

SHORT REVIEW

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Correspondence:

Dr. Apurba Acharya
Dept. of Forensic Medicine
Karnali Academy of Health Sciences,
Jumla, Nepal
Email: dr.apurba94@gmail.com

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An overview of forensic medicine specialists, medico-legal services, and the advent of telemedicine in forensics in Nepal

Apurba Acharya¹, Kushal Bhattra², Umesh Raj Aryal³, Arbin shakya⁴, Alok Atreya⁵, Binamra Bista⁶

¹Asst. Prof., ⁶Lecturer, Dept. of Forensic Medicine, ³Assoc. Prof., Dept. of Community Medicine, Karnali Academy of Health Sciences, Jumla, Nepal; ²Assoc. Prof., Dept. of Biochemistry, Rapti Academy of Health Sciences, Dang, Rapti, Nepal; ⁴Consultant, Dept. of Forensic Medicine, Bheri Hospital, Banke, Nepal; ⁵Assoc. Prof., Dept. of Forensic Medicine, Lumbini Medical College, Palpa, Nepal

Abstract

Forensic medicine in Nepal plays a crucial role in legal and healthcare systems. It involves experts who are integral to the investigation of deaths, analysis of injuries, and cases of sexual abuse, as well as providing expert testimony in legal matters. These professionals determine the cause of death, identify victims in mass disasters, and collaborate with law enforcement to gather evidence, ensuring justice in cases of criminal activities and suspicious deaths. Currently, most of the medicolegal cases are addressed by medical doctors who undergo seventeen days medico-legal training due to lack of forensic medicine specialists, adequate facilities, and modern equipment across Nepal's provinces. This shortage delays and backlogs case handling, ultimately hindering justice delivery.

To address these challenges, the Nepal Medical Council introduced basic guidelines in 2020, advocating for integrating telemedicine in all medical practices including Forensic Medicine, which could significantly enhance service delivery. With at least one forensic medicine expert per province, efforts are being made to improve and standardize medico-legal services. Establishing a standard forensic protocol, including communication methods, specific guidelines, and financial incentives, is essential for shaping the future of forensic medicine experts in Nepal. This approach aims to mitigate the infrastructure inadequacies, ensuring timely intervention, laboratory analysis, and expert opinions, thus improving the overall efficiency and effectiveness of medico-legal services in the country.

Keywords: Autopsies, Clinical Forensic Medicine, Forensic Medicine, Medico-legal System

INTRODUCTION

Forensic medicine involves the application of expert medical knowledge, technology, and analysis for assistance in legal proceedings.¹ Across different parts of the world, the terms legal medicine, medical jurisprudence, and medico-legal practice are commonly used instead of forensic medicine.¹ Additionally, in certain parts of the world, the term “forensic pathology” is interchangeably used with “forensic medicine,” it refers to conducting medico-legal autopsies with or without integrated clinical forensic services.¹ The services provided by an expert in forensic medicine vary depending on the country and can be broadly divided into two categories: divided services and integrated services.²

In divided services, clinical forensic medicine is different from forensic pathological services.^{1,2} Because services are divided, the basic principles of forensic medicine may not be included at the undergraduate level.^{1,2} Most developed countries, such as the USA and Japan, follow this system of forensic services.^{1,2}

In integrated services, a forensic medicine practitioner is responsible for conducting medico-legal autopsies and examinations of living survivors and perpetrators.^{1,2} Furthermore, it also includes services related to medical ethics, negligence, and laboratory examinations.^{1,2} In Nepal and other countries where integrated services are used, undergraduate-level medical education, specifically the Bachelor of Medicine & Surgery (MBBS), requires the teaching of the principles of forensic medicine.

In Nepal, one of the significant issues regarding medico-legal responsibilities is the extent to which the services are being provided within the integrated domain and the variability associated with individuals providing these services. Most of the medico-legal responsibilities are conducted by a medico-legally trained doctor. In some cases, these are even performed by doctors who are not trained medico-legally. Irrespective of the training, these doctors have made commendable efforts in handling cases, regardless of the outcome. However, this has resulted in an inconsistent pattern of medico-legal reports nationwide, mainly when cases are brought for detailed evaluation and forensic expertise.

