

### Ethical and Professional Issues Training for Students and Staff of Laboratory Medicine

Farnaz Zahedi Avval<sup>1,2</sup>,  
Kiarash Ghazvini<sup>3,4</sup>,  
Masoud Youssefi<sup>3,5,6</sup>  
<sup>1</sup> Biochemistry of Nutrition  
Research Center, Mashhad  
University of Medical  
Science, Mashhad, IRAN  
<sup>2</sup> Department of  
Biochemistry, School of  
Medicine, Mashhad  
University of Medical  
Sciences, Mashhad, IRAN  
<sup>3</sup> Antimicrobial Resistance  
Research Center, Mashhad  
University of Medical  
Science, Mashhad, IRAN  
<sup>4</sup> Educational Development  
Center, Mashhad University  
of Medical Sciences,  
Mashhad, IRAN  
<sup>5</sup> Educational Development  
Office, School of Medicine,  
Mashhad University of  
Medical Sciences, Mashhad,  
IRAN  
<sup>6</sup> Central lab, Imam Reza  
Hospital, Imam Reza square,  
Mashhad, Iran

Tel: +98 511 8022206  
Fax: 98 511 7625  
E-mail:  
youssefim@mums.ac.ir

**Background:** Medical Laboratory plays a critical role in maintaining and promoting health. Increasing wide applications of laboratory medicine in clinical practice have highlighted specific topics in the areas of social, professional and ethical issues in the laboratory. Despite the important role of clinical lab in health system, ethical issues have been rarely discussed for clinical labs. Considering the need to provide efficient training program for students, this study was designed and conducted to assess the views of laboratory science educators about offering a professional ethical course in laboratory science curriculum.

**Methods:** The study population was 28 laboratory science educators at Mashhad University of Medical Sciences. A questionnaire was designed to assess instructors' views about the importance, quantity, quality, and the need to provide a professional ethical course for medical laboratory students.

**Results:** The majority of respondents (82.15%) evaluated the importance of offering an ethical course for laboratory medicine to be at a very high level. Most educators (75%) believed that good clinical laboratory practice is extremely related to moral issues. Many lecturers (85.7%) completely agreed with the addition of professional ethical course for laboratory science students. Respondents (89.3%), also, believed that the educating professional ethical issues to medical lab students will enhance service quality and performance of the future laboratories. In addition, most professors suggested offering two credit points to cover such issues for the students (85.7%).

**Conclusion:** We recommend offering a separate course in laboratory science curriculum to cover the clinical ethical issues, such as modality of taking samples, interaction with patients, the way of giving information about genetic tests, viral and malignancies, the way of storing data and access to medical records, the diagnosis of infertility, prenatal diagnosis, legal issues in poisonings, and the way of interacting with the doctor and medical private issues.

**Key words:** Professional ethics, Laboratory medicine, Curriculum

### تعلیم المباحث الاخلاقه العرفیه لطلاب و موظف المخبتر الطبی

**التمهید و الهداف:** المخبتر الطبی له دور مهم و بارز فی حفظ و ارتقاء صمه المجتمع و بالرغم من هذه الاهمیه الکبیره قل ما نجد من البحوث فی هذا المجال . تعلیم الاخلاقه العرفیه من المواضيع الاساسیه الی الیتم تدریسها فی مختلف التخصصات الصحیه و لكن لم نجد فی مجال المخبتر هذا المدرس . ان الهداف من هذه الدراره متابعه نظرات مدرسین العلوم المخبریه فی مجال اعطاء دروس الاخلاقه العرفیه فی تخصص العلوم المخبریه.

**الأمطوب:** ائتربك فی هذه الدراره ۲۸ مدرس من اعضاء الریبه العلمیه فی جامعه مشهد للعلوم الطبیه. تم اختیار استماره جمع آراء المدرسین فی مجال الصیه و ضروره و کیفیه اعطاء دروس الاخلاقه العرفیه و تم تحلیل المعطیات عبر القوانین الإحصائیه .

