

Reflective journals: unmasking student perceptions of anatomical education

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Background: In medical education, reflection has been considered to be a core skill in professional competence. The anatomy laboratory is an ideal setting for faculty/student interaction and provides invaluable opportunities for active learning and reflection on anatomical knowledge.

Materials and methods: This study was designed to record student attitudes regarding human cadaveric dissection, explore their experiences of anatomy through an analysis of their journal-reflective writings and determine whether this type of creative writing had a beneficial effect on those students who chose to complete them. A total of 75 journals from Medical and Allied Health Science students were collected and analysed.

Results: Results were categorised according to the following themes: (i) Dissecting room stressors (27.6%); (ii) Educational value of dissection (26.3%); (iii) Appreciation, Gratitude, Respect and Curiosity for the cadaver (18.9%); (iv) Positive and negative sentiments expressed in the dissecting room (25.8%); (v) Benefit of alternate teaching modalities (4.6%); (vi) Spirituality/Religious Beliefs (3.7%); (vii) Shared humanity and emotional bonds (3.69%); (viii) Acknowledgement of human anatomical variations (3.2%); (ix) Beauty and complexity of the human body (1.8%) and (x) Psychological detachment (0.9%). Students appreciated the opportunity to share their emotions and reflect on the humanistic dimension of anatomy as a subject. Student reflections illustrated clearly their thoughts and some of the difficult issues with which they wrestled.

Conclusions: The anatomy laboratory is seen as the budding clinician's first encounter with a patient, albeit a cadaver. This was the first time that reflective journals were given to students in the discipline. Reflective journals allow students to express themselves in an open-ended and creative fashion. It also assists students to integrate anatomy and clinical medicine and assists in applying their basic anatomical knowledge in an authentic, yet safe environment. (*Folia Morphol* 2017; 76, 3, 506–518)

Key words: reflection, journal writing, anatomy, medical education, cadaveric dissection

INTRODUCTION

Reflection, as defined by John Dewey, is a “purposeful form of thought provoked by unease in learners when they recognise that their understanding is incomplete”

[28]. It is also regarded as a process regarding thinking about and exploring an issue of concern which is triggered by an experience [11]. Specifically, in medical education, reflection has been considered to be a core

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skill in professional competence [47]. Journal writing has been considered as a means to facilitate reflection and allow students to express feelings regarding their educational experiences.

According to the literature reviewed, reflective learning has become increasingly popular within the domain of medical education [81] and other health related professions such as nursing [4, 63]. Reflection using journal writing has been described and explained in many different ways [87] and has been utilised in a variety of professions such as nursing [24, 36, 72, 95], physical therapy [91, 92]; occupational therapy [85] and teacher certification [13, 17].

The anatomy laboratory is an ideal setting for faculty/student interaction and provides invaluable opportunities for active learning and reflection on anatomical knowledge. Despite reductions in its importance, time allocation and status within the domain of anatomical education in modern curricula, anatomical knowledge remains the bedrock in medicine and related health professions [2]. Human dissection within gross anatomy courses usually occurs early in undergraduate medical and allied health science curricula [16]. There have been many studies conducted worldwide on the role of dissection and its effect on the encouragement of humanistic qualities of respect, empathy and compassion, all of which embrace the concepts of socialisation and professionalisation in medical education [22, 31, 32, 65, 67, 73, 84]. Hafferty [31] further stated that the experience of dissection is regarded as an emotional rite of passage which promotes the process of changing over from layperson to doctor. Bertman and Marks [7] reported that this ritual takes place via a psychological process of which very little is yet known. According to Woodward [96], reflective journal writing allows students to ask questions, reflect on their own learning processes and make a connection between their theoretical understanding and personal experience in practice.

Dissection offers students opportunities to recognise and come to the realisation that the cadaveric donors that they are exposed to, were once living people with a name, family and life history. There is a dichotomy of opinion in the literature with regard to the role played by the cadaveric donor. Newell [58] labelled dissection as the "royal road" with the cadaver that students explore, in essence, being the "first patient" [15, 91]. Prakash et al. [70] stated that when dissecting a cadaver, the student is faced with the reality of life — morbidity and mortality — as well as the remarkable responsibility of a clinician to care for a patient. Other authors such as Winkelmann and

