

Assessing Medical Student's Competency toward Post-Mortem in India - A Systematic Review

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ABSTRACT

BACKGROUND

Post-mortem examination which involves external examination as well as dissection of various body cavities is being conducted pan India as part of investigation process in cases of suspected deaths. The present systematic review was conducted to assess the knowledge and attitude of medical undergraduate students towards post-mortem as these traits will influence the quality of autopsy reports being prepared by them in their professional careers.

METHODS

We conducted the search, involving both electronic as well as manual scientific databases for our present study. Only articles in English were selected. Any disagreements were resolved through consensus.

RESULTS

Initial search yielded 163 articles out of which 13 were selected for the present study. More than 50 % of the studies discuss the reasons for not specializing in forensic medicine while 4 studies also discussed the suggestion for improvement of autopsy procedures. Most of the participants in the selected studies have reasonable knowledge regarding autopsy. In two studies, more than 50 % of the participants preferred virtual autopsy over traditional autopsy. 97.6 % of the participants of one study were of the opinion that autopsy should be scrapped from the medical curriculum. The analysis of the present review has shown that though the undergraduate medical students possess fair amount of knowledge regarding the post-mortem, they lack the skill and confidence in conducting the postmortem examination independently. It is necessary to expose the undergraduate medical students for more training of post-mortem examination and also to upgrade the mortuary so as to improve the autopsy procedure.

CONCLUSIONS

Autopsy training is an integral part of the forensic medicine curriculum and the same is appreciated by the undergraduate medical students. We recommended that enough exposure to autopsy should be provided along with providing proper emotional support. Most important is to upgrade the infrastructure of mortuary and motivation of doctors for conducting medico-legal autopsy.

KEYWORDS

Autopsy, Attitude, Knowledge, Medical Students, India

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BACKGROUND

Forensic medicine is an important subject in the medical curriculum as it teaches the doctor about the legal intricacies related to healthcare and also provide aid to law abiding agencies. Apart from dealing with medico-legal autopsies and forensic pathology, Forensic medicine also comprises of applied medical sciences and clinical forensic medicine dealing with conditions like domestic violence and rape.¹ Post-mortem examination which means examination of body after death is also taught in forensic medicine. Autopsy or postmortem examination can be either clinical autopsy which helps in reaching the diagnosis of the deceased or autopsy can be medico legal. Medico-legal postmortem is conducted to know the time since death and cause of death and sometimes to know the identity of the deceased along with many other medical science related opinions in relation to death.

Historically physicians like Osler and Virchow conducted autopsy to understand the pathology of certain diseases like pulmonary embolism and endocarditis.² Post mortem examination has always been central to medical education it helps the student to understand the gross anatomy, clinic-pathological correlations, death certification and death statistics.³ Autopsy rate has been declining worldwide,² possible reasons for the decline may be advancement in diagnostic techniques, inadequate training of the staff and reluctant relatives.⁴

In India, the quality of medico-legal work has been substandard⁵ as it is not surprising for a doctor to undergo training without observing autopsy⁶ as most of the private colleges and in Uttar Pradesh most of the government colleges too, don't have the authority or permission to undertake autopsies.⁷ In India, a medical graduate can conduct autopsy, so if he did not undergo proper training of postmortem then there is a possibility that the report prepared by such doctors might be incomplete as stated by various court orders/strictures, which has expressed concern over the poor quality of the autopsy report and the need of improving the same.^{8,9} Also, as the forensic medicine is taught in the second year and in third year part-1, the undergraduate students needed to refresh the subject on regular basis as they tend to forget theoretical aspects of the subject in due course of time.¹⁰

METHODS

The present systematic review was carried out in order to ascertain the knowledge, attitude, and perception of undergraduate medical students towards autopsy in India. Both electronic as well as manual search was carried out for the literature. Electronically, the relevant literature search was carried on PubMed, MEDLINE databases and manual search irrespective of date of publication using both medical subject heading (MeSH) terms like "Autopsy", "Students", "India" and keywords like knowledge, attitude, perception, post-mortem, undergraduate, India, medical curriculum. Different combinations of key words were made using "And" and "Or" as Boolean operators.

Inclusion Criteria

1. Published in English language.
2. Study conducted in India.
3. Observational cross-sectional studies.
4. Limited to undergraduate medical students.