**النتائج:** كان جواب اکثر المشركون (۸۵.۷%) ان اعطاء دروس الاخلاقه العرفیه مهم جدا. اعتقد ۷۵% ان الخدمات المخبریه لها ارتباط كبير بالمواضيع الاخلاقیه. وافق ۸۵.۷% من المدرسین على اضافه دروس الاخلاقه العرفیه فی تخصص العلوم المخبریه. اعتقد ۸۹.۳% من المدرسین ان تدریس موضوع الاخلاقه له تأثير كبير فی رفع مستوى الخدمات فی مجال المخبتر. اقترح ۸۵.۷% من الاساتذه تخصيص وحدتین دراسیتین تتعلق بموضوعات اخلاقیه مخبریه فی الواحدات الدراریه.

**الاستنتاج:** نظرا الی الصیه الموضوع الاخلاقی فی مجال المخبتر الطبی و رقیه المدرسین فی هذه الدراره نقترح ایجاد وحده دراسیه فی البرنامج الدراری للعلوم المخبریه .

**الكلمات الرسیه:** الاخلاقه العرفیه . العلوم المخبریه . الدراره التعلیمیة.

### آموزش مباحث اخلاق حرفه ای جهت دانشجویان و کارکنان آزمایشگاه پزشکی

**زمینه و هدف:** آزمایشگاه پزشکی نقش مهمی در حفظ و ارتقای سلامت جامعه ایفا می کند علیرغم اهمیت نقش آزمایشگاه در سیستم سلامت، موضوعات اخلاق آزمایشگاه بندرت مورد بحث قرار گرفته اند. آموزش اخلاق حرفه ای در بیشتر رشته های مرتبط با حوزه سلامت انجام می پذیرد اما چنین واحد آموزشی در برنامه آموزشی علوم آزمایشگاهی تعریف نشده است. با در نظر گرفتن ضرورت این مطالعه به بررسی دیدگاه مدرسان رشته علوم آزمایشگاهی در مورد ضرورت و کارکردهای ارائه واحد آموزشی اخلاق حرفه ای در دوره علوم آزمایشگاهی می پردازد.

**روش:** جمعیت مورد مطالعه بیست و هشت نفر عضو هیات علمی دانشگاه علوم پزشکی مشهد مدرس دوره علوم آزمایشگاهی بودند. یک پرسشنامه جهت بررسی دیدگاه اساتید در مورد اهمیت، ضرورت، کمیت و چگونگی ارائه واحد اخلاق در دوره علوم آزمایشگاهی تدوین و با بررسی روایی و پایایی مورد استفاده قرار گرفت.

**یافته ها:** بیشتر پاسخ دهندگان (۸۵.۷٪) اهمیت ارائه واحد اخلاق آزمایشگاهی را در حد خیلی زیاد ارزیابی نمودند. مدرسان (۷۵٪) معتقد بودند که ارائه خدمات آزمایشگاهی در حد خیلی زیاد با موضوعات اخلاقی مرتبط است. بیشتر اساتید (۸۵.۷٪) در حد خیلی زیاد موافق افزودن واحد اخلاق آزمایشگاهی به دوره آموزشی علوم آزمایشگاهی بودند. شرکت کنندگان (۸۹.۳٪) معتقد بودند که تدریس موضوعات اخلاق به دانشجویان علوم آزمایشگاهی سبب بهبود کیفیت ارائه خدمات آزمایشگاهی خواهد شد. اساتید علوم آزمایشگاهی (۸۵.۷٪) میزان دو واحد آموزشی را برای ارائه موضوعات اخلاق آزمایشگاهی پیشنهاد نمودند.

**نتیجه گیری:** با در نظر گرفتن اهمیت موضوعات مرتبط با اخلاق در آزمایشگاه پزشکی موارد متعدد دیگر در این حوزه، و بر اساس دیدگاه بیشتر اساتید رشته های علوم آزمایشگاهی این مطالعه، بازبینی برنامه درسی علوم آزمایشگاهی در کشور و گنجانیدن واحد آموزشی خاص موضوعات مرتبط با اخلاق حرفه ای آزمایشگاهی را پیشنهاد می نماید.

