

**Public Perception of Pathologists: The Unsung Heroes****Gayathri Devi Thanigaimani<sup>1</sup>, Chitradhar Kumara<sup>2</sup>, Aparnaa Thiyagarajan<sup>3</sup>, Sukriti Nandika<sup>4</sup>**<sup>1</sup>Professor, Department of Pathology, Panimalar Medical College Hospital & Research Institute, Chennai, Tamilnadu, India<sup>2,3,4</sup>II<sup>nd</sup> Professional Year MBBS Student, Panimalar Medical College Hospital & Research Institute, Chennai, Tamilnadu, India

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**Abstract:****Background:** Pathologists play an important role in patient care and management but yet they are under recognized by the patients.**Aim:** The objective of this study was to evaluate the level of awareness regarding the medical specialty of pathology and the role of pathologists in patient care among inpatients, patient attendants, and the general public.**Methodology:** This was a questionnaire based observational study conducted in a tertiary referral hospital in Chennai and online, over a period of two months, July and August 2023. A validated questionnaire was used to collect data which was then analysed utilizing SPSS software version 29.**Results:** On analysis of the 785 survey forms received, 735 were included in the study out of which only 312 (42.44%) of the people identified a pathologist to be a medical doctor. About 263 (35.76%) participants were not aware or disagreed with the fact that physicians used the work of pathologist in the form laboratory reports for treating patients and about 197 (26.79 %) respondents did not know or accept that pathologist had a significant influence on the choice of treatment for patients. Only about 312(20%) rightly identified that the duty of the pathologist included microscopic assessment of tissues, 233(14.9%) were aware that pathologists performed blood tests and 226 (14.4%) were aware that pathologists analysed body fluids collected by doctors.**Conclusion:** Apart from lack of recognition of the work of pathologist, these misconceptions may result in patients doubting the validity of the laboratory results and delaying their treatment.**Keywords:** Diagnosis, Misconception, Patient care, Role of pathologist.

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**Introduction**

Pathologists often referred to as "the doctor's doctor", play a pivotal and often under-appreciated role in the realm of healthcare [1]. Their significance lies in their ability to diagnose intricate and complex diseases and helping to formulate treatment strategies. Recent developments such as targeted therapy and immunotherapy for various cancers such as renal cell carcinoma, lung carcinoma etc has exponentially increased the role of pathologist in the treatment of these conditions [2,3].

Equipped with extensive expertise across a spectrum of diseases, they serve as educators imparting knowledge to students, medical professionals, and patients about the fundamental aspects of various illnesses.

While some pathologists predominantly operate within laboratory settings, others directly engage with patients by means of performing Fine needle aspirations, biopsies, bone marrow aspirations, etc.

Unfortunately, the roles undertaken by pathologists remain shrouded in misunderstanding, with misconceptions regarding their qualification and their involvement in patient care being prevalent not only among patients but also among policymakers and paramedical staff within the wider medical community [4].

This lack of clarity underscores a larger issue: the need for effective communication and awareness about the invaluable contributions of pathologists. Social media platforms offer a promising avenue to bridge this gap, facilitating enhanced communication between pathologists and patients. By utilizing these platforms, pathologists can directly engage with patients, dispel misconceptions, and provide insights into their critical functions. This can subsequently lead to improved communication within hospital environments, promoting informed decision-making and patient satisfaction.

To address these pervasive challenges, a comprehensive study has been initiated. The aim of the study was to analyse the perception of the people about pathologists and their role in patient care. The study scrutinizes and analyses the misconceptions prevalent among both patients and public about pathologists. By delving into the sources of these misunderstandings, the research aims to shed light on the underlying factors contributing to this lack of awareness. Through rigorous analysis, the study seeks to emphasize the urgency of public education initiatives focused on illuminating the true role of pathologists in patient care.

### Materials and Method

This is a questionnaire based observational study conducted in a tertiary care hospital in Chennai, South India over a period of two months, July and August 2023. A questionnaire was developed by the study investigators and its content was validated by field experts, including two clinical specialists and two pathologists. To ensure reliability, the test-retest method was employed with 20 participants over a 15-day interval. The correlation between the two sets of responses was calculated using Pearson's correlation coefficient. To maintain confidentiality and ensure privacy, the questionnaire was anonymous. The finalized questionnaire consisted of four parts- a consent question, 4 demography questions, 6 single-choice questions about the pathologist and 2 multiple-choice questions about the role of pathologist and their source of knowledge. After obtaining ethical committee approval (IEC number PMCHRI- IEC-115), a survey was conducted to assess the familiarity of a diverse group of participants, including inpatients, outpatients, their companions, and the general public about the role of pathologists.

