**ORIGINAL ARTICLE**

# Impact of Human Body Dissection on First Year Undergraduate Medical Students
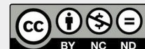
• Sandip Shah[1]• Sarun Koirala[1]• Laxman Khanal[1]• Presha Baral[1]

**Sandip Shah**
sandip.shah@bpkihs.edu

iD https://orcid.org/0000-0002-7752-2865

[1] Department of Human Anatomy, B. P. Koirala Institute of Health Sciences, Dharan, Nepal

**Abstract**

**Background:** The first contact with the dissection hall is an unforgettable, stressful but important step in the medical education. The present study aimed to assess the stress experienced just after one week of first dissection (IES1) and compare it with impact after 12 weeks (IES2) of first experience.

**Methods:** In this prospective cohort study, we enrolled 100 first year medical students of B. P. Koirala Institute of Health Sciences attending the cadaveric dissection. The questionnaire for Impact Event Scale (IES) was administered on two separate occasions after the human body dissection. Along with overall score for impact event, we also assessed the sub-scores of Intrusion and Avoidance.

**Results:** The percentage of students having clinically important reaction (a score of 20 or above) after one week of first cadaveric dissection in both sub-scales of Intrusion and Avoidance were 2% and 6% respectively but were found to be reduced to 1% each after 12 weeks. The overall scores indicating traumatic stress reaction was found to be reduced to 2% from 8%. The comparison between IES1 and IES2 using Wilcoxon signed ranked test showed statistically significant difference ($p < 0.001$). The bivariate correlation analysis between IES 1 and IES 2 showed positive correlation with statistically significant level ($rs = 0.25; p < 0.001$).

**Conclusion:**   Overall score in students having traumatic stress reaction dropped by 6% after 12 weeks. The stress related to the human body dissection with respect to both Intrusion and Avoidance sub-scales in medical students reduced after the period of 12 weeks of first cadaver dissection.

**Keywords**: Dissection; Impact Event Scale; Intrusion

The response of medical students on their exposure with cadaver dissections varies with regards to their attitudes, emotions, and views. While medical students enter their academic course which demands dedication, they experience a lot of stress [1].

The Impact of Event Scale (IES) instrument has been employed to assess the psychological effect of dissection on them [2]. The IES instrument measures subjective stress related to a specific event and comprises items composed of commonly reported experiences following a potentially traumatic event. The IES is considered as one of the earliest self-report measures of post-traumatic disturbance which can be used for

## METHODS

This prospective cohort study enrolled all the first-year medical undergraduate students of B. P. Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. The census sampling technique was applied. After obtaining institutional ethical clearance and informed consent from the students, the questionnaire for IES were administered to students twice, after one week and after 12 weeks of first human body dissection at the department of Human Anatomy, BPKIHS. The permission to use the IES instrument was also obtained although it is freely available for conducting research on-



| Below is a list of comments made by people after stressful life events. please check each item indicating how frequently these comments were true for you *during the past 7 days or other agreed time period*. If they did not occur during that time, please mark the *"not at all"* column | *Frequency* | | | |
| --- | --- | --- | --- | --- |
| | *not at all*<br>*0* | *rarely*<br>*1* | *sometimes*<br>*3* | *often*<br>*5* |
| a.   I thought about it when I didn't mean to | | | | |
| b.   I avoided letting myself get upset when I thought about it or was reminded of it | | | | |
| c.   I tried to remove it from memory | | | | |
| d.   I had trouble falling asleep or staying asleep, because of pictures or thoughts about it that came into my mind | | | | |
| e.   I had waves of strong feelings about it | | | | |
| f.   I had dreams about it | | | | |
| g.   I stayed away from reminders of it | | | | |
| h.   I felt as if it hadn't happened or it wasn't real | | | | |
| i.   I tried not to talk about it | | | | |
| j.   Pictures about it popped into my mind | | | | |
| k.   Other things kept making me think about it | | | | |
| l.   I was aware that I still had a lot of feelings about it, but I didn't deal with them | | | | |
| m.   I tried not to think about it | | | | |
| n.   Any reminder brought back feelings about it | | | | |
| o.   My feelings about it were kind of numb | | | | |

For each question score *0* for *"not at all"*, *1* for *"rarely"*, *3* for *"sometimes"* and *5* for *"often"* *intrusion total* comes from adding the scores for questions *a, d, e, f, j, k, n; avoidance total* from adding scores for questions *b, c, g, h, i, l, m, o.* Add intrusion and avoidance for the *full total.*

*Intrusion total =*         *Avoidance total =*         *Overall Score=*

**Figure 1**: Impact of Event Scale

repeated measurement over a period. Its sensitivity to change renders it useful for monitoring the client's progress in therapy [3, 4]. More research in anatomy education is necessary to counterbalance emotional arguments about dissection with scientific evidence [5].