Exclusion Criteria

1. Studies not conducted in India.
2. Studies on undergraduate students other than the students of MBBS.
3. Studies on post-graduate students.
4. Reviews

The present study was conducted according to the guidelines set forth by preferred reporting items for systematic reviews and without meta-analyses (PRISMA).¹¹

RESULTS

Study Selection

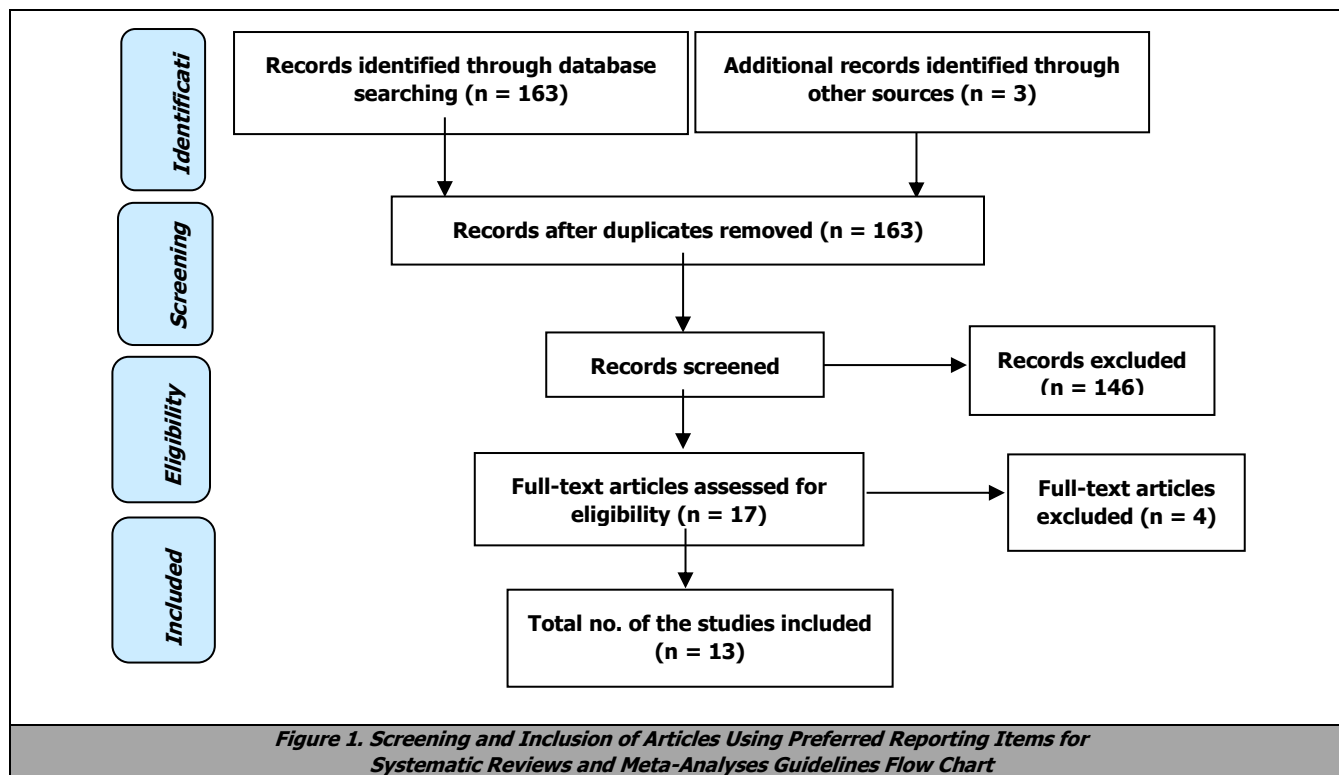
Initial search, after removal of duplicates, yielded 163 articles (Fig.1). 146 articles were excluded after screening of title and abstract. 4 articles out of the remaining 17 articles were excluded because either the article focused on superfluous topics or provided insufficient information to assess or repeated attempt to contact the author for additional information failed, resulting in 13 articles that were used for the analysis of the present study. All articles were cross-sectional studies where data was collected by using a self-administered questionnaire. Indian journal of forensic medicine and toxicology (n=3) is most common journal for publication while journal of indian academy of forensic medicine (n=2) is the second most common journal for publication on student competency towards autopsy in India. Summaries of the relevant articles are listed in Table 1.¹²⁻²⁴

Location and Year of Study

All the studies in the present review were conducted in the last decade, from 2013 to 2019. All the studies were conducted in the 9 states, two studies were conducted in the states of Gujarat, Haryana, Telangana, Uttar Pradesh respectively and one study in the states of Bihar, Karnataka, Kerala, Madhya Pradesh, and Maharashtra.

