around the globe.
- This situation is graver in the developing world, particularly Pakistan.
- This decreasing number of histopathologists while there is an increase in the prevalence of new cancer cases, has created a dangerous situation.
- There is a fast-emerging trend of sub-specialisation in histopathology in the rest of the world which is not yet established in Pakistan.
- There are only a few histopathologists and setups in Pakistan who have expertise in sub-specialities and are practicing it.
- Many histopathologists are not trained in intra operative frozen section diagnosis.
- After COVID-19 pandemic, the world witnessed a fast adoption of digital tools to maintain day to day services. The same was seen in histopathology. Many countries made their own scanners along with the support of leading global vendors which provided a cheaper solution but, unfortunately, this did not happen in Pakistan.

### Solutions

- Increase the number of histopathology labs both in private and public sectors across the country.
- The governing bodies/reference laboratories should ensure uniformity of histopathology education throughout the country.
- Similarly, sub-specialties programmed in histopathology should be introduced at post-graduation levels.
- Increase the task force of histopathology in terms of both histopathologists and technologists.
- Adoption of digital techniques may bridge the gap of large disparities between the number of cases requiring histopathology facility and the declining number of histopathologists in general around the globe and developing countries like Pakistan in particular.<sup>10</sup>
- Prices of scanners and digital microscopes are high and beyond the capacity of many low resource laboratory organisations of the country.
- Big laboratories and smaller ones with government support should be encouraged to purchase some

scanners.

- The adoption of digital techniques can resolve many issues of delayed diagnosis.
- It will make the second and third opinions much easier and will save both time and money.
- With the help of whole slide images, there can be equal opportunities of learning for all histopathologists across the country through formation of a centralised task force.
- The field of precision medicine will flourish with digitised data.

### Conclusion

Currently, there is a shortage of histopathology facilities in the region. It is time that the loop holes in the field of histopathology are identified and corrected by making a country-wide task force of histopathology through centralisation. The role of big labs and government involvement will be crucial.

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