Journal of Chemical Health Risks

www.jchr.org

JCHR (2026) 16(2), 2697-2704 | ISSN:2251-6727

Toxic Effects of Formaldehyde Exposure Among Undergraduate Students – A Questionnaire Based Cross-Sectional Study

Dr Megadhaarani S. P.[1*], Dr Sheetal V. Pattanshetti[2]

[1]Postgraduate, Department of Anatomy, Jawaharlal Nehru Medical College, KAHER, Belagavi, Karnataka, India (Corresponding author)

[2]Professor and HOD, Department of Anatomy, Jawaharlal Nehru Medical College, KAHER, Belagavi, Karnataka, India

(Received: 16 February 2026 Revised: 25 March 2026 Accepted: 05 April 2026)

KEYWORDS:

Formaldehyde exposure, Cadaver dissection, Medical students, Acute symptoms, Toxicity grading, Occupational health

ABSTRACT:

Introduction: Formaldehyde, a widely used chemical in cadaver preservation for anatomy education, poses significant health risks to students and staff due to its toxic and irritant properties upon exposure during dissection sessions. The main aim is to assess the acute symptoms associated with formaldehyde exposure among undergraduate students and to evaluate the severity of these symptoms based on standardized toxicity grading.

Methods: A descriptive cross-sectional study was conducted among first-year MBBS and BDS students at Jawaharlal Nehru Medical College, Belagavi. Data were collected using a structured Google Form questionnaire assessing symptom severity on a 4-point grading scale.

Results: The study involved 300 undergraduate students with a mean age of 19.4 years, the majority being female [60.0%]. Around 14.7% of participants reported having pre-existing respiratory conditions. Among the symptoms reported following formaldehyde exposure during cadaver dissection, the most common was the perception of an unpleasant smell, which 46.0% rated as moderate and 7.0% as severe. Eye-related symptoms were also prevalent, with burning sensation [37.7% moderate, 14.3% severe], excessive lacrimation, redness, and itching frequently noted. Respiratory symptoms such as nasal irritation and difficulty in breathing were observed in up to 25.3% and 12.3% respectively, while dryness of the mouth and throat affected more than 10% of participants. Neurological complaints including headache, nausea, and dizziness were reported by a notable proportion, whereas skin symptoms such as itching of hands and rashes were generally mild or absent. Only a small number of students experienced systemic symptoms like respiratory [4.3%], gastrointestinal disturbances [4.7%], or fainting episodes [5.0%].

Conclusion: A significant proportion of students experienced acute symptoms due to formaldehyde exposure during cadaver dissection. These findings underscore the need for improved safety measures and consideration of less toxic alternatives in anatomy laboratories.

Introduction

Formalin, a chemical compound comprising 37% to 50% aqueous solution of formaldehyde [CH_2O], is formulated as $CH_2[OH]_2$ and $HO[CH_2O]_n.H$. It is widely used in medical institutions as a tissue fixative, disinfectant, and embalming agent due to its potent preservative and antimicrobial properties.[1] In anatomical sciences, formalin plays a critical role in cadaver preservation, with embalming fluid typically infused into major arteries such as the femoral or internal carotid arteries to prevent tissue putrefaction, maintain structural relationships, and ensure hygienic handling of the specimens.[2] Cadaver dissection is a cornerstone of anatomical education and forms the foundation for clinical training by allowing students to explore the intricacies of the human body through direct visualization and tactile engagement.[3]

However, despite its educational significance, formaldehyde exposure poses notable occupational health risks, especially to first-year medical and dental students, as well as anatomy faculty and support staff. The evaporation of formaldehyde vapors from embalmed cadavers during dissection classes can result in acute and chronic health issues. These include mucosal and respiratory tract irritation, dermatological reactions, neurological symptoms, and possible systemic effects.[4-6] Routes of exposure are diverse—primarily through inhalation, but also via direct skin contact, accidental eye splashes, or even rare cases of ingestion, particularly in poorly ventilated environments.[7]

