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Evaluation of undergraduate forensic medicine education in Nepal: a critical analysis using Schwab's five commonplaces and Schubert's curriculum images

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Abstract

Following the establishment of Nepal's first medical college in 1972, forensic medicine was introduced in 1978. To date, 25 medical colleges in the country have included forensic medicine as a compulsory subject in the undergraduate medical curriculum. Although this subject has been introduced into the medical curriculum, the outcome is unsatisfactory, as reflected by the poor medico-legal reports prepared by newly graduated medical students. Forensic medicine education is therefore at a critical juncture with challenges while paving the way for opportunities to improve. In this analysis, we examined the current state of forensic medicine education for the undergraduate medical programme in the country. For this purpose, we used Schwab's five commonplaces in the curriculum. We then evaluated the curriculum from the perspective of Schubert's curricular image frameworks.

We noted significant differences in the curriculum content, teaching methods, and practical training across the curriculum. An acute shortage of qualified teachers, limited resources, and inconsistent curriculum updates have further complicated the situation. The current curriculum does not address cultural sensitivity, which should not be overlooked during medico-legal practices.

Following the curriculum evaluation, we find room for improvement and propose recommendations. First, the forensic medicine curriculum should be standardized and uniform to address national needs. There should be uniformity and improvement in practical hands-on training. The manpower should be trained to work in rural settings with limited resources so that the overall justice system of the country can improve. Recent technological advances should be incorporated into the curriculum and interdisciplinary collaboration encouraged. Allocating more scholarship/sponsorship seats for postgraduate programmes and recruiting skilled graduates to be evenly distributed regionally would be important steps toward strengthening the country's medico-legal proceedings and justice system.

Keywords Forensic medicine, Education, Curriculum, Nepal, Medico-legal, Autopsy

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Introduction

The evidence provided by forensic medicine plays an important role in medico-legal proceedings and therefore aids in delivering justice [1]. Nepal is a lower-middle-income country in South Asia. Despite being a developing country in terms of economic turmoil, the scenario in Nepal has evolved to include forensic medicine education and the medico-legal field to quite an extent over the last 30 years [2].

Education in forensic medicine in Nepal involves a combination of accomplishments and challenges. Twenty-five medical colleges in Nepal teach forensic medicine as a separate subject during undergraduate medical courses, and few medical colleges have started postgraduate programmes in forensic medicine in recent years. However, challenges persist in terms of a lack of uniformity in the curriculum being taught, an acute shortage of faculty and limited resources for clinical and laboratory training as described in our previous review on the status of forensic medicine in Nepal [2]. The present review is a critical analysis of the undergraduate forensic medicine curriculum in Nepal using Schwab's five commonplaces and Schubert's curriculum images. Numerous studies have utilized Schwab's framework to analyze curriculum in general, for a comprehensive approach to curriculum development [3–6]. However, studies focusing on the analysis of medical curricula using this framework are sparse let alone the forensic medicine curriculum in particular.

Forensic medicine in Nepal is regulated by the Ministry of Health and Population, the Nepal Medical Council, and the Medical Education Commission. These bodies oversee the curriculum, accreditation, and practice standards.

In this article, we provide an overview of undergraduate forensic medicine education in Nepal and analyse the undergraduate forensic medicine curriculum through the lens of Joseph Schwab's five commonplaces as interpreted by Wesley Null which includes a fifth commonplace–curriculum making- in addition to Schwab's original four: subject matter, learners, teachers, and the milieu [7]. This expanded framework allows for a more comprehensive analysis of the modern curriculum. We then reflect on William Schubert's images of the curriculum within the framework of Nepal [8]. Finally, this article suggests ways in which it can be reconstructed to enhance the quality and effectiveness of teaching forensic medicine in Nepal at the undergraduate level. While we touch on some aspects of forensic services to provide context, a comprehensive analysis of forensic medicine services is beyond the scope of this study.

Overview of undergraduate forensic medicine education in Nepal

In Nepal, at the undergraduate level forensic medicine is a compulsory subject in the MBBS (Bachelor of Medicine, Bachelor of Surgery) programme in all 25 medical colleges in the country. Tribhuvan University has 8 medical colleges under it, and Kathmandu University has 11 medical colleges under it. In addition to these universities, there are independent academies run by the government, namely, the Patan Academy of Health Sciences (PAHS), the BP Koirala Institute of Health Sciences (BPKIHS), the Karnali Academy of Health Sciences (KAHS), the Rapti Academy of Health Sciences (RAHS), Madhesh Institute of Health Science (MIHS) and the Pokhara Academy of Health Sciences (PoAHS). Each of these academies has a unique syllabus for the MBBS programme. One more medical college is in the pipeline to be allocated seats for the MBBS programme by the Medical Education Commission (MEC) and Nepal Medical Council (NMC). The total number of MBBS seats allocated across all medical colleges in Nepal is 2140. In Nepal's medical education system, government medical colleges (such as Maharajgunj Medical Campus) primarily enroll government scholarship students, while private medical colleges are required to allocate 10% of their total seats to government scholarship students according to the National Medical Education Act, 2018 Sect. 17(4) [9]. The district-wise location of all the medical colleges in Nepal is depicted in Fig. 1.