**واژه های کلیدی:** اخلاق حرفه ای، علوم آزمایشگاهی، دوره آموزشی

### میڈیکل لیبارٹری کے کارکنوں کو پیشہ ورانہ اخلاقی مسائل کی تعلیم

**ہیک گراؤنڈ:** میڈیکل لیبارٹری معاشرے میں صحت و سلامتی کے معیار کو برقرار رکھنے میں بنیادی کردار ادا کرتی ہیں اس کے با وجود لیبارٹری میں پیشہ ورانہ اخلاق کے مسئلے کو اکثر نظرانداز کیا جاتا ہے۔ اگرچہ میڈیکل سائنس کے مختلف شعبوں میں پیشہ ورانہ اخلاق کی تعلیم دی جاتی ہے لیکن اس لیبارٹری سائنس کے موضوعات کی تعلیم میں اس پہلو کا خیال نہیں رکھا جاتا۔ اس ضرورت کے پیش نظر یہ تحقیق انجام دی گئی ہے اور اس میں لیبارٹری علوم کے اساتذہ کے نظریات جاننے کی کوشش کی گئی ہے۔

**روش:** اس تحقیق میں مشہد یونیورسٹی آف میڈیکل سائنس میں لیبارٹری علوم کے ایکذیمیک کونسل کے ممبروں سے ان کے نظریات جانے گئے۔ اس تحقیق میں انٹھائیس اساتذہ نے شرکت کی۔

**نتیجے:** شرکت کرنے والوں کی اکثریت پچاس فیصد نے اخلاقی امور کی تعلیم کو نہایت ضروری قرار دیا۔ انہوں نے یہ بھی واضح کیا کس طرح اور کس نہج پر اخلاقی اصولوں کی تدوین کی جائے اور انہیں نصاب میں شامل کیا جائے۔ ماہرین کا کہنا تھا کہ لیبارٹری کے کام اور اخلاقیات میں جولی دامن کا ساتھ ہے۔ اساتذہ کی اکثریت نے اخلاقی مسائل کی تدریس کی ضرورت پر زور دیا۔ ان کا ماننا ہے کہ طلباء کو اخلاقی اقدار کی تعلیم دینے سے بہتر خدمات پیش کی جاسکتی ہیں۔ اساتذہ نے اخلاقیات کی تعلیم کے لئے دو یونٹ مخصوص کرنے کی سفارش کی ہے۔

**سفارشات:** اخلاقیات کی اہمیت اور اس کے مفید نتائج کے پیش نظر اساتذہ کی جانب سے اس موضوع کی تعلیم پر تاکید کی بنا پر یہ ضروری قرار دیا جانا چاہیے کہ اخلاقیات کے درس کو نصاب میں شامل کیا جائے اور لیبارٹری علوم کے طلباء کو ان مسائل سے آشنا کرایا جائے۔

**کلیدی الفاظ:** اخلاق، لیبارٹری سائنس۔

## INTRODUCTION

Medical laboratory institutions and their staff are responsible for the health and welfare of their patients as well as communities. Laboratory medicine has dramatically developed in recent decades and these laboratories are widely used as main centers for diagnosis and management of the diseases. Growing application of laboratory medicine in clinical practice has highlighted social, professional and ethical topics in the laboratory medicine. Despite the important role of clinical laboratory in health system, ethical issues have been rarely discussed for clinical laboratories, while professional norms and regulations should be clearly defined to ensure ethically defensible procedures in the lab. Despite all previous attempts, some controversies and complexities still exist in this area. Ethical concerns, such as the access to patients' information and samples, confidentiality, concept problems, genetic code issues, bio-banking and many other laboratory issues needs to be further discussed. Furthermore, laboratory results might lead to discrimination or stigmatization, which are subjects of ethical discourse. In some cases, a critical balance is needed to protect patients' rights against benefits of the community. Therefore, such issues require further clarifications.

The ethical policy, addressing such moral complications, has been developed in some countries, while in most countries there are no codified protocols and defined policies. Consequently, the IFCC (International Federation of Clinical Chemistry) has suggested international focus groups and meetings develop globally accepted ethical protocols for various ethical topics in the laboratory [1].

All health workers should consider ethical and professional principles in each and every interaction with patients and service recipients. Clinical laboratory employees also should consider such regulations. This will help create a safe environment for patients, respect privacy and human dignity, create a positive image of ethical values in a clinical setting in addition to improving service quality. It is universally accepted to consider ethical standards in any clinical environments, including hospitals, clinics, research centers, health centers, and also laboratories.

Laboratory personnel have an important role in maintaining and improving health to this end, and they should effectively be familiar with the principles of medical ethics [2]. Due to complex and harmful consequences of certain situations, such as infertility testing, prenatal diagnosis, toxicological legal issues, these staff are continuously involved with ethical and legal issues [3-5].