Journal of Chemical Health Risks

www.jchr.org

JCHR (2026) 16(2), 2697-2704 | ISSN:2251-6727

Several studies have documented the health implications of formaldehyde exposure. Akbar-Khanzadeh et al. [1994] reported that 88% of gross anatomy laboratory workers experienced eye irritation, and 74% reported nasal discomfort.[1] Yadav et al. [2023] similarly observed that more than half of their study population suffered from eye-related symptoms during dissection sessions.[8] These symptoms can impact concentration, academic performance, and overall student well-being. Formaldehyde has also been classified as a human carcinogen by the International Agency for Research on Cancer [IARC], further heightening concerns about its long-term use in educational environments.[9] Efforts have been made to reduce exposure through improved ventilation, protective measures, and reduced contact time; however, these are often inconsistently implemented across institutions. Alternatives such as phenoxyethanol, glutaraldehyde, and Thiel's embalming method have shown promise in offering similar preservation efficacy with significantly lower toxicity.[10] Moreover, modern advancements in digital cadaveric simulations have emerged as effective supplemental teaching tools that eliminate chemical exposure altogether.[11]

Given the increasing awareness of health hazards linked to formaldehyde, it becomes imperative to understand the nature and extent of symptoms experienced by students during dissection. Against this background, the present study aimed to assess the symptoms associated with formaldehyde exposure among undergraduate students and to evaluate the severity of these symptoms based on standardized gradings in order to determine the level of toxicity.

Materials and Methods

This was a single center, descriptive cross-sectional study conducted among first year MBBS and BDS students in the Department of Anatomy, Jawaharlal Nehru Medical College [KLE Academy of Higher Education and Research [KAHER]], Belagavi, Karnataka over a period of three months between April and June 2025. The study was approved by the Institutional Human Ethics Committee [IHEC] with reference number 306 dated 28.08.2025.

The first year MBBS and BDS students exposed to formaldehyde during gross anatomy [cadaveric] dissection were included in the study using nonprobability sampling technique – complete/universal sampling. Data collection was carried out using a structured digital questionnaire developed through Google Forms which also had consent . Prior to participation, all students were informed about the objectives and procedures of the study through an introductory section in the Google Form. This section included details regarding the purpose of the research, the voluntary nature of participation, assurance of anonymity, and the right to withdraw at any time without any penalty. A consent checkbox was provided at the beginning of the form, and students were required to indicate their consent before proceeding to answer the questionnaire. Only those who provided consent were allowed to complete the form. The questionnaire comprised 20 items designed to capture a range of symptoms commonly associated with formaldehyde exposure. Each symptom was evaluated on a four-point ordinal scale ranging from 0 to 3, where 0 indicated 'not recognizable,' 1 denoted 'barely recognizable,' 2 corresponded to 'moderate,' and 3 indicated 'severe' symptom severity. This gradation allowed for the assessment of both the presence and intensity of symptoms among participants.

Statistical analysis: All data collected through the Google Form were compiled in Microsoft Excel and subsequently analyzed using IBM SPSS Statistics for Windows, Version 27.0 [IBM Corp., Armonk, NY, USA]. Descriptive statistics were used to summarize participant characteristics and symptom profiles. Continuous variables, such as age, were presented as mean ± standard deviation [SD], while categorical variables, including gender, presence of underlying respiratory conditions, and severity of symptoms [graded 0 to 3], were expressed as frequencies and percentages.

Results

The study included participants with a mean age of 19.4 years and a standard deviation of 1.1 years, ranging from 18 to 26 years. The majority of the participants were female, accounting for 60.0% of the total study population. Additionally, 14.7% of the participants [n = 44] reported having pre-existing conditions such as known allergies, asthma, or other respiratory illnesses.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2026) 16(2), 2697-2704 | ISSN:2251-6727

Table 1: Distribution of Symptom Severity Grades among Participants Exposed to Formaldehyde

Symptoms	Grade 0	Grade 1	Grade 2	Grade 3
	n [%]	n [%]	n [%]	n [%]
Unfavorable smell	86 [28.7]	55 [18.3]	138 [46.0]	21 [7.0]
Burning of eyes	79 [26.3]	65 [21.7]	113 [37.7]	43 [14.3]
Excessive lacrimation	96 [32.0]	85 [28.3]	94 [31.3]	25 [8.3]
Redness of eyes	150 [50.0]	93 [31.0]	45 [15.0]	12 [4.0]
Itching of eyes	130 [43.3]	98 [32.7]	60 [20.0]	12 [4.0]
Blurring of vision	172 [57.3]	86 [28.7]	36 [12.0]	6 [2.0]
Difficulty in breathing	182 [60.7]	78 [26.0]	37 [12.3]	3 [1.0]
Nasal irritation	116 [38.7]	85 [28.3]	76 [25.3]	23 [7.7]
Running nose | Sore nose	148 [49.3]	83 [27.7]	49 [16.3]	20 [6.7]
Dryness of mouth	187 [62.3]	73 [24.3]	32 [10.7]	8 [2.7]
Dryness of throat	184 [61.3]	77 [25.7]	32 [10.7]	7 [2.3]
Cough	173 [57.7]	87 [29.0]	31 [10.3]	9 [3.0]
Headache	125 [41.7]	103 [34.3]	54 [18.0]	18 [6.0]
Nausea	160 [53.3]	75 [25.0]	54 [18.0]	11 [3.7]
Itching of hands	211 [70.3]	70 [23.3]	13 [4.3]	6 [2.0]
Rashes | Blisters	229 [76.3]	56 [18.7]	10 [3.3]	5 [1.7]
Dizziness	212 [70.7]	56 [18.7]	24 [8.0]	8 [2.7]
Grade 0, Not recognizable; Grade 1, Barely recognizable; Grade 2, Moderate; Grade 3, Severe				