Inclusion criteria encompassed individuals aged 18 and above of all gender, proficient in English or Tamil, from various non-medical professionals, who willingly consented to take part. Exclusions

comprised doctors, healthcare workers such as nurses, laboratory technicians, medical students, individuals under 18, and those unwilling to participate. To gather data, inpatients, outpatients, and patient attenders were randomly selected within the hospital setting to receive the questionnaire. The data was collected from the general public using Google forms distributed by whatsapp employing the snowball sampling method.

**Statistical Analysis:** The softwares used included N- master (version 2.0) and SPSS (version 29). Sample size calculation was done by Hypothesis Testing for Single Proportion using n-master software (version 2.0). For power of 80% and alpha error 1% sample proportion 20%, we arrived at a sample size of 731. The collected data underwent analysis using techniques such as frequency distribution, multiple response frequency calculation and Pearson's chi-square method to derive meaningful insights using the software SPSS v29. Statistical significance for association of the demographic data with the pathologist perception answers were considered to be significant at a p value of less than 0.05.

### Results

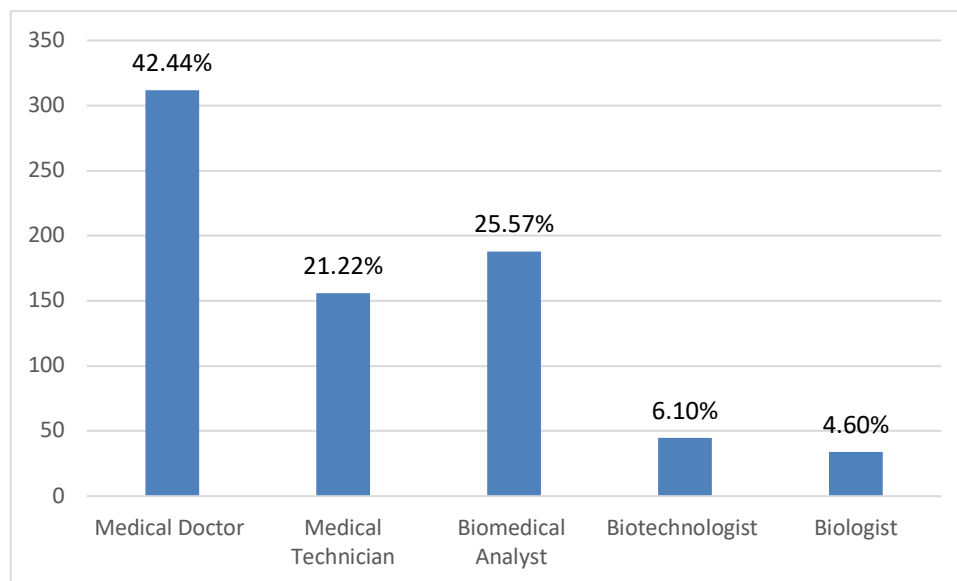
A comprehensive sum of 785 surveys was acquired, comprising 458 from individuals attending hospital and 327 from general public. Following the exclusion of participants of the medical profession, such as doctor, healthcare workers and medical students, the final cohort consisted of 458 hospital respondents and 277 internet users.

Analysis of demographic data, the first part of the questionnaire [Table/Fig-1], showed that the participants were almost equally distributed across both genders (Male 402, Female 333) while analysis of age of the participants showed majority of them (499 participants 68%) were in the age group of 18 to 39. About 451 (61.35%) of the participants had attended college to complete either undergraduate or postgraduate studies. A very small percentage of only 39(5.3%) had schooling of less than 8<sup>th</sup> grade.

**Table 1: Distribution of age, sex and education levels among study participants**

Demography	Number of responses (Percentage)
<b>Age group (in years)</b>	
18-39	500 (68.02)
40-59	191 (25.98)
60-74	40 (5.4)
>74	4 (0.6)
<b>Sex</b>	
Male	404 (54.96)
Female	331 (45.03)
<b>Qualification</b>	
Below 12 <sup>th</sup> standard	39 (5.31)
Completed 12 <sup>th</sup> standard	245 (33.33)
Undergraduate	307 (41.77)
Postgraduate	144 (19.59)

The next part of the questionnaire was to analyze people’s knowledge about the role of a pathologist. About 312 (42.44%) of the people identified a pathologist to be a medical doctor whereas 423(57.49%) identified a pathologist to be a biomedical analyst, biologist, biotechnologist, or medical technician [Table/Fig-2]. There was a significant association with the respondent’s education (P value 0.001), but the relation was insignificant with the respondent’s sex (P value 0.030) and age (P value 0.585).