The theoretical and practical aspects of the subject are generally taught in 3rd-year MBBS, but this may vary with teaching methods and hours spent on teaching across medical institutions. Students study the following components of forensic medicine during the MBBS programme: legal procedures, medical jurisprudence, medical ethics, forensic pathology, clinical forensic medicine, and toxicology. Forensic medicine is one of those subjects, the knowledge of which is tested in the licensing examination conducted by NMC for registering medical students as medical practitioners. This inclusion has emphasized its importance in education and practice [10]. However, there are inconsistencies among curricula across institutions, leading to differences in the level and depth of knowledge put forward for learning by students.

When compared to other countries, for example, the Philippines, autopsy pathology, is an elective course in their medical schools, and only the students interested in pursuing a residency in pathology would be interested. Legal medicine and medical jurisprudence, however, are required courses in all Philippine medical schools and are subjects tested during the Physician Licensure Examination.

Practical training is an essential component of any education programme, and forensic medicine is no exception

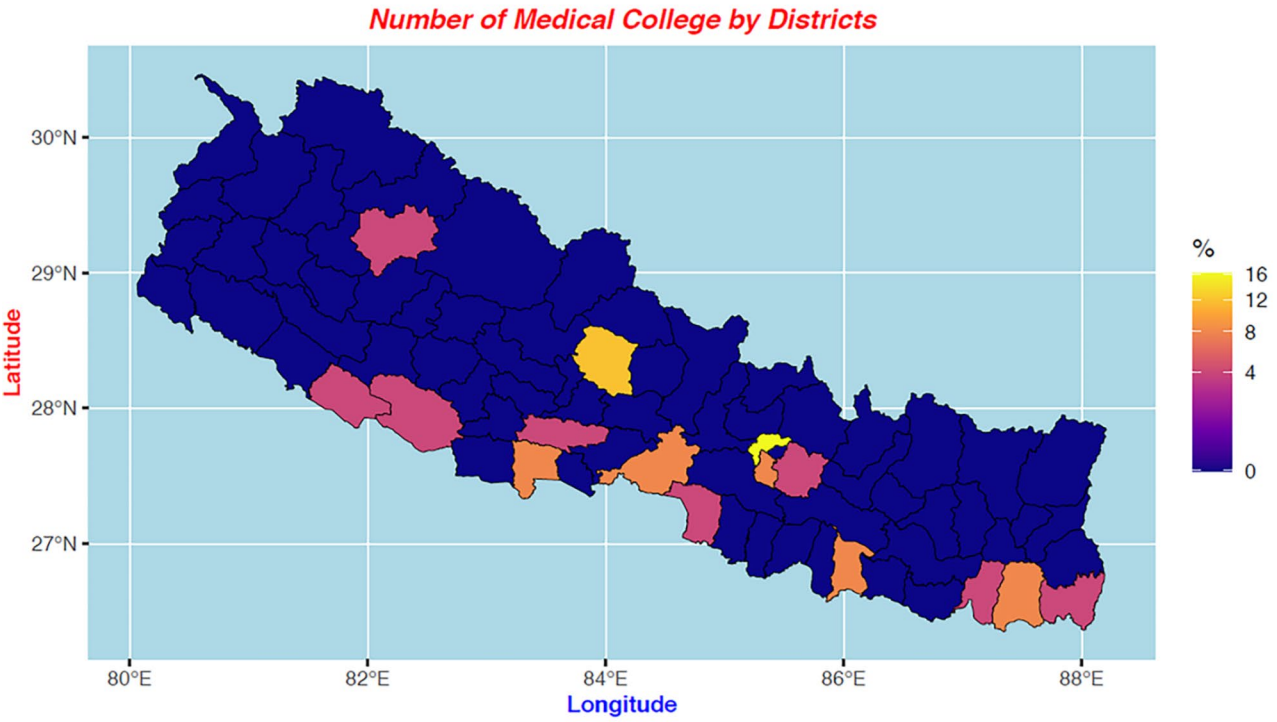

Fig. 1 Map of Nepal showing the district-wise location of the medical colleges in the country

to this. Forensic medicine practices include participating in medico-legal autopsies, examination of weapons, medicolegal examination of clinical cases such as alleged victims and perpetrators of sexual offences, examination of drunkenness, identification of common poisons and poisoning, etc. In the absence of actual participation in any of these responsibilities, the education will be limited to theoretical components. This, for instance, will lead to a situation wherein a student will be completely unaware of the practical aspects that surround a medico-legal duty such as obtaining consent or counselling a family member, or examining a decomposed body. With limited autopsies across medical colleges in Nepal, they are dependent upon a government-run hospital where autopsies may be carried out by medical officers, and the resources available there may not even meet the basic standards. This will thus create a state of inadequate exposure to students with limited infrastructure, hampering the overall quality of medical education and medico-legal services.

In the MBBS programme, it is a clinical subject that is studied once the students pass the pre-clinical (basic science) courses. Also, the practical responsibility of forensic medicine is inclined more toward the clinical domain with the need to examine subjects/bodies in medico-legal cases, be they living or dead. However, it is considered a pre-clinical (basic science) subject when faculty members are recruited during postgraduate admissions and the accreditation standard set by MEC or NMC [10]. This disparity has led to ever-growing confusion for medical doctors when they seek post-graduate studies, further creating doubts in perceiving forensic medicine as a subject academically and clinically.