The symptom-wise distribution of severity grades among participants showed that the most frequently reported symptom was an unfavorable smell, with 46.0% rating it as moderate and 7.0% as severe. Burning of the eyes was reported as moderate in 37.7% and severe in 14.3% of students, while excessive lacrimation was also common, affecting 31.3% moderately and 8.3% severely. Eye-related symptoms such as redness [15.0% moderate, 4.0% severe], itching [20.0% moderate, 4.0% severe], and blurring of vision [12.0% moderate, 2.0% severe] were noted, although many rated these as barely or not recognizable. Respiratory symptoms including nasal irritation [25.3% moderate, 7.7% severe], running or sore nose [16.3% moderate, 6.7% severe], and difficulty in breathing [12.3% moderate, 1.0% severe] were also observed. Dryness of the mouth and throat affected over 10% moderately. Neurological symptoms such as headache [18.0% moderate, 6.0% severe], dizziness [8.0% moderate, 2.7% severe], and nausea [18.0% moderate, 3.7% severe] were present in a notable proportion [Table 1]. Skin-related symptoms like itching of hands and rashes or blisters were less severe, with

Journal of Chemical Health Risks
www.jchr.org
JCHR (2026) 16(2), 2697-2704 | ISSN:2251-6727

most participants reporting them as absent or barely recognizable.

Respiratory disturbances were reported by only 4.3% of students. Similarly, gastrointestinal disturbances were noted in 4.7% of the participants, with 95.3% remaining asymptomatic in this regard. Fainting episodes were reported by 5.0% of students [Table 2]. Out of the 300 participants, 72.0% reported that preventive measures were implemented in the dissection hall, while 28.0% indicated the absence of such measures. Regarding personal precautions, the majority of students [76.3%] consistently took precautions during dissection sessions, whereas 13.0% took none and 10.7% did so only occasionally. When asked about their opinion on using alternatives to formaldehyde, more than half of the participants [53.3%] supported the idea and 39.7% were uncertain [Table 3].

Table 2: Systemic Symptoms Reported Following Formaldehyde Exposure

		Frequency [N = 300]	**Percentage [%]**
Experienced respiratory disturbances	No	287	95.7
	Yes	13	4.3
Experienced GI disturbances	No	286	95.3
	Yes	14	4.7
Fainting episodes	No	285	95.0
	Yes	15	5.0
GI, Gastrointestinal			

Table 3: Participant Responses on Preventive Measures, Personal Precautions, and Attitudes Toward Formaldehyde Alternatives

		Frequency [N = 300]	**Percentage [%]**
Preventive measures in the dissection hall	No	84	28.0
	Yes	216	72.0
Personal precautions taken	None	39	13.0
	Occasionally	32	10.7
	Yes	229	76.3
Support the use of formaldehyde alternatives	No	21	7.0
	Maybe	119	39.7
	Yes	160	53.3

Discussion

The present study aimed to assess the symptomatology and perceived severity of formaldehyde exposure among first-year undergraduate medical and dental students exposed to formalin during gross anatomy dissection. The findings revealed a high prevalence of mild to moderate mucosal, ocular, and respiratory irritation, with a subset of students reporting neurological and cutaneous symptoms. These observations are consistent with the well-documented toxic profile of formaldehyde, a potent irritant and probable human carcinogen, commonly used in cadaver preservation in medical colleges.[2]

The mean age of the participants was 19.4 years, reflecting the typical demographic of first-year medical students. A higher proportion of female students [60%] participated, and this gender distribution is consistent with Fernandes et al. [2022] and Singhvi & Singh [2020].[12, 13] Notably, 14.7% of students had pre-existing allergies or respiratory conditions such as asthma. This is of particular concern, as individuals with atopic tendencies are more susceptible to the irritant effects of formaldehyde,[14] supporting the need for heightened preventive strategies for at-risk populations.

