

Questionnaire based survey on creating awareness among I MBBS Students on practice of hygiene and risk of infections in dissection theatre

Nimisha Sinha¹, Vidya CS^{2*}, Shreya Singh³

¹I Year MBBS Student, JSS Medical College and Hospital, JSS Academy of Higher Education & Research Mysuru-15, Karnataka, India

²Professor, Department of Anatomy, JSS Medical College and Hospital, JSS Academy of Higher Education & Research, Mysuru-15, Karnataka, India

³I Year MBBS Student, Maulana Azad Medical College, New Delhi, India

Received: 02-03-2021 / Revised: 20-03-2021 / Accepted: 30-04-2021

Abstract

Introduction: The cadavers have to be preserved in embalming fluid which is a combination of chemicals that include fixatives, preservatives, germicides, buffers, wetting agents, anticoagulants, dyes, and perfuming agents. In the dissection hall, the technicians, teachers and especially the medical students are exposed to formaldehyde and are more susceptible to upper respiratory infections due to improper hygienic practice. The study aims to know the perception of medical students regarding importance of hygiene in Dissection Hall and to know if medical students are aware that they are at probable risk of infections while working in the Dissection Hall. **Method:** Validated questionnaire with 30 items was prepared on practice of hygiene and risk of infections in dissection theatre. The validated questionnaire was generated in google forms and the link was shared via WhatsApp with I MBBS students of JSS Medical College and 44 other colleges across India. The responses were subjected to statistical analysis, and the results were interpreted. **Results:** A total of 578 students participated in the survey voluntarily and the responses were downloaded and the outcome was expressed in percentage. 83.6 % of the subjects had prior information regarding hygiene guidelines before their first dissection and 88.2 % were not aware about the WHO stipulation on minimum exposure of non occupational formalin. Details regarding responses to all items have been discussed in the content of the manuscript. **Conclusion:** The harmful effects of formalin can be reduced by using hand gloves and masks while doing dissection of cadavers. We are all aware on the kind of havoc the current Covid pandemic has created and it has almost overturned the existing systems. The present survey was undertaken with the aim of imparting knowledge on safe hygienic practices in dissection theatre.

Keywords: Dissection hall, hygiene, cadavers, I MBBS students

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Cadavers are considered as first teachers in Medical College, Anatomy teaching and learning is primarily based on cadaveric dissection[1]. Dissection facilitate students for understanding anatomical structures three dimensionally which is most essential for skill development. I year MBBS students experience few difficulties during cadaver dissection as they are exposed for the first time. Formalin, a commercial source of formaldehyde is the most commonly used embalming fluid and used for preservation of cadavers. The students are exposed to formalin in dissection hall for 10 - 12 hours per week on average. Students, instructors and lab attendants who come in close proximity to the cadaver in the dissection hall makes them more susceptible to acquiring infections. The continuous exposure to formalin has proved to have toxic effect and most of the students do complain of irritant symptoms like watery eyes, irritation of nose, redness of eyes, headache and other symptoms[2]. Studies have been reported that cadaver may house pathogens leading to diseases like TB, Hepatitis B and transmissible spongiform encephalopathies. Furthermore, cut wounds during dissection can lead to diseases like tetanus and HIV[3]. Alt Epping et al reported in their study that 89.1 % of the participants experienced uneasiness and 61.7 % felt some kind of apprehension towards

cadaveric dissection[4]. Amaza Sambo D et al reported that 88 % of the students believed that infections are carried by cadavers[5].

Furthermore, the potential hazard of infections from cadavers was reinstated in previous studies, wherein it was concluded that diseases like Tuberculosis, Hepatitis B and C and transmissible spongiform encephalopathies like Creutzfeldt Jakob Disease can be spread through negligent handling of cadavers and improper hygienic practices[6]. Since the previous studies speculate that cadavers are a potential source of infection, the present survey aims to ascertain if medical students follow the prescribed WHO guidelines regarding hand hygiene and to determine if certain lapses in following hygiene guidelines by medical students like improper disinfection of their hands and dissection instruments, improper disposal of unnecessary dissection remnants and careless handling of personal belongings like phone and books inside the dissection hall make them more susceptible to infections. Hence we made an attempt to know the practice of hygiene among I MBBS students in dissection theatre and in future to create awareness about risk of infections.