Changes have been far and few in between with an ever-present conundrum regarding forensic medicine throughout the country. The socio-economic status has played a significant role with regards to this as how our society sees a forensic medicine specialist certainly has its consequences once a doctor has thoughts on pursuing forensic medicine at the post-graduate level. Within the last ten years, the field has seen gradual growth with the number of Nepal Medical Council registered practicing specialized forensic medicine doctors nearing fifty from eleven (2012), but what should be taken into consideration is that the overall population of the country has also increased to over 30 million. This has led to a state of provision of medico-legal services and forensic medicine education both at the undergraduate and post-graduate levels with minimal standards, with glaring doubts over the quality and essence, thus casting doubt upon

their effectiveness. Further, the field still lacks adequate exposure and support from both federal and provincial governments.

This is where the establishment of the only society of forensic specialists in Nepal, the Medico-Legal Society of Nepal (MeLeSoN) has been striving for results. Before the advent of MeLeSoN, there was no provision for the conduct of medico-legal services, especially autopsies, by private institutions. This was changed during the last ten years with four different private medical colleges having started medico-legal duties including autopsies thus increasing the practical and hands-on exposure to undergraduate-level students, which will certainly raise the standard of medico-legal services they will provide after they graduate. This change will also have its effect on forensic medicine education as the subject demands adequate exposure from a practical point of view and for those medical colleges not providing medico-legal services, these changes should act as a driving factor to start medico-legal duties within their institutions which will in turn help standardize medico-legal services throughout the country. The MeLeSoN, beyond this, has established standard operating procedures for all the medico-legal duties that are carried out in the country. However, with only a handful of institutions providing medico-legal services with an expert, there remain challenges regarding the standardisation of these services along with inadequate resources and an ever-persisting gap between theoretical knowledge and practical skills.

Although comprehensive national data on annual forensic case volumes is not available, the uneven distribution of cases across institutions constitutes a major obstacle to achieving adequate student exposure. Major teaching hospitals in urban centres usually have sufficient cases, but those elsewhere barely meet the minimum case requirements for student education. This disparity highlights the need for standardized rotation systems and supplementary training modalities to ensure equitable practical exposure for all medical students.

Expected competencies and skills

Upon completion of the forensic medicine curriculum, medical students are expected to demonstrate competency in the following core skills:

a. Clinical forensic skills:

- Identify and properly document medicolegal cases.
- Initiate proper police notification procedures.
- Perform systematic clinical examination of trauma cases.
- Document injuries using standardized terminology and body charts.
- Collect and preserve relevant forensic evidence.
- Complete standardized government medicolegal reports.
- Estimate age using dental eruption patterns and radiological findings.

b. Autopsy skills:

- Recognize postmortem changes.
- Observe and interpret autopsy findings.
- Understand the process of sample collection for toxicology.
- Identify common causes and manner of death.

c. Documentation and reporting:

- Complete mandatory medicolegal forms and certificates.
- Write clear, objective medical reports.
- Maintain proper chain of custody documentation.
- Issue death certificates correctly.
- Document clinical findings in standardized formats.

d. Emergency response skills:

- Identify and provide initial management in poisoning cases.
- Handle acute cases of sexual assault appropriately.
- Preserve evidence while providing emergency care.
- Document time-sensitive findings.

e. Communication skills:

- Communicate effectively with law enforcement officials.
- Provide factual information to investigating officers.
- Explain medical findings to relevant authorities.
- Maintain professional boundaries in medicolegal case.

f. Legal understanding:

- Know basic medicolegal sections of Nepal's legal code.
- Understand physician's legal obligations in medicolegal cases.
- Recognize limitations of medical expertise.
- Follow proper procedures for court attendance.

Although autopsy demonstration is done for all the students, not all students after completion of the undergraduate medical degree will perform autopsies. Those students studying under the government scholarship scheme have to compulsorily work in government hospitals for 2 years where they are required to conduct autopsies and examinations of clinical forensic cases. Autopsy services and examinations of victims and perpetrators of alleged sexual assault cases are carried out only in government hospitals. Refresher medico-legal training for such students is provided by Maharajgunj Medical Campus on a regular basis after the completion of the MBBS course. Likewise, students in urban hospitals consult forensic medicine experts or seniors personally for a hands-on demonstration. For those, who are posted in rural areas, the students have to rely on the knowledge and skills they had acquired during the forensic classes.

g. For government scholarship students (Additional).

- Examine sexual assault victims following established protocols.
- Document findings using standard sexual assault examination formats.
- Collect appropriate forensic specimens in sexual assault cases.
- Perform medico-legal autopsy and prepare standard autopsy reports.
- Collect relevant specimens during autopsy and preserve them.
- Dispatch the samples following the chain of custody.
- Attend the court when summoned.

Evaluation using Schwab's five commonplaces

This analysis utilizes Wesley Null's modification of Schwab's original framework, which adds curriculum-making as the fifth commonplace to Schwab's original four commonplaces (subject matter, learners, teachers, and milieu). This expanded framework allows for a more comprehensive analysis of modern curriculum development and implementation challenges in forensic medicine education.

Subject matter

The fundamental principle of the subject of forensic medicine taught to medical students in medical colleges is to become accustomed to medico-legal cases, collect and examine the evidence, interpret the findings, and furnish a report so that it can serve as a supporting document to provide a verdict by the court. In this context, the subject of forensic medicine should incorporate the common laws practiced in the country in both civil and criminal matters. However, a major drawback in Nepal is that there is no course book/textbook specifically designed for Nepali students. Therefore, without having an option, students in Nepal are compelled to follow textbooks from neighbouring countries that incorporate sections of the legal code (penal code) of their respective legislature. The students should rely upon the guidebooks of solved question papers or lecture notes provided to them by their teachers. Notably, the legislature of a country is bound to change, and if the teacher has not kept up with recent amendments, students are likely to follow outdated content.