The most frequently reported symptom was an unfavorable odor, with over half the students rating it as moderate to severe. Burning and watering of the eyes were also highly prevalent, reported moderately by 37.7% and severely by 14.3% of students. Excessive lacrimation, redness, itching, and blurring of vision were also prominent. These ocular symptoms have been consistently reported in the literature [Alnagar et al.,

Journal of Chemical Health Risks

www.jchr.org

JCHR (2026) 16(2), 2697-2704 | ISSN:2251-6727

2018; Yadav & Chaudhary, 2023], where formaldehyde's volatile nature leads to rapid irritation of the conjunctival mucosa.[8, 15] Lakchayapakorn & Watchalayarn documented that over 50% of their subjects experienced significant eye irritation, closely paralleling the present findings.[16] The lachrymatory and cytotoxic effects on ocular tissues may lead to persistent discomfort and reduced concentration in the dissection hall if appropriate ventilation and safety measures are not maintained. Respiratory and nasal symptoms such as nasal irritation [25.3% moderate, 7.7% severe], sore or running nose [16.3% moderate], and breathing difficulty [12.3% moderate] were reported in a considerable number of students. This aligns with the findings of Bharadwaja & Bafna [2016],[17] who observed upper respiratory tract symptoms in 30–40% of medical students exposed to formaldehyde fumes. Though only 4.3% in the present study reported more significant respiratory disturbances, this may be underreported due to short-term exposure durations and possible symptom normalization over time. Formaldehyde is a known sensitizer and can exacerbate asthma symptoms or even induce new-onset airway hyperresponsiveness.[1] The results underscore the need for screening students with underlying respiratory illnesses before routine exposure.

A less frequent but noteworthy proportion of students reported neurological symptoms, including headache [18.0% moderate, 6.0% severe], dizziness [8.0% moderate], and nausea [18.0% moderate, 3.7% severe]. These symptoms may result from systemic absorption of formaldehyde vapors or secondary stress responses triggered by unpleasant olfactory or visual stimuli in the dissection environment. Prior studies have shown similar findings: Dixit et al. [2005] and Uddin et al. [2019] both observed frequent headaches and nausea among students exposed to formaldehyde.[2, 18] These nonspecific symptoms often reduce academic performance and comfort in practical sessions. In this study, 4.7% of students reported GI disturbances, and 5.0% experienced fainting episodes. Although relatively rare, these symptoms mirror the findings from El Okda et al. [2009],[19] who identified nausea and lightheadedness in a similar proportion of students. Such systemic symptoms likely reflect individual variation in sensitivity, ventilation adequacy, and duration of exposure. Skin-related complaints such as itching of the hands and rash formation were among the least reported symptoms. Around 70% of students did not experience any dermal manifestations. These findings are consistent with the literature, where cutaneous effects are generally less prevalent than mucosal or respiratory symptoms unless there is direct skin contact with formalin.[20, 21] However, sensitization and allergic contact dermatitis have been reported in prolonged or high-dose exposures, suggesting that even rare cutaneous effects warrant attention.[22]

A notable 72.0% of students reported the presence of preventive measures in the dissection hall, and 76.3% indicated they consistently took personal precautions. These findings are encouraging and reflect increasing awareness of formaldehyde toxicity in anatomy laboratories. Commonly implemented strategies include adequate ventilation, use of exhaust fans, wearing of gloves and masks, and use of low-formalin solutions.[23] The correlation between symptom severity and lack of preventive practices has been highlighted by several studies, including Jangde et al. [2015],[24] who showed that students in poorly ventilated halls reported more intense discomfort and absenteeism. However, 28.0% of students in this study indicated the absence of any systemic preventive practices in their dissection halls. This reveals the persistence of infrastructural gaps in anatomy teaching environments and highlights the need for standardized national guidelines for dissection hall safety.[25]

Over half of the participants [53.3%] supported the use of formaldehyde substitutes, and an additional 39.7% were uncertain. This reflects a growing global consensus toward reducing or eliminating formaldehyde use in medical teaching.[26-28] Alternatives such as phenoxyethanol, glutaraldehyde, Thiel's method, or even digital cadaveric simulation tools have gained popularity due to lower toxicity and comparable preservation efficiency.[10, 29, 30] However, barriers including cost, availability, and lack of familiarity continue to impede widespread implementation in resource-limited settings such as India.