State of Forensic Medicine Experts across Nepal

Expertise with specialization in forensic medicine was rare in Nepal until the start of the 21st century. It wasn't always about the extent of medico-legal services that could have been provided, but more often than not, who would provide them. Until 2014, only 11 registered doctors specialized in forensic medicine under the Nepal Medical Council.³ However, this number has significantly increased over the last decade, with over 50 registered forensic medicine specialists nationwide.⁴

In Nepal, a forensic medicine expert's duty can be associated with academic responsibilities, medico-legal services, or both, based on affiliation in an academic health institution with or without the provision of medico-legal services or in a provincial or tertiary hospital. These academic health institutions could be independent health academies or university-affiliated medical colleges. Academic duties involve medical education as per the curriculum of undergraduate and postgraduate students. Nepal has practically implemented a modified form of an integrated system for medico-legal responsibilities. This includes postmortem examination; clinical forensics including physical and sexual assault victim and perpetrators examinations; age estimation, drunkenness examination, mental status examination; and forensic anthropology involving recovery and identification of human remains.

However, unlike standard integrated services, forensic medicine responsibilities in Nepal are mostly devoid of laboratory examinations, histopathology, forensic serology, forensic genetics, and forensic epidemiology. Laboratory-based investigations with DNA units are usually carried out by the Central Police Forensic Science Laboratory of Nepal police and do not include any forensic medicine experts to date.⁴ Beyond this, no centralized units specialize in histopathology, laboratory services, or epidemiology to provide medico-legal services in the country.

Within the seven provinces and 77 districts across Nepal, each province consists of at least one medical institution providing undergraduate or postgraduate medical education, except for Sudur-Paschim Province. Additionally, the country has thirteen larger federal and provincial general tertiary hospitals.⁵ Considering all medical institutions, tertiary hospitals, and provincial hospitals across Nepal, at least one forensic medicine expert is currently present in each province, with or without involvement in medico-legal duties.

Province 2 (Madhesh) and Province 7 (Sudur-Paschim) have the lowest number of forensic medicine experts, each working in an academic health institution without providing medico-legal services and in a provincial hospital in their respective provinces. All the other provinces have more than one forensic medicine expert actively providing medico-legal services, academic responsibilities, or both. Among these five provinces with multiple forensic medicine experts, Bagmati has the highest number, followed by Koshi province. The educational health institutions with or without the provision of all the medico-legal services and tertiary or provincial hospitals with forensic medicine expertise in each province are listed in Table 1.

The table does not include those who are registered with a specialization in forensic medicine under the Nepal Medical Council but are currently not practicing in any of the above

Table 1. List of forensic medicine experts across all the provinces in Nepal

Province	Forensic Medicine Expert Across Academic Health Institutions		Provincial / Tertiary Hospital with Forensic Medicine Expert
	With the provision of all Medico-legal Services	Without Provision of all Medico-legal Services	
Koshi	1. BP Koirala Institute of Health Sciences	1. Birat Medical College 2. Nobel Medical College	1. Koshi Hospital
Madhesh	—	1. National Medical College	—
Bagmati	1. Maharajgunj Medical Campus 2. Patan Academy of Health Sciences 3. KIST Medical College 4. Kathmandu Medical College 5. Kathmandu University School of Medical Sciences	1. Nepalese Army Institute of Health Sciences 2. Nepal Medical College 3. Chitwan Medical College 4. College of Medical Sciences (CoMS)	1. Bharatpur Hospital (Forensic Medicine expert from CoMS provide all the medico-legal services)
Gandaki	1. Pokhara Academy of Health Sciences 2. Manipal College of Medical Sciences	1. Gandaki Medical College	—
Lumbini	1. Rapti Academy of Health Sciences	1. Lumbini Medical College 2. Devdaha Medical College & Research Institute 3. Nepalgunj Medical College	1. Lumbini Provincial Hospital 2. Bheri Hospital
Karnali	1. Karnali Academy of Health Sciences	—	—
Sudur-Paschim	—	—	1. Seti Provincial Hospital

duties because they are either not in the country, retired, or have a different career trajectory. Additionally, it does not include any academic health institutions without an existing forensic medicine expert or post-graduate doctors pursuing forensic medicine.

More than half of Nepal's medical colleges or academic health institutions have not been able to start medico-legal services, even though it is part of their educational curriculum. This has led to a state whereby undergraduate students are theoretically equipped with medico-legal responsibilities but lack behind in on-field practical exposure, ultimately hindering the quality of medico-legal services that they will impart after graduating. Furthermore, most forensic medicine experts working just as academic faculties within these institutions without clinical practice has led to inefficient utilization of skilled manpower that Nepal had yearned for multiple decades.

Time to move forward?

Forensic medicine experts have been providing medico-legal services across 15 different centers throughout Nepal. The medico-legal services delivered across the country, however, lack standard facilities. With only one standard central laboratory providing the bulk of the services throughout the country, an inevitable delay in laboratory procedures will threaten the overall justice for the survivors and family members. An introductory laboratory setup, including toxicology and DNA units, in all provinces will not only help in prompt and less erroneous results from samples but it will also lead to adequate conclusions in cases that would otherwise lead to blind spots from an investigation and justice point of view.