The other problem involves the content of what is being taught. There has been an inconsistency among the medical colleges concerning the subject matter being imparted to the students. The curriculum of Tribhuvan University states that an undergraduate should observe 25 autopsies. The Maharajgunj Medical Campus under Tribhuvan University is a government-run institution that has a large number of cases because it receives cases from throughout the country. However, in other medical colleges, where no medico-legal autopsies are conducted, witnessing 25 autopsies is impractical. Similarly, the curriculum at Kathmandu University requires students to observe 10 autopsies. The curriculum content should be designed to evaluate the characteristics and needs of Nepalese students in this field.

The curriculum of Kathmandu University also focuses on toxicology. This focus has been imparted because the students should know and understand the common poisonings, their characteristics, the mechanism of action, the role and duty of the doctor in such cases, and if there is a fatal outcome, then the doctor should be eligible to conduct autopsies, collect samples for qualitative and quantitative assays and furnish reports. However, the Tribhuvan University curriculum does not prioritize toxicology to a greater extent. The PAHS curriculum is more focused on clinical presentations than didactic lectures. The teaching hours allocated to forensic medicine vary between 60 and 80 h between universities and deemed academic institutions running MBBS programmes.

Teachers

One of the major setbacks in forensic medicine education in Nepal is the lack of qualified faculty. In terms of headcount, there are 45 forensic medicine experts in the country, of whom only 41 are involved in forensic medicine teaching at the undergraduate level. One of the remaining 4 is involved in postgraduate teaching only. Teachers constitute one of the cornerstones for the effective running of any educational programme. The lack of teachers hampers the implementation of the curriculum and thereby the knowledge imparted to the students. Some medical colleges entirely lack forensic medicine faculty; however, names on the paper to be shown during inspection by MEC exist. Few medical colleges have appointed faculty in forensic medicine who have obtained their master's degree in forensic science and without the basic MBBS degree. One might think that forensic medicine and forensic science are the same, but in reality, they are entirely different disciplines.

The country is facing a severe deficit of forensic medicine faculty. One of the primary reasons has been the lack of serious drive to study this subject and the failure of the government to prioritize it. Every medical student, after passing through the MBBS, wanted to treat patients. A medical doctor is symbolized and represented in a white coat (apron) with their stethoscope draped around their neck. Peer pressure, family pressure, and societal pressure directly or indirectly lure medical doctors to pursue a clinical discipline during postgraduate admission. There has been the misconception that a medical doctor should examine a patient and not a dead body. This is one of the potential reasons for the lack of faculty in forensic medicine and preclinical subjects such as anatomy,

physiology, pharmacology, pathology, microbiology, and biochemistry.

Currently, a three-year postgraduate programme (MD) in Forensic Medicine is offered only by a handful of medical colleges in Nepal. Even among these few medical colleges, a persistent issue has been the occurrence of vacant seats over multiple consecutive years. The course aims to cover various sub-domains within the field, including forensic pathology, clinical forensic medicine, forensic toxicology, and others, with the end goal of producing a specialist doctor skilled in independently addressing medico-legal nuances. But in the context of Nepal, there have been far fewer such specialists with less than five graduating in the last year.

To address this shortage, BPKIHS started a bridge course programme of 3–6 months for dentists who have graduated with bachelor's degrees in dental surgery (BDS). After the completion of the bridge course, the dentist was eligible to choose and study any preclinical subject or forensic medicine for a postgraduate degree. This was implemented for nearly 5–6 years, which produced 7 forensic experts in the country. This accreditation and eligibility of BDS students to study the MD postgraduate degree in preclinical and forensic medicine were subsequently halted. Although this bridge course provided an opportunity to study MD forensic medicine, the credibility of those graduates from a dental background to examine and provide opinions is that clinical forensic cases pertaining to sexual offences, abortion, delivery, or pregnancy, who had never studied obstetrics or gynaecology, are itself doubtful.

The lack of vision and motivation from the government and ludicrous job opportunities have led forensic experts to change courses or go abroad for better opportunities in recent times. Forensic experts leaving the country not only hampered the MBBS programme but also the MD programme. Accreditation is given to a medical college to run a postgraduate programme due to the availability of eligible faculty members as postgraduate student preceptors. However, the lack of preceptors in the middle of the course hampers the study and psychology of the students enrolled.

The MEC's vow to improve the standard of medical education is confined to speech and papers only. A new accreditation standard set for undergraduate medical programmes in the country raised eyebrows. On 26 July 2024, MEC made favourable decisions for the administrators of medical colleges. According to the new standard, a lack of faculty would not reduce the student intake for the programme; rather, the same faculty could be shown in different medical colleges, and accreditation could be obtained to run the full-fledged MBBS programme (Fig. 2). Such decisions always hamper the quality of the education being imparted and earn more for those who are involved in the lucrative business of running a medical college [11].