Material and method

After obtaining ethical clearance from Institution Ethical Committee and voluntary consent of participants, cross - sectional questionnaire - based study was conducted in Department of Anatomy, JSS Medical College, Mysuru between June 2020 to August 2020. The total students recruited at JSS Medical College was 200 and remaining 310 students from other Medical Colleges was included. The questionnaire was shared to students of other Colleges who were aware of hygiene practices in dissection theatre. Prior consent from Head of Department and Institution was obtained to include the

*Correspondence

Dr. Vidya CS

Professor, Department of Anatomy, JSS Medical College and Hospital, JSS Academy of Higher Education & Research, Mysuru-15, Karnataka, India

E-mail: vidyacs@jssuni.edu.in

students from other Colleges for survey. After omission of repeated responses, sample size was 578 which was sufficient enough for interpretation of results. The subjects were asked to fill questionnaire validated by subject expert on 29 items by using google forms. The questions were based on their everyday practice of hygiene and sanitization in dissection hall. Care was taken to maintain the

confidentiality of the participants. The responses were downloaded to MS Excel

Statistical Analysis

All the responses were subjected to statistical analysis, and the results were interpreted. Frequency of responses was expressed in percentage.

Table 1: Showing responses for questionnaire on hygienic practices in dissection hall

S.No.	Items	Responses in percentage
1	Prior to your first dissection, were you informed about hygiene guidelines and the possibility of contracting infections in dissection hall?	Yes-83.5% No-16.5%
2	Do you ever hold dissection specimens/ touch the cadaver with bare hands?	Yes, always-31.9% Yes, frequently -15.9% Yes, occasionally-29.6% No, never-22.5%
3	How do you dissect?	With bare hands-39.4% Wearing gloves in one hand-5.4% Wearing gloves in both hands-55.2%
4	How often do you sanitize your hands in the dissection hall?	Only before dissection-0.1% Only after dissection-77.5% /Both before and after dissection-22.4%
5	How do you sanitize yourself?	Rely on the institution's facilities-45% Carry your own sanitizer/ disinfectant-55%
6	Do you follow the prescribed guidelines for hygiene without any lapses?	Yes, always-39.2% Yes, frequently-40% Yes, occasionally-17.3% No, never-3.5%
7	Is there a facility to keep your personal belongings (books, bags, etc.) outside dissection hall?	Yes-82% No-18%
8	If/ when you take your phone inside dissection hall, do you sanitize it later?	Yes, always-17.2% Yes, frequently-8.8% Yes, occasionally-16.3% No, never-57.7%
9	Do you ever touch your books/ stationery straight after dissection without first sanitizing your hands?	Yes, always-6.2% Yes, frequently-10.9% Yes, occasionally-28.1% No, never-54.8%
10	Do you wear the same lab coat that you wear inside dissection hall in places like canteen/ mess/ outside campus?	Yes, always-48.7% Yes, frequently-14. %7 Yes, occasionally-17.5% No, never-19.1%
11	Do you eat/ drink inside dissection hall?	Yes, always-16.8% Yes, frequently-22.8% Yes, occasionally-21.4% No, never-40%
12	While dissecting, if you sneeze/ cough/ wipe your tears (due to irritation), do you disinfect your hands before continuing again?	Yes, always-25.5% Yes, frequently-18.5% Yes, occasionally-20.5% No, never-35.5%
13	Do instructors and lab attendants adhere to basic hygiene guidelines?	Yes, always-92% Yes, frequently-2% Yes, occasionally-3% No, never-3%
14	How often do you sterilize your dissection instruments?	Yes, always-91.5% Yes, frequently-1.6% Yes, occasionally-5% No, never-2.9%
15	Do the attenders dispose tissue remnants, cutting debris, disposable plastic sheet, cotton and gloves in a container marked as infectious hospital waste?	Yes, always-89% Yes, frequently-5% Yes, occasionally-4% No, never-2%

16	Do you regularly replace rusted/ broken dissection instruments?	Yes, always-48.2% Yes, frequently-23.4% Yes, occasionally-18% No, never-10.4%
17	Have you been vaccinated against tetanus and hepatitis B?	Yes-69.4% No-30.6%
18	Have you suffered from any injury / cut wounds during dissection?	Yes-45% No-53% Don't remember-2%
19	When you got injured, did you immediately inform the staff?	Yes-74% No-23% Don't remember-2% Not applicable-1%
20	Are you aware that WHO has stipulated maximum non-occupational exposure to formalin at 0.1ppm (0.1 mg per cubic metre) should not exceed for more than 30 minutes?	Yes-88.2% No-11.8%
21	Have you ever seen / come in contact with exudes like formalin/dyes/ bodily fluids/ fecal leakage from the cadaver?	Yes-78.7% No-21.3%
22	Are you aware that the cadaver can be a potential source of diseases like Gertsman Straussler Scheinker syndrome, tuberculosis, hepatitis, Creutzfeldt Jakob disease?	Yes-59.5% No-40.5%
23	Are you aware that vectors like body lice, ticks, fleas, maggots can reside on the cadaver and transmit diseases like typhus, fungal infections, etc.?	Yes-64% No-36%
24	Do you think that cadaveric dissection should be supplemented with plastination models, prosected specimens, virtual dissection and medical imaging to alleviate the risk of infections?	Yes-40% No-60%
25	Do you personally perceive the cadaver as a source of discomfort/infection?	Yes, always-57.8% Yes, frequently-22% Yes, occasionally-12% No, never-5.2%
26	Are you apprehensive in handling the cadaver?	Yes, always-71.6% Yes, frequently-24.8% Yes, occasionally-3.2% No, never-0.4%
27	If provided with the choice, would you lessen your voluntary participation in dissection?	Yes-66% No-34%
28	Does your dissection hall have adequate facilities for ventilation, drainage, sanitization, running water and lighting?	Yes-82% No-18%
29	What according to you is a practical solution to enhance hygiene levels and reduce the risk of infections in dissection hall?	Answer