**Figure 1: Analysis of the question “Who is a pathologist?”**

With regards to the extent of involvement of the pathologist in patient care, participants were asked to grade their idea using 5 point Likert scale for some correct and some incorrect statements [Table/Fig-3]. In analyzing those data, it was found that an alarming 263 (35.76%) of participants were not aware or disagreed with the fact that physicians used the work of pathologist for treating patients and about 197 (26.79 %) of respondents did not know or accept that pathologist had a significant influence on the choice of treatment for patients.

**Table 3: Results of questions regarding role of pathologist in patient care.**

Question	True n (%)	False n (%)			
A pathologist deals with autopsies.	509 (69.25)	226 (30.74)			
p-value for gender = 0.317 (Insignificant), qualification = 0.207 (Insignificant), and age = 0.002 (Significant)					
Question	Strongly Agree n (%)	Agree n (%)	I Don't know n (%)	Disagree n (%)	Strongly Disagree n (%)
Pathologists often cooperate with the police in cases where murder is suspected.	238 (32.38)	308 (41.9)	140 (19.04)	29 (3.9)	20 (2.7)
p-value for gender = 0.03 (Significant), qualification = 0.007 (Significant), and age = 0.72 (Insignificant)					
Most physicians use the work that a pathologist does.	167 (22.72)	305 (41.49)	186 (25.3)	66 (8.97)	11 (1.49)
p-value for gender = 0.37 (Insignificant), qualification = 0.01 (Significant), and age = 0.67 (Insignificant)					
The work done by a pathologist has a significant influence on the choice of treatment for patients.	200 (27.21)	338 (45.98)	152 (20.68)	41 (5.57)	4 (0.54)
p-value for gender = 0.58 (Insignificant), qualification = 0.0001 (Significant), and age = 0.58 (Insignificant)					
The pathologist plays a big role in making the correct diagnosis of a disease.	299 (40.68)	319 (43.4)	98 (13.33)	15 (2.04)	4 (0.54)
p-value for gender = 0.44 (Insignificant), qualification = 0.21 (Insignificant), and age = 0.78 (Insignificant)					

**Test applied- Pearson Chi square test**

The second part of the questionnaire was to assess the understanding of pathologists' duties in the hospital [Table/Fig-4]. Participants were provided with a choice of nine options to indicate their perspective on the responsibilities of a pathologist

in the hospital concerning patient care. The choices were microscopic assessment of tissues, collection of blood in labs, performing blood tests, biopsies, analysis off body fluids collected by doctors, radiological image interpretation, treatment of

chronic diseases and performing operations. The highest positive response of about 312 (20%) was for microscopic assessment of tissues as a duty of pathologist, which was followed by performing blood tests 233 (14.9%) and 226 responses

(14.4%) were for analysis of body fluids collected by doctors, which are some of the actual responsibilities of the pathologist in the hospital among the choices provided.

**Table 4: Analysis of the perception of the duties of pathologist in the hospital**

Question with options	Responses	Percentage
<b>What are the duties of a pathologist?</b>		
Microscopic assessment of tissues	312	20.0%
Describing radiological images	116	7.4%
Analysis of body fluids collected by doctors	226	14.4%
Collection of blood samples in the lab	166	10.6%
Biopsies	168	10.8%
Performing Blood Tests	234	14.9%
Operations	81	5.2%
Treating chronic Diseases	137	8.8%
I Don't Know	122	7.8%
Total	1560	100%

**Test applied- multiple response frequency calculation**

The third part of the questionnaire was to identify the primary sources of information about pathologists [Table/Fig-5]. When asked about their primary source of information about pathologists, most responses identified doctors 350(33.1%) and

the internet 171 (16.1%) as their primary sources. Fewer responses indicated their sources to be from family, friends, books, television and radio while 111 (10.5%) had not heard about pathologist from the above mentioned sources.

**Table 5: Analysis of source of information regarding pathologist**

Question with options	Responses	Percentage
<b>What is your primary source of information about pathologist?</b>		
Doctors	350	33.1%
Family	112	10.6%
Friends	128	12.1%
Internet	171	16.1%
Books	81	7.6%
Television	80	7.6%
Radio	26	2.5%
None of the above	111	10.5%
Total	1059	100.0%

**Test applied- multiple response frequency calculation**

**Discussion:**

A pathologist is a medical expert who specializes in assessing medical risks and diagnosing diseases by analyzing clinical, gross, microscopic, immunophenotypic, ultra structural, cytogenetic, and molecular observations of tissues, body fluids, and cells. Their role encompasses a wide range of diagnostic techniques for accurate disease identification and risk evaluation.[5]Lack of awareness about the role of pathologist in patient care is not only a disheartening scenario for the pathologists, it is also the cause of various misunderstandings in the minds of the patients. Statistics show that about 70% of decisions made by clinicians with respect to patient management are dependent on laboratory results.[6]This emphasizes the crucial role of pathologists in hospitals, the significance of a strong clinician-

pathologist relationship, and the essential trust patient need to place on laboratory results. The outcomes of our survey revealed that while some individuals are aware that a pathologist holds the title of a medical doctor, their understanding of the specific responsibilities and importance of a pathologist remains limited. According to the results of the study, the importance of the pathologist in patient care and their involvement in the management of the patient's medical condition has not been widely imbibed in the minds of the patient.