Learners

The cost of the tuition fee for the MBBS programme is Rs 41,68,090 (approximately £ 23,470) for colleges inside Kathmandu Valley and Rs 45,95,720 (approximately £ 25,879) for colleges outside the valley (1£= Rs 177.59 as of 20 September 2024) for Nepali students. This cost is levied for students studying under a government-funded scholarship scheme. 10% of the seats in private medical colleges are reserved for scholarships. This tuition fee is comparably less expensive than the tuition fee in private medical colleges in neighbouring India. Nepal is therefore a hub for Indian students to obtain an MBBS at a lesser fee. For Indian students, the same amount is paid in Indian currency rather than Nepali rupees, which is 1.6 times costlier. For students other than Indian students, the tuition fee is equivalent to that of Indian students but is paid in dollars. Therefore, private medical colleges in Nepal prefer foreign students over Nepali students.

The medium of instruction at medical schools is English; however, for international students, learning the local language is important to be able to communicate with Nepalese patients who do not speak a word in English. Alternatively, you may find it more comfortable to convey your concerns and provide a clinical history in the local dialect. The patient is at the centre of the medical universe, and understanding the patient is important. Language therefore poses a barrier. Foreign students may face problems in becoming accustomed to Nepali cuisine. Geographically, Nepal is divided into three regions: the southern plains, northern high Himalayas and middle regions of hills and mountains. Owing to its mountainous terrain, the northern part of the country is difficult to access and is poorly developed compared with the southern plain lands, which feature easily accessible roadways. Students studying in medical colleges in mountainous regions have limited opportunities for recreational activities.

Although the majority of the Nepali population is Hindu, Nepal has diverse populations of various ethnicities. The social custom of one region may differ from that of another region. The students should learn the cultural aspects of the population they are serving to, especially in forensic medicine practice. The already grieving family has accompanied the body of their loved one to the mortuary. Improper handling or a lack of cultural or customary knowledge would disregard the deceased, which may trigger the family of the deceased [12]. The other challenge that foreign students face is reading Nepali law and the sections of the penal code, which would be futile later.

Subject	Max. no of student intake	Professor	Associate Professor	Assistant Professor	Total
COMMUNITY	150	1+1		4	6
	100	1		3	4
	75	1		2	3
	50	1		2	3
Maximum of one third faculty can have Masters in Public Health or equivalent degree. Rest of the faculties need to have MD Community Medicine or equivalent degree.					
FORENSIC	150	1		2	3
	100	1		2	3
	75	1+1			2
	50	1+1			2
*All basic sciences should have adequate number of technical staffs (tutor/demonstrator and lab assistant) for providing support to the practical labs to enable efficient T/L activities. All laboratories should be equipped with the latest technologies desired for intended learning outcomes for a particular session Adequate space, clean and healthy environment, proper record of the academic activities, safety measures, and student feedback mechanism must be mandatorily followed. All Basic science Subjects should have computer-based learning, if medical colleges have computer-based learning facilities then number of required faculties in basic science can be considered to allocate the seats per intake. If there are two medical colleges nearby, faculties in basic science can be shared between two medical colleges if they have the agreement to share the faculties between two medical colleges. MEC can consider to count the faculties from both the colleges.					

Fig. 2 Screenshot of the faculty requirement guidelines set by the Nepal Medical Education Commission for the MBBS programme

Milieu

The educational, cultural, and professional landscape in Nepal plays a role in shaping the teaching and practice of forensic medicine. This milieu (environment) presents both unique challenges and opportunities for the development of this field.

Over the past few years, Nepal has witnessed a mega explosion in the field of medical education, with 25 medical colleges being established offering MBBS programmes [2]. This, however, has not brought more experts to the field of forensic medicine. There are fewer than 50 certified specialists in a country with more than 30 million people, complicating education and practice [2].

The variation of Nepalese society in terms of different cultures also adds another dimension to forensic medicine education and practice. Owing to the heterogeneous nature of their ethnic and religious characteristics, medico-legal cases, particularly those related to inquiries into causes of death or autopsy, are treated with extreme care. This is a problem that is more related to the need for traditional protocols of final rituals and mourning, which can overcome those required by forensic medicine [12, 13]. Practitioners should therefore bridge these two paradigms by taking a more nuanced standpoint.

There are several barriers responsible for professional hurdles in this field: the absence of a governing body or department responsible for conducting and monitoring the provision of medico-legal services and the subsequent drafting and implementation of policies at the national level. As a result, the there is a lack of uniformity in medico-legal practices across the country.

To effectively conduct postmortem examinations, a well-equipped Forensic Medicine unit needs particular tools and spaces. As per the guidelines published by NHS England [14], the essential components include:

- Modern-day autopsy tables with well-equipped and effective fluid drainage.
- Room with adequate ventilation and lighting.
- Secure, climate-control storage for preserving biological specimens.
- Storage facility for collected evidence other than biological specimens.
- High-quality dissection instruments.
- Digital imaging equipment for documentation.
- Facilities for histopathology and toxicology analysis.
- Changing room and bathing facilities.

However, many Nepalese institutions lack these facilities. Several mortuaries lack the necessary facilities and tools, and there are instances where proper infection control protocols are not consistently followed [15]. The dearth of forensic science labs with just one main police science lab located in Kathmandu creates bottlenecks in processing and analysing forensic samples, affecting the reliability and efficiency of criminal investigations. In addition to constraining forensic services, these deficiencies have a major effect on the education of medical students, decreasing the opportunity for access to ideal facilities and practices in their training.