Results

In the present survey 578 participants (278 Males and 300 females) from 44 Medical Colleges across India responded to all 29 items of the questionnaire. We observed that 83.6 % of the subjects had prior information regarding hygiene guidelines before their first dissection but only 39.1 % followed them without any lapses. It should be noted that only 17.1 % sanitized their phones after using it inside dissection hall; 45.3 % touched their books after dissection without sanitizing themselves first. 16.8 % accepted eating / drinking inside dissection hall. 88.2 % were not aware about the WHO stipulation which mandates non occupational formalin exposure to be at 0.1ppm for less than 30 minutes. 59.5 % were not aware that cadavers are a potential source of fungal infections, typhus, tuberculosis, hepatitis. 78.7 % came in contact with the exudes from the cadaver. It should be noted that 57.8 % view the cadaver as a source of discomfort, 71.6 % feel apprehensive in handling it. Also, 40 % feel dissection should be supplemented with plastination models, prosected specimens, medical imaging and virtual dissection.

Discussion

In the present study, 22.3 % of the participants sanitize their hands both before and after dissection. 77.3 % hold dissection specimens with bare hands. 57.8 % don't disinfect their phone and 45.3 % touch their books without sanitizing their hands after dissection. Getachew D and Cahill K reported that participants complained of irritation of

eyes, nausea and fear of infection, throughout the duration of the study[7,8]. Naz S et al reported that 16.2 % of students faced difficulty in breathing after cadaver dissection[9]. The present study showed that 78.7 % participants came in contact with exudes from the cadaver and 66.8 % experienced hypersensitivity because of it. 57.8 % view cadaveric dissection as a source of discomfort and 71.6 % were apprehensive in handling it.

Student's perception on emotional, physical and psychological stress in cadaver dissection was analyzed and reported that 8.1 % of them complaining of nausea and dizziness[10]. Sarah Collins reported that tetanus occurred in susceptible individuals who were unimmunized or partially immunized and proper prophylaxis is a tangible preventive measure against Hepatitis and HIV[11,12]. Other Researchers have reported Hepatitis B and Creutzfeldt Jakob Disease and M. tuberculosis organisms can spread through negligent handling of cadavers[13]. The present study showed that 51.8 % didn't replace broken or rusted instruments, 25.9 % suffered from injuries during dissection and 30.6 % were not vaccinated against tetanus and Hepatitis B.

In previous studies majority of the participants viewed dissection as the most effective tool in learning anatomy[14] but in the present study 40 % participants responded cadaveric dissection is indispensable part of medical science but it should be supplemented with virtual dissection, medical imaging, plastination models and

prosected specimens. In the present study 94 % of students opined that sanitizing hands before and after dissection, wearing masks and gloves while dissecting and cleaning the instruments thoroughly after dissection could minimize the risk of infections. As dissection cannot be replaced by virtual dissection or by prosected specimens in medical curriculum students and educators should make use of cadavers without being affected to physical and mental health. For the students, the way forward is to change their attitudes as well. They should make a wise choice in using the available resources towards becoming a true professional and competent doctor for the society.