Analysis of the Included Studies

Most of the participants in almost all the studies were aware of the necessity of the autopsy in case of unnatural deaths. Preservation of viscera for either histo-pathological analysis or toxicological analysis or for both is required when the cause of death cannot be ascertained after autopsy. Except for the three studies, all of them had asked their participants regarding the utility of viscera preservation and majority of the participants responded positively regarding the knowledge of utility of viscera preservation.



On the first exposure to postmortem, not more than ¼th of the participants (10.6 %¹⁶ to 36.6 %¹²) were comfortable in most of the studies except in the study of Najan²³ in which 88.2 % of the participants were comfortable on their first exposure. According to study by Rautji²¹, 47.7 % of the participants were of the opinion that student should watch more post-mortem examination while in rest of the studies in which this question was asked, more than 50 % of the participants were of the opinion that students should watch more post-mortem. Also, when asked about whether student should actively participate in autopsy, except for the two studies conducted by Rao¹² and by Patel¹⁴ where only 14 % and 25.4 % of the participants respectively, more than 50 % in rest of the studies were of the opinion that students should actively participate in autopsy.

Out of the 8 studies which asked about whether conducting postmortem causes disfiguration of the body, opinion of the subjects were divided, where about ¼th of the participants of the four studies 27 %, ¹³ 24.9 %, ¹⁴ 26.2 %, ¹⁸ 22 %²⁰ respectively agreed for the same, in the remaining four studies more than 50 % of the participants 57 %, ¹² 62.9 %, ¹⁵ 80.8 %, ¹⁹ 56.8 %²³ respectively agreed that the post mortem causes disfiguration of the body.

Only 6 studies gathered opinion regarding the scrapping of autopsy from medical curriculum and barring one study¹³ where 97.6 % of the subjects agreed for the removal of autopsy, in rest of the study 74.6 %, ¹² 90.5 %, ¹⁹ 94 %, ²² 83.3 %, ²³ 93.5 %²⁴ of the participants respectively were of the opinion that autopsy should not be scrapped from the medical curriculum.

When asked about the suggestions regarding the improvement of autopsy procedure, majority of the subject of the 5 studies 68.3 %, ¹² 55.3 %, ¹³ 79.7 %, ¹⁷ 74.1 %, ²² 57.4 %²⁴ respectively, suggested that replacing the primitive

instrument with the modern instrument will help in improving the autopsy procedure. Also, most of the participants agreed that there is a need for the improvement of hygiene level of the mortuary.

Only 3 studies, conducted by Rao, Ahmad¹³ and Kumar¹⁷ gathered the information about the need of specific casualty posting in forensic medicine and 76.6 %, 84 % and 90.4 % of the participants respectively, were of the opinion of having specific casualty posting in forensic medicine.

Out of 13 studies considered for the study, 5 studies conducted by Patel¹⁴, MN¹⁵, Kumar¹⁷, Jadav¹⁸ and Chawla²⁰ collected the data for the main source of knowledge about autopsy, and the percentage of the participants that credited medical curriculum as the main source for their knowledge regarding autopsy were 94.9 %, 89.5 %, 95.7 %, 89 % and 83 % respectively. Also, in the study conducted by Patel¹⁴ and Kakkeri,¹⁹ 61.5 % and 92 % of the participants respectively, suggested replacing traditional autopsy with virtual autopsy.

Two studies which gathered information regarding capability of the students to conduct independently, the answer is contrasting that while in the study by Kakkeri,¹⁹ 60.9 % of the participants were confident in conducting the autopsy independently, only 2 % of the participants in the study of Chawla²⁰ feel the same regarding conducting the autopsy independently. Majority of the participants in most of the studies were not interested in specializing in forensic medicine and the reason given by them was that they are interested in some other specialties except in the two studies conducted by Bharathi¹⁶ and Bagga,²¹ where 68.3 % and 65 % of the participants respectively, were not interested in the forensic medicine because they do not want to go to the court for giving evidence.