The professional environment has begun to take shape due to recent legal and policy changes. The Medico-Legal Service Operation Directives 2075 BS (2019 AD) have provided a new opportunity for private-sector medical colleges to offer medico-legal services that can be used as an additional means of improvement in the field [2]. These directives set the guidelines for medico-legal services in Nepal, including standards for mortuary facilities and medico-legal practices, which in turn influence the educational environment and curriculum. However, the implementation of these changes and their impact on service quality are still ambiguous.

The Medico-Legal Society of Nepal (MeLeSoN), for example, is one such positive development in this area [2]. This is an umbrella organization of all forensic medicine experts in the country. They regularly provide training, conduct workshops, and conferences and publish newsletters to update and disseminate information with suggestions for improving the medico-legal sector of the country [2]. Such organizations are responsible for setting standards in their practices, offering continuous education, and advocating for their needs.

Curriculum making

The curriculum development and revision process for forensic medicine in the country reveals significant variations and challenges. While some institutions have attempted to change curricula, others have held constant with their original curriculum without substantial changes.

The curriculum of Tribhuvan University was implemented first in 1976, and since then, it has been revised twice; the last revision was made in 2008. Kathmandu University revised its MBBS curriculum only once, in 2011, after its implementation in 1996. Similarly, BPKIHS also revised its curriculum once in 2014 after the commencement of its first curriculum in 1994. Other academies have not reported any major revision of the curriculum after its implementation. The curriculum literally means “to run”; however, this lack of regular updates limits the ability to keep pace with evolving forensic medicine practices and legal frameworks.

The structure, organization, and instructional design differ significantly among curricula. Although many curriculums have a definite allocation of theory and practical hours, it is not obvious in the curriculum of the Patan Academy of Health Sciences. For Tribhuvan University and the Karnali Academy of Health Sciences, there is a division of modules, which is self-explanatory. However, for other institutions, the division is less pronounced. Apparently, this has resulted in a substantial divergence between them with respect to the quantum of learning that a student acquires.

Several institutions have not covered the content comprehensively. While all universities as well as academies cover core topics, the curriculum differs in terms of the included subtopics and emerging areas. The curriculum of Kathmandu University and Karnali Academy of Health Sciences seem to cover a more extensive curriculum than any other university, as it offers more detailed content on each topic listed; this may lead to graduating doctors with differing levels of expertise in new aspects of forensic medicine.

The extent of emphasis placed on practical work, especially in autopsies, does, however, differ significantly from institution to institution. Some medical colleges require a minimum of 10 autopsies, whereas others require between 25 and 30 autopsies. This variation raises a red flag on whether students receive enough practical exposure. Furthermore, clinical postings, laboratory sessions, and court visits are irregular, and despite the differences noted in the curricula, there is limited forensic medicine exposure for future doctors.

The methods of assessment also differ from curriculum to curriculum. Although summative assessment is used by all the curricula, no formative assessment exists. This gap limits students’ chances of checking their progress and improving themselves during the course. Contemporary assessment tools such as OSPE and OSCE are implemented in almost all curricula, except Tribhuvan

University, which is a positive trend, but the lack of uniformity is a drawback and should be mitigated.

The incongruity in curriculum across the medical colleges of Nepal highlights the need for standardization. The overall development of a national curriculum for education in forensic medicine could ensure that all graduates, irrespective of the college from which they have earned a degree, are on a converse surface when the knowledge base and skills are concerned. A nationally coordinated review and update of the curriculum from time to time could ensure the relevance and effectiveness of forensic medicine education in Nepal.

Insights from Schubert's images of the curriculum

Schubert's eight curriculum images are a useful way of examining forensic medicine education in Nepal today. It may be possible to gain a more nuanced understanding of the pros and cons of the current approach and future options for improvement by examining these images with respect to the curriculum in place.

Curriculum as content or subject matter

As far as content, one could argue the current forensic medicine curriculum fits into this picture. It is developed to convey a set of knowledge that forensic medicine students need to acquire. There are certain benefits with this kind of image: content-centred instructions and the systematic delivery it creates for all the students to create a deep understanding. Meanwhile, this image has a few pitfalls in the context of teaching forensic medicine in Nepal. It could thereby be argued that the single most important constraint is perhaps a non-uniform national curriculum that forces students to learn different modules, which affects adequacy and relevance. The lack of content-specific textbooks is also a major issue.

Curriculum as a programme of planned activities

The curriculum follows a structured approach with planned activities. There are some magnificent disparities in the way its implementation is conducted in institutions. Some universities require 10 autopsies, whereas others require approximately 25–30 autopsies. The disparity is in the extent of training opportunities that are available for the students. Some do not receive enough hands-on experience in practice, and the need for standardization is mandatory.

Curriculum as an intended learning outcome

The existing forensic medicine curriculum in Nepal is so designed to produce a graduate who can deal with medico-legal cases and provide testimonial support as an expert. However, no frequent updates in the curriculum as is seen in a few universities can also lead to a misalignment of learning outcomes and societal/field needs.

Curriculum as cultural reproduction

To some extent, the forensic medicine curriculum in Nepal reproduces the profession's culture and ethical standards. However, it fails to account for the cultural context within which it is situated to a great extent. The programme does not sufficiently sensitize students to the various ethnic and religious practices surrounding death and anecdotes the findings during postmortem examination.

Curriculum as experience

This image is not fully realized in the current curriculum. While some institutions, such as PAHS, have focused more on clinical presentations and practical experiences, others rely heavily on didactic lectures. In many institutions, limited access to medico-legal autopsy and forensic science laboratories restricts opportunities for students to learn from experience.

