

# Evaluation of Indoor Concentration and Personal exposure of Formaldehyde in Anatomy Dissection Rooms, University of Medicine 1, Yangon

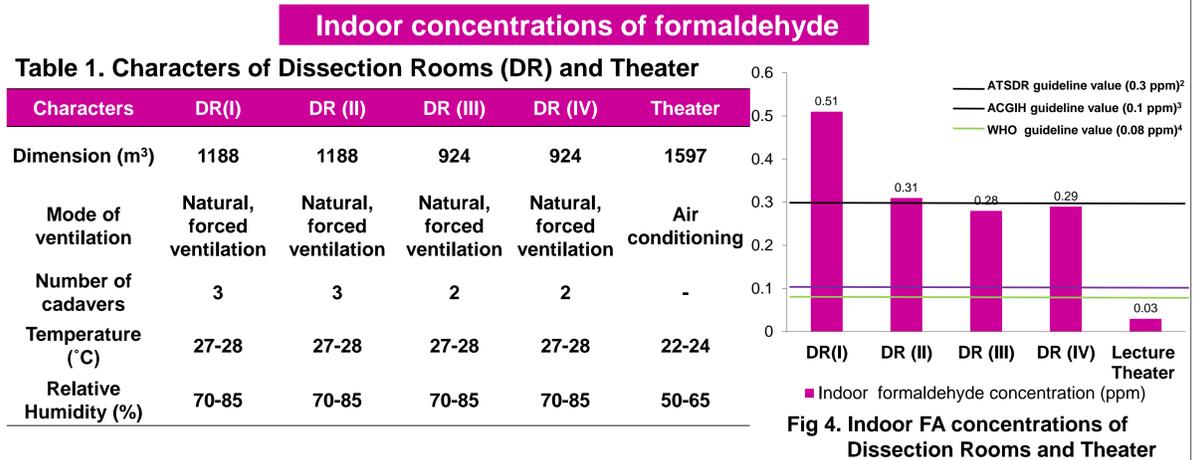
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## Background and Aim

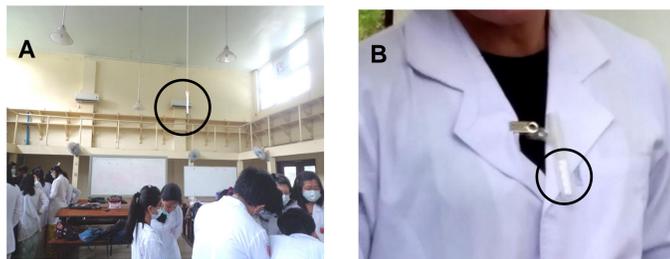
- Cadaveric dissection** is recognized as an integral part of learning Anatomy, the basis of medical and surgical knowledge.
- Formaldehyde (FA)** evaporation from embalmed cadavers can produce **high exposure to medical students and instructors**.
- Exposure to formaldehyde can cause **adverse health effects** including carcinogenesis.
- This study aimed to **evaluate indoor concentration and personal exposure of formaldehyde** in Anatomy Dissection Rooms, University of Medicine 1, Yangon.

## Results

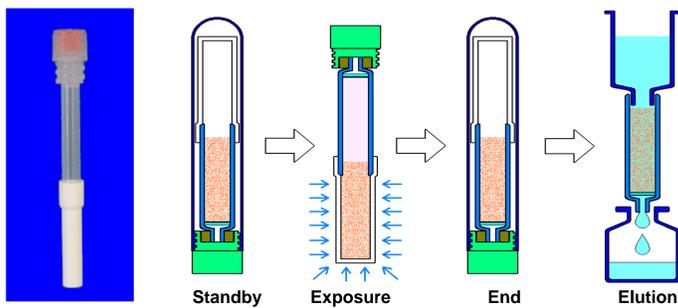


## Materials and Methods

- Diffusive sampling devices, DSD-DNPH samplers, were simultaneously attached to subjects' white coat collar (breathing zone) for **personal exposure** assessment and placed about six feet from the ground for determination of **indoor** concentration.
- The samplers are **small, light-weighted and do not require power source**<sup>1</sup>.