We aimed to assess the impact of human body dissection on first year medical students by using IES and to compare IES between two time points: one week (IES1) and 12 weeks (IES2) after the first dissection experience. The findings of this study could be very helpful to assess the stress of young undergraduate medical students related to human body dissection.

line as "The Impact of Event Scale." The IES is available from the Victims' website at Swinburne University and in the NSW Motor Accident Authority Guidelines for the Management of Acute Whiplash [6]. It has 15 items, each with four response options: "not at all", "rarely", "sometimes", and "often" and are scored 0, 1, 3, and 5 respectively. The questionnaire provides an overall scale, and the sub-scales of Intrusion and Avoidance (Fig. 1). The sub-scale scores of 0-8 represent a minor reaction; 9-19 a moderate reaction, and a score of 20 or above a clinically important reaction. The McFarlane's cut-off overall score of 30 on IES indicates a traumatic stress reaction [2].

**Table** 1: Sub-scores and overall scores according to grouping variables (n = 100). Values are expressed as mean (SD) and mean rank.

| Parameter | | ISI | ASI | OSI | IS2 | AS2 | OS2 |
|---|---|---|---|---|---|---|---|
| Total participants | Mean (SD) | 5.83 (5.25) | 7.60 (6.36) | 13.43 (10.32) | 2.45 (4.68) | 3.13 (5.22) | 5.58 (9.38) |
| Gender (M/ F) | Mean (SD) | 6.17 (5.67)/ 5.24 (4.45) | 8.17 (6.36)/ 6.62 (6.35) | 14.35 (10.69)/ 11.86 (9.60) | 2.57 (5.28)/ 2.24 (3.50) | 3.27 (5.57)/ 2.89 (4.61) | 5.84 (10.56)/ 5.14 (7.05) |
| | Mean Rank | 51.68/ 48.49 | 53.56/ 45.28 | 53.56/ 45.28 | 49.40/ 52.38 | 52.47/ 47.15 | 50.82/ 49.96 |
| | p-value | 0.59 | 0.17 | 0.17 | 0.59 | 0.53 | 0.84 |
| Nationality (N/ F) | Mean (SD) | 5.83 (4.98)/ 5.83 (5.69) | 8.57 (6.22)/ 6.15 (6.39) | 14.40 (9.68)/ 11.97 (11.18) | 1.73 (2.51)/ 3.53 (6.65) | 2.48 (3.14)/ 4.10 (7.25) | 4.22 (4.77)/ 7.63 (13.48) |
| | Mean Rank | 51.47/ 40.05 | 56.31/ 41.79 | 54.91/ 43.89 | 49.17/ 52.50 | 49.58/ 51.89 | 50.25/ 50.88 |
| | p-value | 0.68 | 0.014 | 0.06 | 0.55 | 0.68 | 0.91 |
| Past experience of seeing dead body (Yes/ No) | Mean (SD) | 4.93 (4.42)/ 6.98 (6.00) | 6.68 (5.69)/ 8.77 (7.02) | 11.61 (8.65)/ 15.75 (11.83) | 2.00 (3.54)/ 3.02 (5.82) | 2.41 (3.70)/ 4.05 (6.61) | 4.41 (6.63)/ 7.07 (11.93) |
| | Mean Rank | 45.96/ 56.27 | 47.08/ 54.85 | 45.75/ 56.55 | 48.08/ 53.58 | 46.79/ 55.22 | 46.40/ 55.72 |
| | p-value | 0.77 | 0.18 | 0.06 | 0.32 | 0.13 | 0.10 |
| Place of origin (Urban/ rural) | Mean (SD) | 5.75 (5.46)/ 5.97(4.91) | 7.23 (6.71)/ 8.29(5.69) | 12.98 (10.92)/ 14.26(9.21) | 2.02 (3.33)/ 3.26(6.48) | 3.00 (4.12)/ 3.37(6.87) | 5.02 (6.68)/ 6.63(13.06) |
| | Mean Rank | 49.36/ 52.61 | 47.52/ 56.04 | 48.25/ 54.69 | 49.12/ 53.06 | 49.94/ 51.54 | 49.30/ 52.73 |
| | p-value | 0.59 | 0.16 | 0.29 | 0.49 | 0.78 | 0.57 |

#Mann-Whitney U test. *IS: Intrusion score. AS: Avoidance score. OS: Overall score. M: male, F: female, N: Nepali, F: Foreigner.*

The IES was administered between the periods of December 2018 to March 2019. Since the data were not normally distributed, non-parametric tests such as the Mann-Whitney U test, Wilcoxon-Signed ranked test and Spearman correlation test were applied. The results were considered statistically significant at p < 0.05.