This study is among the few from South India that comprehensively quantifies symptom severity among medical students using a structured grading system. By combining symptomatology with personal and institutional preventive behaviors, the study adds to the existing body of evidence advocating for improved

Journal of Chemical Health Risks

www.jchr.org

JCHR (2026) 16(2), 2697-2704 | ISSN:2251-6727

ventilation, student education, and safer preservation techniques. Given that even short-term exposure led to moderate symptoms in a sizable portion of the cohort, these findings call for urgent institutional attention to formalin safety practices.

The present study had certain limitations. As a single-center, cross-sectional design conducted among first-year MBBS and BDS students, the findings may not be generalizable to other institutions, or geographic regions. The reliance on self-reported data through an online questionnaire introduces the potential for recall bias and subjective interpretation of symptom severity, which may affect the accuracy of the results. Furthermore, exposure levels to formaldehyde were not objectively measured using environmental monitoring devices, thereby limiting the ability to correlate symptom severity with actual concentration levels. The absence of a control group not exposed to formaldehyde also restricts the ability to draw causal inferences.

Conclusion

In conclusion, the present study highlights the significant prevalence of acute symptoms associated with formaldehyde exposure among first-year undergraduate medical and dental students during gross anatomy dissection. Commonly reported symptoms included eye irritation, nasal discomfort, dryness of the throat and mouth, and neurological manifestations such as headache and dizziness, with varying degrees of severity. Although systemic effects such as gastrointestinal disturbances and fainting were infrequent, their occurrence underscores the potential for formaldehyde to induce broader physiological responses. While most students reported adherence to personal precautions and the presence of preventive measures in the dissection hall, a considerable proportion expressed support for the adoption of safer alternatives. These findings emphasize the urgent need for enhanced ventilation, strict adherence to safety protocols, and exploration of less toxic substitutes to formaldehyde in academic settings. Implementing such measures could improve student well-being, reduce exposure-related morbidity, and foster a safer learning environment in anatomy education.

Ethical Approval: Ethical clearance was obtained from Institutional Ethical Committee with reference number: 306 dated 28.08.2025

Details of funding: Self-funded

Conflicting Interest: None declared

Acknowledgements: We express our sincere gratitude to the Department of Anatomy, Jawaharlal Nehru Medical College, KLE Academy of Higher Education and Research [KAHER], Belagavi. We also thank the Institutional Ethics Committee for approving the study protocol with reference number 306 dated 28.08.2025 and ensuring adherence to ethical standards.

References

1. Akbar-Khanzadeh F, Vaquerano MU, Akbar-Khanzadeh M, Bisesi MS. Formaldehyde exposure, acute pulmonary response, and exposure control options in a gross anatomy laboratory. Am J Ind Med. 1994;26[1]:61-75.
2. Dixit D, Athavia P, Pathak H. Toxic effects of embalming fluid on medical students and professionals. Journal of Indian Academy of Forensic Medicine. 2005;27[4]:209-11.
3. Elbeshbeishy R, Salama R, Goud BKM, Babiker R, Jhancy M, Hamed N, et al. Unveiling the perceptions of medical and allied health students towards cadaveric dissection and virtual resources in anatomy education: a cross sectional study. BMC Med Educ. 2025;25[1]:829.
4. Bhat D, Chittoor H, Murugesh P, Basavanna PN, Doddaiah S. Estimation of occupational formaldehyde exposure in cadaver dissection laboratory and its implications. Anat Cell Biol. 2019;52[4]:419-25.
5. Abhijeet Y, Mukul Y. A study of the effects of formalin on first year MBBS students. Headache. 2014;22:1467.
6. Dhar D, Chaudhuri S, Singh S, Bhattacharya S. Effect of exposure to formaldehyde on the skin of first-year medical students during Anatomy dissection: A longitudinal study. The Journal of Community Health Management. 2019;5.
7. Raja DS, Sultana B. Potential health hazards for students exposed to formaldehyde in the gross anatomy laboratory. J Environ Health. 2012;74[6]:36-40.

Journal of Chemical Health Risks

www.jchr.org

JCHR (2026) 16(2), 2697-2704 | ISSN:2251-6727

8. Yadav S, Chaudhary S. Examining the harmful effects of formaldehyde vapours on Indian medical students while they are in the dissection hall. Journal of Survey in Fisheries Sciences. 2023;10[1]:828-40.