**Fig 1. (A) Air sampler measuring indoor FA concentration (B) Personal sampler measuring personal FA exposure**



**Fig 2. DSD-DNPH sampler for measurement of Formaldehyde<sup>1</sup>**

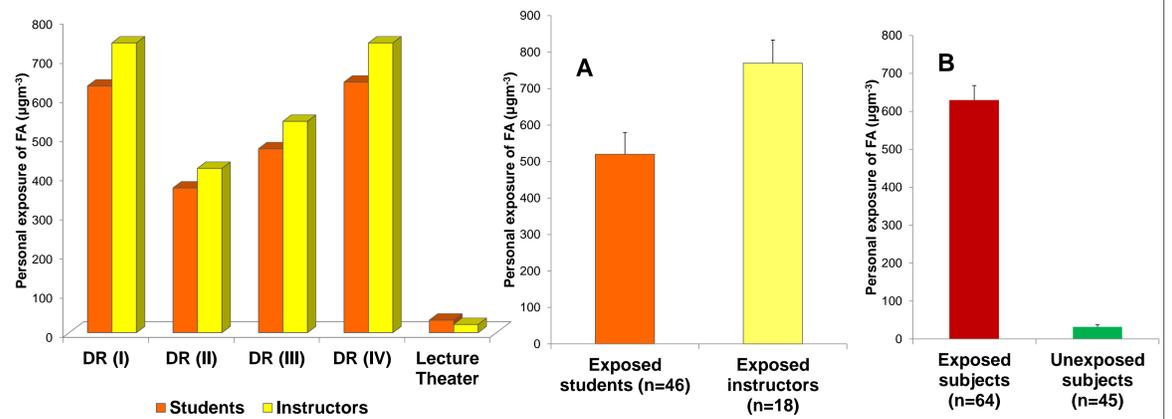
- There was a total of seven periods of dissection during the study period, **May to September, 2019**.
- Students and instructors in the **Dissection Rooms** were categorized into exposed group and those in the **Lecture Theater** as unexposed group.
- A self-administered questionnaire was given to each subject to assess FA-related symptoms.



**Fig 3. (A) Data logger for temperature and relative humidity (B) High-performance liquid chromatography**

- This study was approved by **Research and Ethics Committee**, University of Medicine 1, Yangon (003/UM1, REC.2019).

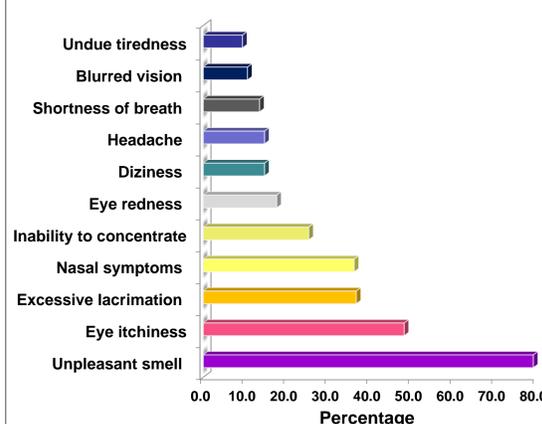
## Personal exposure of formaldehyde



**Fig 5. Personal exposure of FA among students and instructors in Dissection Rooms and Theater**

**Fig 6. Comparison of personal exposure of FA (A) Exposed students Vs. Exposed instructors (P=0.36) (B) Exposed subjects Vs. Unexposed subjects (P<0.001) • Analyzed by Independent sample 't' test, Mean (SEM)**

## Formaldehyde-related symptoms



**Fig 7. Percentage of formaldehyde-related symptoms reported by exposed subjects**

**Table 2. Risk of having FA-related symptoms in exposed subjects (n=64)**

Formaldehyde-related symptoms	Odd Ratio (95% CI)	Wald (df)	P value
Unpleasant smell	29.3 (6.5-31.7)	19.4 (1)	P<0.001
Itchiness of eyes	13.0 (3.6-46.4)	15.7 (1)	P<0.001
Excessive lacrimation	12.6 (2.8-57.0)	10.9 (1)	P=0.001
Nasal symptoms	8.2 (2.3-29.6)	10.5 (1)	P=0.001
Inability to concentrate	3.5 (1.2-10.3)	5.3 (1)	P<0.05

• Analyzed by Simple Logistic Regression

**Table 3. Percentage of exposed subjects reporting regular use of Personal Protective Equipments during Gross Anatomy Dissection**

Use of PPE	Percentage of exposed subjects (n=64)
Laboratory coat	90%
Hand gloves	82%
Masks	32%
Eye Goggles	19%

## Discussion and Conclusion

- This study is the **first study** to evaluate indoor concentrations and personal exposure of formaldehyde in a **Medical University in Myanmar**.
- Indoor formaldehyde concentrations of the Anatomy Dissection Rooms are found **higher than** that of the Lecturer Theater and the guideline values.
- During dissection, both students and instructors are **highly exposed to FA** and are at **high risk** of having intolerable formaldehyde-related symptoms.
- Proper personal protective devices, more efficient ventilatory system and low formaldehyde embalming techniques should be used to reduce high FA exposure.

## References

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**No conflict of interest**