## RESULTS

The response rate was 100% for both time points and there was no missing data. The total number of participants was 100 with a mean age of 19.7 years. In the present study, 63% were males, 60% were Nepalese students, 40% were foreign students, and 65% were from urban region. Fifty-six percent reported that they had seen dead bodies before they enrolled in BPKIHS. The mean overall scores of IES after one week and twelve weeks of human body dissection were 13.43 and 5.58 respectively. When we compared the mean rank, there was no statistically significant relation with different variables and overall score (p > 0.05) except Avoidance Sub-scale at 1 week (AS1) of Nationality (p = 0.014) (Table 1).

Clinically important reaction in Intrusion Sub-scale at 1 week (IS1) and AS1 were 2% and 6% respectively and Intrusion Sub-sclae at 12 weeks (IS2) and Avoidance Sub-scale at 12 weeks (AS2) were 1% each. The traumatic stress reaction (McFarlane's cut-off overall score of 30) reduced from 8% to 2% (Table 2). There was statistically significant differences (p < 0.001) when we compared the IS, AS and overall score of IES between the two time points (Table 3). There was a positive correlation (rs = 0.25, p = 0.011) between OS1 and OS2.

## DISCUSSION

We found that 8% of first year medical students have the traumatic stress reaction after cadaver dissection at first week but reduced to 2% after 12 weeks of cadaver dissection. The US studies on the anatomy room experience have reported that 5% of students suffer from symptoms suggestive of post-traumatic stress disorder (PTSD) [7]. In contrast, a study from India reported that most of the first-year medical students found their first visit to the anatomy dissection room exciting and suffered very little or no stress at all [8]. This could be

**Table** 2: Percentage of sub-scale scores and overall scores of IES1 and IES2.

| Sub-scale Score | IS I | AS I | IS 2 | AS 2 | Overall score | OSI | OS2 |
|---|---|---|---|---|---|---|---|
| 0-8 (Minor reaction) | 75% | 69% | 94% | 94% | 0-29 | 92% | 98% |
| 9-19 (Moderate reaction) | 23% | 25% | 5% | 5% | ≥ 30 | 8% | 2% |
| ≥ 20 (Clinically important reaction) | 2% | 6% | 1% | 1% | | | |

*IS: Intrusion score. AS: Avoidance score. OS: Overall score. The McFarlane's cut-off overall score of 30 on IES indicates a traumatic stress reaction.*

because of cultural changes, scientific progress, and new trends in medical education [9]. Another study from the USA showed that work with cadaver is not only distressing, but also rewarding [10]. In many researches, aspects of dissection that medical students face are reported to include revulsion at the sight and smell of the cadavers, shock at confronting death, desecration and dismemberment, violation of cultural taboos, dehumanization and invasion of privacy. In the last three decades, anatomists have done research on medical students' reactions, both physiological and emotional, to cadaver dissection such as pupils' uncertainty and high levels of anxiety before their first real practical class. However, once they come face to-face with the situation which they feared, levels of anxiety drop considerably as the student reaches a stage of adaptation and psychological balance [11].

A study done in New Zealand found that mean IES score at one week was 12.89, one month was 7.68, one year was 5.05, and two year was 1.55. Our IES mean

**Table** 3: Comparison between IES1 and IES 2 along with p-value.

| Variables | | Mean Rank | p-value |
|---|---|---|---|
| Intrusion Sub-score 2 - Intrusion Sub-score I | Negative Ranks Positive Ranks | 44.11 40.63 | < 0.001* |
| Avoidance Sub-score 2 - Avoidance Sub-score I | Negative Ranks Positive Ranks | 46.32 34.00 | < 0.001* |
| Overall Score 2 – Overall Score I | Negative Ranks Positive Ranks | 48.60 43.45 | < 0.001* |

*\*Wilcoxon signed ranked test*

score at one week after human dissection was found to be slightly higher (13.43) than the study done in New Zealand [12].

In our students, the mean value of overall score at week 1 (OS1) and overall score at week 12 (OS2) for male (14.35 and 5.84) were found to be higher than female (11.86 and 5.14). A study conducted in New Zealand for medical students reported IES1 for male and

female were 10.4 and 15.5 [13]. Similar study conducted among physiotherapy students reported the IES1 for male and female were 6.9 and 12.7 [2]. Another study from New Zealand for physiotherapy and occupational therapy students reported IES1 for male and female were 12.6 and 15.7 [12]. The differences in cultural and geographical characteristics could be the reason for disagreement of the findings by gender.

There are several limitations of this study. Firstly, we followed up our students up to 12 weeks only. Secondly, we failed to use other psychometric measures such as General Health Questionnaire, 20-items; Stress Arousal Check List- 45 items and Cope Inventory. Finally, other confounders like the influence of exposure to other basic science subjects and a new environment at hostel on stress were not assessed.

## CONCLUSION

There was a drop of 6% in overall score in students having traumatic stress reaction after 12 weeks. The stress related to the human body dissection with respect to both Intrusion and Avoidance sub-scales in medical students reduced significantly after the period of 12 weeks of first cadaver dissection.

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