Sl. No.	First Author	Title	Journal	Year of Publication	Study Population	Method of Data Collection	Study Design	Sample Size	Study Area	Remark
01	G Venkat Rao	Autopsy-Perception and Attitudes of Undergraduate Medical Students in South India: A Questionnaire Survey	International Archives of Integrated Medicine	2016	MBBS students	Self-administered questionnaire	Cross-sectional	300	Telangana	Most of the participants were familiar with autopsy procedure. Recommended mandatory casualty posting for the forensic medicine
02	Nihal Ahmad	Attitude and Knowledge of Practical Aspects of Forensic Medicine	Journal of Evidence Based Medicine and Healthcare	2015	MBBS students	Self-administered questionnaire	Cross-sectional	300	Kerala	Most of the students possess reasonable knowledge regarding autopsy. Recommended mandatory casualty posting for the forensic medicine
03	Reekee Patel	Forensic Autopsies: Form the Point of View of Medical Students in Bhuj, Gujarat	Medico-legal Update	2016	MBBS students	Self-administered questionnaire	Cross-sectional	374	Gujarat	Majority of the students are reluctant in respect to actively participate in autopsy. Suggestion for improving autopsy procedure not discussed.
04	Madhu Sudhan S	Current status of Knowledge, Attitude and Awareness of Medical Students on Forensic Autopsy in Tumkur district of Karnataka	Indian Journal of Forensic Medicine and Toxicology	2019	MBBS students	Self-administered questionnaire	Cross-sectional	210	Karnataka	Propounded the revision of forensic curriculum and to provide emotional support to the students with respect to autopsy
05	Murugesha Bharathi	Current status of Perceptions towards Autopsy & Post mortem Examination among Medical Undergraduate Students	Online International Journal of Medical and Social sciences	2015	MBBS students	Self-administered questionnaire	Cross-sectional	354	Haryana	Most of the participants were familiar with the subject but lack the skill to conduct autopsy. More training was suggested.
06	Aman Kumar	Attitude of Undergraduate Medical Students towards Medico-legal Autopsies at I.G.I.M.S, Patna, Bihar	International Journal of Medical Research Professionals	2018	MBBS students	Self-administered questionnaire	Cross-sectional	94	Bihar	Majority of the participants were aware about the necessity of autopsy. They recommended specific casualty posting of forensic medicine.
07	Jadeep.C Jadav	Knowledge and Attitude of Medical Students on forensic Autopsy in Ahmedabad City	Journal of Indian Academy of Forensic Medicine	2013	MBBS students	Self-administered questionnaire	Cross-sectional	200	Gujarat	Most of the student possess reasonable knowledge regarding autopsy procedure. Suggested emotional aspect of student should be considered prior to autopsy
08	Shamshudd in R Kakkeri	Knowledge and Attitude of Medical Students toward Medico-legal Autopsy	International Journal of Forensic Medicine and Toxicological sciences	2018	MBBS students	Self-administered questionnaire	Cross-sectional	115	Telangana	Majority of the participants agreed that students should watch more autopsy. Improving the hygiene level of the mortuary was recommended
09	Hitesh Chawla	A Study Evaluating Effectual of Knowledge, Attitude and Perception of Undergraduate Medical Students towards Medico-legal Autopsy	Indian journal of Forensic and Community Medicine	2019	MBBS students	Self-administered questionnaire	Cross-sectional	249	Haryana	Most of the participants were aware about the autopsy procedure but not confident to perform independently. Suggested problem-based learning as part of medical curriculum.
10	Inderjit Singh Bagga	Knowledge towards Post-mortem Examination and Reasons for not Specializing in Morbid Anatomy: A study among Medical Undergraduate Students	International Journal of Research in Medical Sciences	2016	MBBS Students	Self-administered questionnaire	Cross-sectional	90	Uttar Pradesh	Most of the subjects were familiar with the procedure of autopsy. More hands-on training of the students in the autopsy was suggested.
11	Ravi Rautji	Attitudes of Medical Students towards Medico-legal/Clinical Autopsy	Journal of Indian Academy of Forensic Medicine	2013	MBBS Students	Self-administered questionnaire	Cross-sectional	300	Maharashtra	Majority of the participants were aware about the rules and regulations of autopsy. Suggested improving the infrastructure of mortuary and training of staff.
12	Ashok B Najan	Knowledge and Attitude of Medical Students Towards Medico-Legal Postmortems at NSCB Medical College, Jabalpur, MP	Indian Journal of Forensic Medicine and Toxicology	2016	MBBS students	Self-administered questionnaire	Cross-sectional	204	Madhya Pradesh	Most of the participants were aware about the necessity of autopsy. More training in forensic medicine was recommended.
13	Anju Singh	Awareness of Medical Students Towards Medico-legal Autopsy in Barabanki, UP	Indian Journal of Forensic Medicine and Toxicology		MBBS students	Self-administered questionnaire	Cross-sectional	216	Uttar Pradesh	Suggested more training of medical students in autopsy. Training of faculty about various pedagogical strategies was also recommended.