The development of new experimental techniques in recent decades, including PCR and genetic testing, and access to patients' genetic codes, has raised new issues in ethics in the laboratory which were unknown until a few years ago. The fact that such genetic testing might be part of primary care tests highlights new concepts in lab ethical issues [6]. As a result, it has been proposed that genetic laboratory personnel should receive even an extra training in ethical issues [7]. Besides, how the patients are to be informed

about the test results is another issue in the field of medical ethics in the laboratories [8, 9].

The staffs at the medical laboratory are required to follow the ethical rules and regulations which are not taught during their education. Although in many medical fields such as nursing, and midwifery, the professional ethics is included in their curricula, such credit is not defined for laboratory medicine curriculum. Considering the need for offering efficient curriculum for the students, this study was conducted to assess the opinion of medical laboratory faculty members about the professionalism and ethical training in terms of necessity, importance, content and quantity.

## METHODS

This cross-sectional study was designed and conducted during 2012 to evaluate medical laboratory faculty member views about the need to include professional ethics in the field of laboratory medicine training.

In this study, 28 faculty members from various disciplines including biochemistry, microbiology, genetics, hematology, immunology, pathology, parasitology and mycology in Mashhad University of Medical Sciences were selected purposively/purposefully. All these faculty members were involved in teaching laboratory medicine to laboratory sciences students. In addition, these faculty members were active in clinical laboratories inside or outside the university. All instructors involved in laboratory medicine teaching were included, except for those who were not accessible at the time of study or refused to fulfill the questionnaire, for any reasons, were excluded from the study.

A questionnaire based on Likert scales was used in this study. Questionnaire's validity and reliability was reviewed and approved by experts in educational development office of our University. The questions were designed to assess instructors' views about the importance, clinical relevance, professional applications as well as impact on quality of laboratory services of lab-specific ethical issues. Lecturers' views about every variable were assessed according to 5-point Likert's spectrum of rating. In addition, the questionnaire contained open-ended questions about the recommended academic credit point, and any other suggested topics to be discussed in such a lab-related ethical course.

## RESULTS

The results are illustrated in table 1. According to the majority of respondents (82.15%), the importance of professional ethics was very high. Most faculty members (75%) believed that ethical issues are thoroughly related to the clinical functions of the medical laboratory. The majority of instructors (85.7%) fully agreed with the inclusion of professionalism and medical ethics to the curriculum for laboratory science students.

Respondents (89.3%) believed that the inclusion of such trainings will significantly enhance the service quality and performance of the laboratories. Most instructors recommended addition of two academic credit points to teach medical lab ethical issues to lab trainees (85.7%).

**Table 1- The lecturers' viewpoints about ethical training in clinical laboratory**

	Very high n (%)	High n (%)	Moderate n (%)	Low n (%)	Very low n (%)
Importance of ethics	23 (82.15)	5 (17.85)	-	-	-
Relation to clinical issues	21 (75)	6 (21.4)	1 (3.6)	-	-
Relation to future profession	22 (78.6)	6 (21.4)	-	-	-
Agreeing with the inclusion of ethical training	24 (85.7)	3 (10.7)	1 (3.6)	-	-
Effect on service quality	25 (89.3)	3 (10.7)	-	-	-

The educators have cited patient privacy, laboratory errors and forensics, accuracy, and principles of professional conduct in the lab as the most important topics to be discussed about professionalism and ethics in laboratory medicine courses.

## DISCUSSION

This study referred to our faculty members' beliefs that the teaching of ethics to laboratory students has been neglected in our current curriculum.

Ethics plays a vital role in all phases of laboratory work. In our educational program, laboratory sampling is thoroughly taught to the students whereas ethics issues are not fully discussed or contemplated [10]. Basically, there is no difference between nursing and laboratory students in terms of patient sampling while professional ethics regarding that is only considered in nursing curriculum.

In addition to sampling, various stages of laboratory work, in terms of accuracy, precision and sensitivity and presenting laboratory results, are deeply concerned with the principles of professionalism and ethics.

Any inaccuracy in pre-analytical and analytical process can lead to wrong results, which, in itself, could potentially end in patients' morbidity and mortality with serious ethical consequences.