According to literature there have been few similar studies conducted in countries like Poland, Canada, and Turkey. In the study by Kunc et al in Poland only 39% of the study population were aware about the pathologist's medical qualification and 63% agreed that pathologist play an important role in the

management of the patient. About 52% were aware about the role of the pathologist in microscopic review of slides which is better than the results in our study which was only 42%. Similar to our study their primary source of information about the pathologists were their managing doctors and in that study such patients gave more accurate responses about the roles and responsibilities of the pathologist.[7] Fischer et al in their study in Canada showed that about 79% of the study population were aware that pathology was within the medical field, but only 35% were aware that it took 8 years of post-high school training to become a pathologist.[8] Further the public awareness about the role of the pathologist was very poor with most people assuming that their biopsies and pap smears were interpreted by the corresponding clinician. Only a minority (ranging from 13.8% to 36.4%) of patients identified pathologists as the ultimate decision-makers of their test samples.

In the study conducted in Turkey by Findik et al, about 65% were aware that pathologists completed medical school but only 35% identified it as a speciality requiring further training.[9] A significant percentage (44.0%) lacked awareness that pathologists rely on microscopic examinations for their decision. They concluded that awareness among patients about pathologists and their role was inadequate.

A similar study conducted in South India on awareness about Dental Pathologists by other Dentists showed that only 18.34% of participants were aware that the oral pathologists did tissue biopsies. The study concluded that there was a gross lack of awareness about the role of oral pathologists in patient care and reluctance from the dentists to involve the oral pathologists in patient care.[10]

In a study conducted by Ananthamurthy et al among medical students in India, the misconception that pathologists do not play a significant role in patient care was identified.[11] According to this study, their wrong perception had steered medical students away from choosing pathology as their career option. A similar study conducted by Holland et al among medical students also showed similar results with pathology being perceived as an isolated field without much patient contact.[12] Such misconceptions among future clinicians and family physicians of the society will lead to dissemination of wrong information among the public and this needs to be corrected during the medical college days of the medical students. Students should be made aware of that, apart from tissue biopsies that provide final diagnosis, cytopathology along with the updated tests, IHC and flowcytometry, performed on aspirated materials have helped in preoperative diagnosis of patients and played an enormous role in managing

the patient.[13] To break this communication gap between the patient and the pathologists various techniques have been tried worldwide. One such method is to involve pathologists in patient support groups formed for cancer patients. Haller et al in their study showed that presence of pathologists in such help groups helped to relieve patients of their disease related anxiety because they helped the patients to understand their disease better.[14] The patients in groups having pathologists significantly accepted that pathologists played an important part in patient care. In some hospitals in other countries, pathologists had been playing the role of clinician for breaking bad news in case of malignancies diagnosed on pathology workup such as biopsies and cytology reports.[5] In other study an attempt was made to involve pathologists in patient care by making the patients discuss their pathology reports with pathologists who explained their reports with the help of decahead microscope.[15] Though patients were excited about this approach as per the patient satisfaction survey, the pathologists were concerned about the medicolegal implications that may follow this practice.

Another study proposes Pathology Explanation clinics to break barriers between patients and pathologists with suggestions to train pathologists in communication skills and creating a new group of specialised pathologists called Certified Pathologist Navigators. Their goal is for patients to understand the diagnosis, its relevance to the treatment and their choice of health care.[16] Investigators in United States have identified the significance of the role of pathologist as providers of consultative services to other treating physicians and patients and have started seeking financial compensation for the same. Their help is sought from physicians and surgeons to assimilate complex laboratory results more so now with the evolving modes of treatment of many conditions based on the molecular and ancillary findings. Further it has been proved in several studies that understanding of the disease process and prognosis is better when the pathologist consult with the patients to clarify their doubts.[17]

This study's limitations include its confinement to a single tertiary care teaching hospital primarily serving patients from low socioeconomic backgrounds, rather than encompassing multiple hospitals with patients of diverse financial and educational statuses. While online participants helped mitigate this limitation, conducting a broader study would provide a more comprehensive understanding and facilitate improved strategies for addressing the observed scenario.

In densely populated developing nations like India, implementing the suggestions given by other studies may be impractical due to constraints in time and resources. A more viable approach would



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