Further, there is a dearth of histopathological procedures in postmortem cases across all these 15 centers.

Histopathology is one of the core components of forensic medicine worldwide. In Nepal, the lack of histopathology services in postmortem could be partly due to inadequate exposure to histopathology during postgraduate training (limited to 2–3 months in 3 years) or inadequate facilities for forensic histopathology.

In recent years, India has started super-specialization (Doctorate of Medicine, DM) programs to uplift its forensic medicine experts in terms of further training and exposure in the laboratory, histopathology, and radiology. As of July 2024, the Institute of National Importance of Super-Specialty (INI-SS), India, listed these super-specializations as DM-Forensic Pathology, DM-Forensic Radiology and Virtual Autopsy, and DM-Medical and Forensic Toxicology for its Forensic Medicine graduates.⁶

Similarly, Nepal can proceed with such super-specialization as an additional degree or a fellowship. Also, since most of the medico-legal duties carried out by forensic medicine experts are from academic health institutions or tertiary centers with available pathology services, inter-departmental workshops utilizing histopathological samples from postmortem cases can be conducted, and these samples can be further used for research, paving the way for forensic epidemiology.

With the provincial government taking on the responsibility for most of the health services and facilities, it becomes imperative for them to establish a medico-legal unit led by a forensic medicine expert. The only society that has made efforts to help forensic medicine experts of Nepal, the Medico-Legal Society of Nepal (MeLeSoN), is trying to establish this unit across all the provinces. Still, those strides have been curtailed due to a lack of awareness regarding

medico-legal services and political instability surrounding the provincial government. Considering the country's geography and availability of forensic medicine experts in each province, in an ideal case scenario, the provincial government can utilize the skilled human resource either by arranging transportation or using telemedicine based on their centers. This will lead to a new dawn in medico-legal services in Nepal, with each medico-legal case being handled directly by a forensic medicine expert.

Telemedicine in forensics in Nepal: the possibilities ahead

During the global pandemic of COVID-19, timely intervention, diagnosis, treatment decisions, and referrals were done based on the information transmitted through telecommunication.⁷ Although telemedicine was coined almost half a century ago as a tool for healthcare providers to deliver healthcare services to individuals or communities, it came to fruition during the pandemic, breaking all the barriers to providing basic healthcare facilities.⁸ In May 2020, during the COVID-19 pandemic, the Nepal Medical Council released Telemedicine Guidelines for Registered Medical Practitioners in Nepal.⁹ The document was fundamental in the context of telemedicine in Nepal as it incorporated the basic procedural guidelines, including the eligibility for registered medical practitioners, standards required to be met, the implementation of telemedicine utilizing various telecommunication tools, privacy, patient confidentiality, and ethical and financial considerations.

From a forensic point of view, the impact and utilization of telemedicine can be crucial for successfully executing academic and medico-legal responsibilities. Regarding academics, even before the start of the millennium, videoconferencing of postmortem examinations was utilized as a teaching tool for students across continents, and the effectiveness of this method was visible in their results.¹⁰ Almost three decades later, in neighboring India, one of their major institutions, Post-graduation Institute of India (PGI), which is known for conducting the highest number of clinicopathological conferences along with clinical autopsies, is striding forward to relay their sessions across the Southeast Asian countries with the help of the Department of Telemedicine.¹¹ They have been live-streaming such sessions in over 100 medical colleges across India.¹¹

As for medico-legal responsibilities, more specifically postmortem examinations, there have been studies on different aspects of telephonic consultation, concluding with the need for proper education and practical experience regarding postmortem examinations between forensic specialists and medical doctors performing these duties. across both parties.¹² With most of the postmortem duty across Nepal being carried out by medico-legally trained doctors, the issues of proper education and practical knowledge can be sorted by trainings focused on specific

cases. For instance, the current provision of conducting a medico-legal training spanning over seventeen days, incorporating both clinical and autopsy, would be too demanding for a medical doctor working as a medical officer. This training does not always occur at centers that receive adequate cases for hands-on exposure. Further, such training would also lead to a state whereby a peripheral hospital would be devoid of a medical doctor for a lengthy period. Instead, focusing on specific aspects of postmortem cases, for example, examination and dissection of the neck, thoracic cavity and heart; cranial cavity and brain, and abdominal cavity and genitals in the form of two- to three-day workshops at centers with adequate cases, would provide better outcomes during a telephonic consultation. This also applies in clinical forensics, where the current training module, which spans five days, can be divided into workshops focusing on injury and detainee examinations, as well as sexual assault examinations.