Moreover, medical ethics has a major role in improving the quality of health services. Recent advances in medical sciences have simultaneously led to a growing role of medical ethics in different aspects of medical care. The high significance of ethical issues in health systems emphasizes gaining sufficient ethical knowledge by healthcare workers. Therefore, since it is the medical universities' duty to preserve and promote health, these institutions are required to provide sufficient ethical knowledge for their students.

In a study in United States, clinical laboratory educators stated that current education of professional ethics to the students was not sufficient. This study revealed that less than five percent of class time was devoted to the topics of ethics. Instructors generally believed that this time was not sufficient for such vital issues. The study suggested that departments and faculties should ensure adequate ethical issues are taught during lectures, or else these issues should be included as a separate and special course elsewhere in the curriculum [11]. Programs to improve educational curriculum of laboratory medicine usually emphasize on

learning new techniques. In addition to such developing techniques, these programs should also enhance students' professional attitude toward different aspects of ethics [12-13].

Teaching medical ethics can improve students' skills in moral reasoning and judgment. For instance, in an academic investigation, three groups of students were compared. The first group received professional ethics education provided by ethical experts in a defined course, the second group of students received non-codified discussions on ethical issues incorporated into the content of other courses. The third group was given no training in professional ethics. At the end of the course, students' ethical judgment was evaluated by Rest's defining issues test (DIT). It was made clear that the ethical judgment score of the first group was significantly higher than other two groups [14].

Moreover, inclusion of ethical topics improves the quality of educational program. A study in 2012 demonstrated that including ethical topics could even be an appropriate strategy to promote students' motivation and interest in the academic contents of the educational program [15].

On the other hand, issues, which are not entirely consistent with professional ethics, may occasionally occur in the laboratory. Some of these events may have serious ethical consequences. The laboratory employees should be familiar with these issues and be prepared to deal with such cases based on ethical principles [16].

Laboratory ethics education has been ignored in educational programs at all levels. Although ethical discussions have been incorporated in most pathology residency training programs, a study in 2002 indicated that these trainings were still inadequate [17].

In developing an ethical course for laboratory students' issues such as educational objectives, content and teaching outline, schedule, teaching strategies, student evaluation, and educational resources should be carefully defined. In such a course, problem base learning (PBL) and small group discussions seem to be most effective teaching methods. In these methods, the real cases are proposed, discussed and evaluated. Such courses should promote moral judgment skills of the trainees [18].

Topics such as professional standards, requirements, and behavior, as well as, the key issues of moral philosophy and ethical practice, and regulations may be considered in these courses [19-20]. Obviously, moral values of the community

and cultural differences must be considered in designing such ethics courses. Therefore, access to a global consensus about the philosophy, objectives, content and teaching strategies for a professional ethical course is difficult [21-22].

Proper laboratory communication with the patients and physicians is possible only if appropriate professional goals with the emphasis on ethical attitudes are well-defined for the laboratory personnel [23].

Most of the studies conducted in countries where ethical issues are taught to laboratory students, revealed that such trainings were still insufficient. According to our study most of the instructors believed that such education is absolutely necessary in a medical laboratory training program, which is also consistent with previous studies.

The strength of this study lies in the fact that most of the participants were involved in clinical laboratory practice; thus, due to the close contact with real laboratory work, they were familiar with the necessity and outcomes of ethical education. However, a greater number of participants, preferably selected from various universities, might strengthen the results of further investigation.

It has even been proposed that healthcare systems should establish laboratory ethical committees in order to further the teaching of such topics to the laboratory personnel, develop appropriate policies and offer consultation, in case

of the emergence of ethical dilemmas in the laboratory [24]. Laboratories should consider and respect different aspects of patients' rights including physical and mental security as well as information and privacy concerns [25]. The importance of laboratory test results is clear for all health system workers. For example, in many cases, the laboratory result determines the type of treatment for a patient. Indeed the close relationship between the laboratory and the bedside makes clear the importance of medical ethics for clinical lab.

More discussions on laboratory ethical issues are needed in our scientific community to ensure excellent laboratory professionalism. This study indicates the need to provide a specific ethical course for laboratory students to broaden their understanding of ethical implications. Such a course will enhance their ability to identify ethical dilemmas in the laboratory and make decision based on ethical standards. Curriculum revision and inclusion of an ethical course for laboratory students seems to be essential. Such education may be offered in education programs for laboratory workers.