Close proximity of the students, instructors and lab attendants to the cadaver in the dissection hall makes them more susceptible to acquiring infections. This risk may further be aggravated if proper sanitation is not maintained. Thus, being aware of the risk of infections, hygiene practices have assumed immense importance for Medical students in dissection theatre. Adequate ventilation and safety measures in cadaver preservation should be followed in all medical colleges. Proper disposal of biomedical waste within labeled plastic bags. Laboratory aprons and gloves should be advised for the students to minimize direct contact with cadaver. Usage of mobile phones and other personal accessories should be avoided by students during dissection classes. Proper washing areas with disinfectant soaps should be made available to students within the dissection hall. Formalin tanks should be regularly cleaned and surface washing of cadavers should be done frequently. Excess formalin spillage within the dissection hall should be avoided and if possible the excess fluid should be immediately drained. Students who are suffering from allergic rhinitis and asthma should wear protective masks to reduce formalin exposure. They should be advised to dissect no longer than one hour and take adequate break during the dissection classes. Very important is that embalming should be done by trained and skilled attenders. Embalming should be done in a separate embalming room with adequate ventilation[15]. Our study is not exhaustive because any change in opinion regarding this topic and modification in Institution's facilities subsequent to completion of this study might not be reflected in the results.

Conclusion

Cadaveric dissection in Anatomy is an indispensable part of MBBS course and is the fundamental basis of learning structures in detail. Basics of sanitation like simple hand washing, wearing gloves and sterilization of instruments should be followed by each and every student in warding off infections and to prevent irritating effects of formalin. Through this survey the students are made more conscious about adequate hygiene practices which is in need of the present times. Thus the present survey will be useful in preventing the spread of infections when medical students are learning in dissection theatre. Educators are recommended to adequately counsel students before the commencement of the dissection classes for an exciting and risk free anatomy learning through dissection.

Conflict of Interest: Nil

Source of support: Nil

Acknowledgement

Principal H Basavanagowdappa, Head of Institution, JSS Medical College and JSS AHER for their valuable support to conduct the study. We sincerely thank all students for actively participating in questionnaire survey.

References

1. Shaikh ST. Cadaver Dissection in Anatomy: The ethical aspect. *Anat Physiol.* 2015; 5: 007.
2. Dinsmore CE, Daugherty S, Zeitz HJ. Student responses to the gross anatomy laboratory in a medical curriculum. *Clinical Anatomy.* 2001; 14(3): 231-236.
3. Burton JL. Health and safety at Necropsy. *J Clin Pathol.* 2003; 56(4): 254-260.
4. Alt-Epping B, Lohse C, Viebahn C, Steinbüchel N V, Benze G, Nauck F. On death and dying – an exploratory and evaluative study of a reflective, interdisciplinary course element in undergraduate anatomy teaching. *BMC Medical Education.* 2014; 14(15):2-7.
5. Bari Bernard EE, Sambo Amaza D, Julius Akomaye A, Onwih Etim E fiong. Knowledge, Attitude and Practice of Nigerian Preclinical Students to Cadaver Dissection. *Journal of medical and dental sciences.* 2012; 2:33-36.
6. Sterling TR, Pope DS, Bishai WR, Harrington S, Gershon RR, Chaisson RE. Transmission of Mycobacterium tuberculosis from a Cadaver to an Embalmer. *N Engl J Med.* 2000; 342:246-248.
7. Getachew D. Reaction of medical students to experiences in dissection room. *Ethiop J Health Sci* 2014;24(4): 337–342.
8. Cahill K C, Ettarh R R. Attitudes to Anatomy Dissection in an Irish Medical School. *Clin Anat* 2009;22:386–391.
9. Naz S, Nazir G, Iram S, Mohammad M, Umair, Qari IH, et al. Perceptions of cadaveric dissection in anatomy teaching. *J Ayub Med Coll Abbottabad.* 2011;23(3):145-8.
10. Nirmalya Saha, Susmita Chaudhuri, Moirangthem Matum Singh. Attitude of First Year Medical Students in Dissection Hall. *Journal of Dental and Medical Sciences* 2015; 14(5): 2-5.
11. Sarah Collins, Joanne White, Mary Ramsay, Gayatri Amirthalingam, The importance of tetanus risk assessment during wound management. *Science Direct* 2014; 2(1):3-5.
12. Marino, Cristiane and El-Far, Fabiane and Wey, Sergio and Medeiros, Eduardo. Cut and puncture accidents involving health care workers exposed to biological materials. *Braz J Infect Dis.* 2001;5:235-242.
13. Hoffman PN, Healing TD. Guide to infection control in the hospital. *The Infection Hazard Of Human Cadavers.* International society of infectious diseases. 2018;1-15.
14. Vinay Kumar V, Martin Lucas A, Vishal Kumar, Pradeep Kulal. Attitude of first year Indian Medical students towards cadaver dissection. *Int J Anat Res.* 2015; 3(3):1255-58.
15. Surajit Kundu, Pooja Gangrade. Study of the toxic effects of formaldehyde vapours within the dissection hall on the first year Indian medical students. *Int J Anat Res.* 2015;3(2):1179-90.