Curriculum as discrete tasks and concepts

The curriculum could be made robust if a stronger emphasis is given to this image, particularly on developing practical skills through problem-solving and inquiry-based activities. The incorporation of more hands-on training, crime scene visits, and other investigative tasks, such as evidence collection, could foster critical thinking and better prepare students for real-world forensic practice [16].

Curriculum as an agenda for social reconstruction

At present the forensic medicine education programme of Nepal lacks this section. However, there is significant potential for improving this situation, in particular, due to serious difficulties encountered by the entire system of medico-legal death investigations in the country [15]. As mentioned earlier, there is an acute shortage of forensic medicine experts in Nepal. This shortage is even more critical in remote areas where quality medico-legal services are badly compromised by the lack of qualified manpower [15]. By using the curriculum as an agenda for social reconstruction, this area of the problem could be eliminated.

The curriculum can be designed to stress the role of general medical officers in providing the basic level of medico-legal service [15]. This is preferable because the majority of newly graduated doctors work as medical officers in remote areas where there are no specialists available [17, 18].

Some key components of such an overhauled curriculum could be as follows:

i. Enhanced practical training: The reform may include increasing the number of medico-legal autopsies to be witnessed during the MBBS programme and ensuring that they have hands-on experience before graduation.

ii. Focus on rural medico-legal problems: This specific, modern medico-legal issue may need to be addressed properly through the addition of adequate case studies and scenarios based on an intersectional approach from remote areas. By implementing this method, medical officers are accustomed to providing services in resource-limited settings, and access to experts is difficult.

iii. Legal and ethical preparedness: Retrospectively, the weight of the legal part of the medico-legal curriculum may be retained, but greater emphasis should be placed on the ethical part to provide medical students with vast knowledge of the legal procedures and ethical dilemmas they face during their work with the medico-legal system.

iv. Interdisciplinary approach: To elaborate the system as a whole, it will be pertinent to assimilate the views of the police, judiciary, and social workers to provide a holistic understanding of the medico-legal system.

v. Continuing education emphasis: Instil the importance of ongoing learning and skill development in medico-legal matters, preparing graduates for potential roles in forensic services.

vi. Engagement with the community: Integrating teaching units about living with the local population that are sensitive to cultural death norms and autopsies.

vii. Resource optimization: Students are prepared to work within a framework of limited resources for conducting basic medico-legal investigations, as is commonly encountered in many parts of the country.

Therefore, it is necessary to rebuild a curriculum with these features for the medical education system in Nepal to help solve the perennial problems of medico-legal death investigations. The specific aim of this approach would be to enable general medical officers to become competent primary care responders in cases involving medico-legal issues, especially where forensic experts are not readily available [19]. The current medico-legal reports prepared by medical officers are only average reports and in many cases are even inconclusive [20]. This model could make it easier for anyone who requires medico-legal service anywhere in Nepal, which could improve the justice delivery system at the same time. Not only in Nepal, but poor medico-legal reporting is a global challenge. A study in Saudi Arabia observed that all the 418 reports included in the study had errors [21]. Likewise, sub-standard medicolegal reports have been detected in Egypt and Germany [22, 23]. These global trends underscore the need for robust forensic medicine education to improve the quality of medico-legal reporting.

Moreover, this new curriculum can address challenges such as unqualified individuals conducting substandard postmortems and a lack of expert medico-legal services in many parts of the country that were previously listed. On the other hand, if all doctors are trained on basic medico-legal matters as graduates, then this kind of syllabus will be among the best ways through which Nepal's medico-legal system can be transformed towards social construction.

Curriculum as a currere

The present curriculum does not capture this image; it lacks the dynamism and responsiveness that can allow it to adapt to the rapidly changing nature of forensic medicine. Therefore, regular updates and revisions must be performed to ensure that the field remains relevant and to prepare students for the future landscape of the field.

Comparative analysis with neighbouring countries

To explore and propose potential solutions for challenges faced by forensic medicine education in Nepal, the comparison with neighbouring countries about how they deal with these issues might be beneficial. Drawing from such comparative analysis around India, Bangladesh, and Sri Lanka would give important insights to refine Nepal's approach.

India

This southern neighbour of Nepal, offers several relevant examples:

Curriculum Standardization: The National Medical Commission has advocated a uniform curriculum in the subject of forensic medicine across all medical colleges [24]. This includes a uniform distribution of teaching hours: 42 h for II MBBS, followed by 40 h of theory, 70 h of small group learning (SGL), and 20 h of self-directed learning (SDL) in the final year [24].

Practical training The National Medical Commission has mandated one week of rotatory internship training in forensic medicine to produce competent medical undergraduates who can document and certify medicolegal cases and also autopsy posting [25].

Emphasis on Student Research The Indian Council of Medical Research (ICMR) conducts a Short-Term Research Studentship Programme to promote research interest among medical undergraduates which is taken advantage of by many Indian medical institutions, such as the Mahatma Gandhi Medical College and Research Institute (MGMCRI). A strong emphasis on student research in forensic medicine includes forensic anthropology, forensic pathology, cheiloscopy, frontal sinus pattern studies, stature estimation, and paediatric forensic medicine [26].