To summarize, ethical issues are one of the most remarkable principles of professionalism. Teaching these principles will result in graduation of more successful laboratory personnel, and ultimately, a better laboratory service for the community.

## REFERENCES

- Burnett L, McQueen MJ, Jonsson JJ, Torricelli F. IFCC position paper: report of the IFCC taskforce on ethics: introduction and framework. *Clin Chem Lab Med* 2007; 45(8): 1098-104.
- Wood J. The role, duties and responsibilities of technologists in the clinical laboratory. *Clinica Chimica Acta* 2002; 319(2): 127-32.
- Arora DR, Arora B. Ethics in laboratory medicine. *Indian J Med Microbiol* 2007; 25(3): 179-80.
- McQueen MJ. Ethics and laboratory medicine. *Clin Chem* 1990; 36(8 Pt 1): 1404-7.
- Wijeratne N, Benatar SR. Ethical issues in laboratory medicine. *J Clin Pathol* 2010; 63(2): 97-8.
- Carroll JC, Rideout AL, Wilson BJ. Genetic education for primary care providers: improving attitudes, knowledge, and confidence. *Can Fam Physician* 2009; 55(12): e92-9.
- Nyrhinen T, Hietala M, Puukka P, Leino-Kilpi H. Privacy and equality in diagnostic genetic testing. *Nursing Ethics* 2007; 14(3): 295-308.
- Hansson SO. The ethics of biobanks. *Camb Q Health Ethics* 2004; 13(4): 319-26.
- Weber LJ, Bissell MG. Reporting lab results directly to the patient. *Clin Leadersh Manag Rev* 2004; 18(5): 291-2.
- Nyrhinen T, Leino-Kilpi H. Ethics in the laboratory examination of patients. *J Med Ethics* 2000; 26(1): 54-60.
- Booth JM, Garrett JM. Instructors' practices in and attitudes toward teaching ethics in the genetics classroom. *Genetics*, 2004; 168(3): 1111-7.
- Bruns DE. Improving training in laboratory medicine. *Clinica Chimica Acta* 2008; 393(1): 3-4.
- Smith BR. Meeting the curriculum needs for different career paths in Laboratory Medicine. *Clinica Chimica Acta* 2008; 393(1): 5-8.
- Krawczyk RM. Teaching ethics: effect on moral development. *Nurs Ethics* 1997; 4(1): 57-65.
- Chowning JT, Griswold JC, Kovarik DN, Collins LJ. Fostering critical thinking, reasoning, and argumentation skills through bioethics education. *PLoS One* 2012; 7(5): e367-91.
- Desikan P, Chakrabarti A, Muthuswamy V. Ethical issues in microbiology. *Indian J Med Microbiol* 2011; 29(4): 327-30.
- Domen RE. Ethical and professional issues in pathology: a survey of current issues and educational efforts. *Hum Pathol* 2002; 33(8): 779-82.
- Jones NL. Problem-based learning for professionalism and scientific integrity training of biomedical graduate students: process evaluation. *J Med Ethics* 2010; 36(10): 620-6.
- Jones NL, Peiffer AM, Lambros A. Developing a problem-based learning (PBL) curriculum for professionalism and scientific integrity training for biomedical graduate students. *J Med Ethics* 2010; 36(10): 614-19.
- Kolarova TA, Denev ID. Integrating a bioethics course into undergraduate biology education. *Biotechnol Biotechnol Equip* 2012; 26(1): 280-10.
- Layman E. Ethics education: curricular considerations for the allied health disciplines. *J Allied Health* 1996; 25(2): 149-60.
- Reiser SJ, Heitman E. Creating a course on ethics in the biological sciences. *Acad Med* 1993; 68(12): 876-9.
- Stempsey WE. The virtuous pathologist. An ethical basis for laboratory medicine. *Am J Clin Pathol* 1989; 91(6): 730-8.
- Povar GJ. Ethics committees: is there a role for them in the laboratory? *Clin Lab Manag Rev* 1991; 5(4): 236-7.
- Leino-Kilpi H, Nyrhinen T, Katajisto J. Patients' rights in laboratory examinations: do they realize? *Nurs Ethics* 1997; 4(6): 451-64.