9. Swenberg JA, Moeller BC, Lu K, Rager JE, Fry RC, Starr TB. Formaldehyde carcinogenicity research: 30 years and counting for mode of action, epidemiology, and cancer risk assessment. Toxicol Pathol. 2013;41[2]:181-9.

10. Kaliappan A, Motwani R, Gupta T, Chandrupatla M. Innovative Cadaver Preservation Techniques: a Systematic Review. Maedica [Bucur]. 2023;18[1]:127-35.

11. Chatha WA. From Scalpel to Simulation: Reviewing the Future of Cadaveric Dissection in the Upcoming Era of Virtual and Augmented Reality and Artificial Intelligence. Cureus. 2024;16[10]:e71578.

12. Fernandes R, Anturlikar V, Patil D. A Study of Toxic Effects of Formalin on Health of First Year Medical and Dental Students. IJARS. 2022;11[1]:AO48 - AO50.

13. Singhvi SD, Singh PT. A study of allergic responses of formaldehyde in first year MBBS students. International Journal of Research in Medical Sciences. 2020;8[9]:3281.

14. Olisah MC, Meludu SC, Dioka C. Effect of formaldehyde exposure on oxidative stress markers, liver and kidneys of medical students during dissection in gross anatomy laboratory. Scicom J Med Appl Med Sci. 2021;1[1].

15. Alnagar FA, Shmela ME, Alrtib AM, Benashour FM, Buker AO, Abdalmula AM. Health adverse effects of formaldehyde exposure to students and staff in gross anatomy. International Journal of Scientific Research and Management. 2018;6[2]:27-36.

16. Lakchayapakorn K, Watchalayarn P. Formaldehyde exposure of medical students and instructors and clinical symptoms during gross anatomy laboratory in Thammasat University. J Med Assoc Thai. 2010;93 Suppl 7:S92-8.

17. Bharadwaja A, Bafna G. Harmful effects of formalin on first MBBS students: a questionnaire study. Headache. 2016;13:26.

18. Uddin MN, Miah I, Akter N. Research on Comparative Analysis Toxic Effect of Formalin on MBBS Students of Several Medical College in Bangladesh. European Scientific Journal. 2019;15[12]:117-28.

19. El Okda E, Abd Elaziz K, Samaha H. Comparative study of risk assessment of formaldehyde exposure among students in public and private Faculties of Medicine in Egypt. Egypt J Occup Med. 2009;33:143-54.

20. Patil SN, Thorat M. Study of effects of formalin exposure in dissection hall on pulmonary function tests of medical students. Indian Journal of Public Health Research & Development. 2020;11[3]:536-41.

21. Jain S, Nahar P, Baig M. Study of formalin toxicity in I MBBS students. Cough. 2012;3:233-5.

22. Kapoor P, Sharma P. Potential health hazards of formaldehyde usage in gross anatomy dissection hall on students and instructors. Era's Journal of Medical Research. 2020;7[2]:235-8.

23. Dixit D. Role of standardized embalming fluid in reducing the toxic effects of formaldehyde. Indian Journal of Forensic Medicine &Toxicology. 2008;2[1]:33-9.

24. Jangde S, Arya RS, Paikra S, Basan K, Kumar N. How to provide a safe working condition for medical students and professionals in the anatomy dissection room. Sch J App Med Sci. 2015;3[5A]:1867-70.

25. Arora L. Exposure of Medical fraternity to formaldehyde in Anatomy and search for better alternatives to formalin. JD and Med Sci. 2014;13[10]:56-7.

26. Coleman R. Reducing the levels of formaldehyde exposure in gross anatomy laboratories. Anat Rec. 1995;243[4]:531-3.

27. Joshi AG, Punja D, Punja R. Can indoor plants reduce formaldehyde levels in the anatomy dissection hall? A study to evaluate the practicality

of using plants in reducing formaldehyde levels. F1000Res. 2024;13:1249.

28. Whitehead MC, Savoia MC. Evaluation of methods to reduce formaldehyde levels of cadavers in the dissection laboratory. Clin Anat. 2008;21[1]:75-81.

29. Ernesto Ottone N, Vargas CA, Fuentes R, del Sol M. Walter Thiel's Embalming Method. Review of Solutions and Applications in Different Fields of Biomedical Research. International Journal of Morphology. 2016;34[4].

30. Healy SE, Rai BP, Biyani CS, Eisma R, Soames RW, Nabi G. Thiel embalming method for cadaver preservation: a review of new training model for urologic skills training. Urology. 2015;85[3]:499-504.