Bangladesh

Nepal shares similarities with Bangladesh in forensic medicine education and practice [27, 28]. However, the country's governing body for medical education

- Bangladesh Medical and Dental Council (BMDC) - has implemented some innovative approaches in forensic medicine teaching.

Integrated learning and practical posting sessions Forensic medicine is integrated with clinical subjects, allowing for better integration of theoretical knowledge with practical applications [29]. The BMDC has allotted 195 h for forensic medicine teaching including 100 h for lectures, 45 h for tutorials, and 40 h for practicals with additional integrated teaching of 10 h [29]. Furthermore, 12 days are allotted for practical posting sessions which include 8 days at the mortuary and the remaining 4 days for court, police station, one-stop crisis centre (OCC), and DNA/forensic laboratory visits [29].

Sri Lanka

Sri Lanka, despite being an island nation, faces similar challenges in forensic medicine education and offers some unique solutions:

Use of technology The teaching methodology of forensic medicine at the University of Colombo states video demonstration will be done for routine postmortem procedures. This approach would be beneficial in areas where there are low cases or the institutions that do not have autopsy facility [30].

Based on these examples, Nepal could consider adopting similar methods:

i. Adopting the Indian model where all medical colleges follow the same national curriculum.

ii. Integrating forensic medicine with clinical subjects as seen in Bangladesh.

iii. Incorporating community-based learning into practice to combat Nepal's distinct rural healthcare challenges.

iv. Recreating exposure utilising virtual autopsy and 3D imaging.

v. The implementation of a formally structured programme in forensic medicine to promote undergraduate research, as seen with the ICMR Short-Term Research Studentship Programme in India.

vi. Defining research thrust areas as per the requirement in Nepal.

Recommendations

i. Curriculum standardization:

• Establish a National Curriculum Committee under MeLeSoN's leadership that includes stakeholders from the Ministry of Health and Population (MoHP), representatives from NMC and MEC, and leading forensic medicine experts from major institutions.

• Develop standardized requirements across all programmes which include uniform teaching hours (recommend 150–180 total hours), consistent practical training requirements, standardized assessment methods including both OSPE and OSCE, and required core competencies aligned with international standards.

ii. Practical training standardization:

• Implement a hub-and-spoke model where high-volume centres are designated as training hubs. Create formal rotation schedules for students from low-volume centres.

• Establish minimum requirements: 15 mandatory autopsy observations; 5 supervised clinical forensic examinations; and 2 mandatory court visit observations.

• Develop simulation-based training programmes that include virtual autopsy platforms; standardized patient scenarios for clinical forensic cases; and digital crime scene investigation modules.

iii. Faculty development and resource sharing:

• Create a National Faculty Exchange Programme so that expert faculty rotate between institutions; regular workshops for junior faculty; and mentorship pairings between experienced and new faculty.

• Establish regional centres of excellence that have specialized training facilities; shared laboratory resources; and collaborative research opportunities.

iv. Technology integration:

• Develop a National Digital Learning Platform that has a shared case library; virtual learning modules; and standardized assessment tools.

• Implement telemedicine support for remote expert consultation; virtual case discussion; and online supervision for rural practitioners.

v. Assessment and quality control:

• Create a National Assessment Framework to standardise practical examinations; uniform theory question banks; and regular programme audits.

• Implement portfolio-based assessments by implementing digital logbooks; competency tracking; and reflection components.

vi. Clinical integration.

• Establish mandatory clinical rotations that include emergency department exposure, trauma centre observations, and toxicology unit rotations.

• Create interdisciplinary learning opportunities by conducting joint sessions with law enforcement; legal system exposure; and public health integration.

vii. Rural practice preparation:

• Develop rural forensic medicine modules to generate resource-limited setting protocols; basic forensic examination guidelines; and evidence collection and preservation techniques.

• Create support networks by establishing telemedicine consultation systems; mobile forensic units; and regular rural outreach programmes.

viii. Research integration:

• Establish a National Research Framework to identify priority research areas; conduct collaborative projects; and support student research requirements.

• Create Research Support Systems for research grants; publication support; and research mentorship.

Conclusion

The overall analysis indicated that forensic medicine education in Nepal faces significant challenges that need to be addressed. Although it has now been incorporated into medical curricula across the country, there are still many more issues that need immediate attention. By applying the five commonplaces introduced by Schwab and Schubert's curriculum images, we conducted a critical analysis that revealed large gaps in curriculum content and teaching methodologies together with practical activities. Similarly, a limited programme with insufficient teachers as well as the lack of infrastructure to transfer such knowledge aggravates the situation. However, such constraints have a positive side, which points to the enhancement of the need for a national curriculum, improving teaching and learning methods, addressing teacher shortages, and ensuring that content is aligned with the local culture. Additionally, medico-legal issues in rural areas can be addressed in a new way. Technology will ensure proper interconnectivity between theory and practice with respect to learning. This will strengthen the medico-legal system of the country and keep the number of graduate doctors sharp.

Therefore, changing the way forensic medicine is taught helps fill the gap in the nation's justice system and ensures quality healthcare for all. With this, future doctors can incorporate their knowledge into legal processes through interdisciplinary collaboration and smart changes.

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AA conceptualized the review and prepared the original draft. RR developed the methodology for the literature review and supervised the manuscript development process. RGM and AAc both contributed significantly to the critical analysis of the literature and intellectual content of the manuscript. All authors were involved in critically revising the manuscript for important intellectual content. Each author gave final approval of the version to be published.

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