The academic curriculum of undergraduate medical education in Nepal demands basic concepts of autopsy and clinical forensic examination. Thus, case-specific hands-on training would be a suitable outcome instead of rigorous sessions on the entire forensic medicine practical curriculum. MeLeSoN also sets the reference manual and standard operating procedures (SOPs) for all the medico-legal duties. This will guide a medical doctor while performing medico-legal duties, with overall supervision by telephonic conversation or videoconferencing.⁴

One of the advantages of telemedicine in Nepal's forensics is that communication will occur between two registered medical practitioners. These two practitioners, one a registered specialist and the other a case-specific trained medical doctor will improve the overall level of information, resulting in a better evaluation of all the postmortem and medico-legal cases.

The utilization of telemedicine in clinical forensic cases, more specifically, sexual abuse, has resulted in the complete examination, better quality evaluation, adequate sample collection as well as an accurate diagnosis, with the medium of communication being photos and videos.¹³ To assess the effectiveness and ethical considerations of telehealth for sexual assault examinations, a three-year pilot study from May 2015 to March 2018 was conducted. In this study, a sexual assault nurse examiner (SANE) provided telehealth support for history and documentation, forensic examinations, sample collection, and consultation advice.¹⁴ The results across different studies have suggested that the use of telemedicine for sexual abuse cases can be beneficial and needs further evaluation about cost, effectiveness, and imparting justice.¹³⁻¹⁵

Forensic medicine experts in Nepal are involved in medico-legal duties, and those facilitating medico-legal training

provide telecommunication consultation facilities. This could be through telephonic conversations or consultations based on the assessment of photos or videos provided to forensic experts by medical doctors who perform these duties. However, this form of communication has no organized pattern or chain of command. With most communication occurring after executing a medico-legal duty, there could be inadequate documentation, incomplete examination, and improper sample collection. These issues could be tactfully handled with proper supervision of medico-legal cases by forming a medico-legal unit in each province led by a forensic medicine expert. The team, comprising case-specific trained doctors, will remain in contact with the province's expert utilizing telecommunication before the case. If needed, a live-tele discussion can also take place. With the geography of Nepal and its provinces as such, in the case of medico-legal duties demanding a thorough approach beyond the case of trained medical doctors, facilitation from the provincial government can be made about transportation and other logistics. Further, a case-specific training approach and the utilization of telemedicine in each province can bring uniformity across all the reports supervised by a medico-legal expert.

Lastly, the main concern about implementing telemedicine in forensics in Nepal is the burden of responsibility regarding financial remuneration. In the guidelines, the Nepal Medical Council has specified that the telemedicine fees should be based on consultation value, savings on costs such as travel and equipment, geographical variability, and economic status, and that payments do not exceed in-person services.⁹ Considering all these factors, a case-specific incentive can be established, and an expert can be made mandatory to supervise a medico-legal report before dispatching. This will provide a greater financial incentive for medical doctors to pursue forensic medicine, as they currently receive these incentives irrespective of the standard of the duty that they have performed. This will also utilize more forensic medicine experts beyond their academic responsibilities nationwide. It also does not require a separate telemedicine unit, as communication can be established within the medico-legal unit utilizing smartphones or laptops. With the availability of 4G in 741 local bodies out of 753 across all the districts of Nepal, telemedicine in the form of videos, photos, or live tele can be utilized to expand and create uniformity in medico-legal services throughout the nation, using the inadequately utilized experts and their expertise.¹⁶ Further, financially incentivizing telemedicine services will ultimately motivate the current generation of experts handling these cases and medical doctors to seek financial stability and utilize medical knowledge while pursuing a postgraduate degree.

CONCLUSION

Forensic medicine is ever-growing in Nepal. With the pioneers and the first group of senior professors and experts

gradually passing the baton to their juniors, changes are observed every year or two. These changes and a slow increase in forensic medicine experts over the years have steadily expanded the field across all the provinces of Nepal. However, a lot is yet to be done to make the subject, and the specialists associated with it grow from an academic, financial, and global point of view for medico-legal services. From the availability of basic logistics to expanding services in different forms to handling academic responsibilities, a paradigm shift to the newer generation will pave the way for newer approaches. These newer approaches, either in the form of super-specialization or fellowships, virtual autopsies, or the advent of telemedicine, will ultimately guide this generation of forensic medicine experts to establish the field of medico-legal services, which was in its infancy only a few decades ago in Nepal.

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