Table 1. Summary of the Selected Studies in the Review Pertaining to Competency of Medical Students Towards Postmortem in India

DISCUSSION

As forensic medicine has become essential part of medical curriculum, so teaching them is mandatory at medical

college,²⁵ and thus teaching it effectively to the MBBS students will improve their knowledge and attitudes toward forensic medicine.²⁶ The focus of this systematic review is to assess the knowledge, attitude, and awareness of an

undergraduate medical students toward autopsy in India. All the studies in the review used self-administered questionnaire for gathering relevant information from the subjects regarding medico-legal autopsies in India. All the studies in consideration used only close-ended questionnaire in their studies which reduces the recall bias and is also easier to compare and analyze the data but the disadvantage of closed ended question is that it did not give proper insight of the participants.

As evident from the result that, in most of the studies only about one-fourth of the subjects were comfortable on their first exposure to autopsy except for one study.²³ Though no study in the present review asked their participants specifically what they felt after the exposure to autopsy. It has been reported by some authors that the feeling can be from nausea, anxiety to having nightmares^{27,28} and post-traumatic stress^{29,30} as postmortem is considered by many as strong emotional event for the undergraduate students. These traumatic experiences can be minimized by doing proper psychological counselling of the students.³¹

It can be seen from the result that, most of the subjects were of the opinion that students should watch more autopsies which is consistent with those of other studies.^{31,32} But, in the present review, 8 out of 13 studies¹⁴⁻²¹ had not asked their participants about the number of autopsies they have witnessed and in the remaining 5 studies,^{12,13,22-24} they had just mentioned that their participants have witnessed minimum 10 autopsies each.

According to the previous medical curriculum, all the undergraduates were required to watch at least 10 autopsies. As per the current NMC based guidelines, undergraduate students are required to conduct and prepare post-mortem examination report of at least 15 autopsies in a simulated/ supervised environment.³³

Medical curriculum was cited as the main source of knowledge, regarding the postmortem examination, by majority of the subject in the studies in which question regarding the same was asked.^{14,15,17,18,20} which is in contrast to the study conducted by Madadin³⁴ in which 73.4 % of the participants credited TV and media as their main source of information.

When asked about the specialization in forensic medicine, most of the participants were not interested in considering forensic medicine as future career which compares favorably with the study of Ekanem³² and of Papadodima³⁵ but in contrast to the study conducted by Madadin³⁴ in which 80.4 % of the participants wanted to pursue forensic medicine as future career.

CONCLUSIONS

The medical curriculum of undergraduate pertaining to autopsy has significant educational benefit because students can learn about anatomy, pathology and correlate pathological findings with clinical presentations. The analysis of present review revealed that though the undergraduate students have knowledge and awareness of the subject, they do not have the confidence of performing the autopsy

independently. Most of the students were uncomfortable during their first experience of autopsy. On the basis of present study, the authors recommend the following points:

- Prepare the student emotionally prior to their first exposure to autopsy and discuss their experience afterwards and should be counselled on the regular basis.
- Upgrade the infrastructure and hygiene level of mortuary so as to increase the interest of the students in autopsy.
- The students should be provided enough opportunities to attend autopsy so that they can be confident to perform the autopsy independently.
- We recommend further similar studies mentioning the number of autopsies watched by the students and in different part of the country in order to accumulate more valuable data.

Limitations

There are certain limitations in the present study that should be considered. First of all, the search strategy including the choice of MeSh terms and keywords might not have covered all the relevant published article related to present study. Also, as the present study is not funded, so although some article which passed the inclusion criteria could not be included as they were available only on payment and repeated request for the waiver of the same to the author/journal availed no response. Only those aspects were compared and discussed in the present review regarding autopsy that were common in all of the studies as to discuss the different features of each and every study is insuperable and beyond the scope of present study.

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