Güldner [94] and Bohl et al. [9] reported that students see the cadaver as a great teacher, thus attributing a social role and status to it. The student-cadaver encounter in medical education is regarded as a "nodal point" [68] — a moment in time which can result in compassionate detachment on the part of the student that is essential if the future clinician is to cope with issues such as death and bereavement [23] and causes them to reflect on issues of human dignity and grief [34]. Despite this detachment, students are encouraged to develop personal relationships with their cadavers based on the same gratitude and respect that is afforded to highly regarded teachers [9]. Regrettably, students may be inadequately prepared for their initial encounter with the human body and they may experience a variety of emotions [16]. The literature is replete with studies documenting dissection room experiences [76]. Many studies report on the negative emotions such as anxiety, disgust and/or apprehension experienced by students [18, 19, 30, 35, 60, 78, 79, 88]. According to Shapiro et al. [78], this anxiety is both natural and healthy, especially if it leads to reflection and self-analysis. O'Carroll et al. [60] reported that stress is heightened by intensive psychological and physical reactions with some students experiencing sleep disorders. Nnodim [59] reported students experiencing intensive anxiety which can reach the level of post-traumatic stress [25]. Physical reaction to cadavers include revulsion at the sight and smell of it, shock at confronting death, desecration and dismemberment, violation of cultural taboos, dehumanisation and invasion of privacy [2]. On the other hand, some students express positive emotions towards the process of dissection [49] such as interest, excitement and the need for acquiring new knowledge [12, 54].

Further to learning to cope with the exceedingly "emotional confrontation" with the cadaver [70], additional outcomes identified in the dissecting room experience include teamwork, respect and familiarisation for the body, application of practical skills, integration of theory and practice, preparation for clinical work and an appreciation of the status of dissection within the history of medicine [49].

The attitudes and beliefs of South African medical and allied health science students regarding cadaveric dissection experiences have not been thoroughly explored. Kotze et al. [44] reported student fears of dissecting the face, possible collapse or vomiting and feelings of sadness in a study conducted at Stellenbosch University in South Africa. South Africa is a multi-cultured society having sacred rituals with regard to handling the dead [77]. Sobnach et al. [80] reported an incidence of 17% of

medical students at the University of Cape Town (South Africa) who believed in an after-life with a view that the body must be kept intact after death. This importance of having an intact body is stressed in certain religious groups and is associated with respect for the ancestors and the idea of an after-life [46, 48]. Kometsi and Louw [43] further explored the concept of ancestors which is defined as "a belief, that after death, one joins a spiritual world that works in collaboration with and in immediate subordination to God over humankind". Satyapal [77] reiterated that their 'spirits' (amadlozi) should also be at peace. Ndlovu [57] stated that ancestors are thought to communicate personal messages or messages from God to living human beings through symbols like dreams.

Another crucial concept highlighted as part of the dissection experience is the presence of human anatomical variations. Older [61] maintains that students may come across these variations as some of them may be common and are often of clinical importance. Bernard [6] cited additional benefits of cadaveric dissection such as an enhanced understanding of course material and the provision of a "true picture of the human structure".

The Department of Clinical Anatomy at the University of KwaZulu-Natal is comprised of two teaching delivery sites, viz. the Nelson R. Mandela School of Medicine and the Westville Campus. On both delivery sites, preparation before practical sessions usually follows a schedule and seldom touches on how to manage emotions. There is only an introductory lecture on the rules and regulations to be followed in the dissecting room but no organised discussion or reflection on dissection experiences. In addition, a Dedication Ceremony is only conducted at the Nelson R. Mandela School of Medicine campus. In many of the studies alluded to above, experiences were examined retrospectively by recollection using structured questionnaires. There have been no studies at South African Anatomy Departments that recorded student attitudes as they progressed through a dissection room-based anatomy curriculum using reflective-journaling. In this respect, our study was unique. Therefore, this investigation was designed to record student attitudes to human cadaveric dissection, explore their experiences of anatomy through an analysis of their journal-reflective writings and determine whether this type of creative writing had a beneficial effect on those students who chose to complete them.

MATERIALS AND METHODS

The study sought to explore medical and allied health student experiences of anatomical teaching and learning

at the Department of Clinical Anatomy, University of KwaZulu-Natal, Durban, South Africa. A total of 298 journals were distributed to all second year MBChB ($n = 197$) and Allied Health students comprising second year Bachelor of Physiotherapy ($n = 40$) and Medical Science ($n = 27$) students as well as first year Occupational Therapy ($n = 34$) students. At the time of the study, anatomy practical teaching sessions were comprised of full body gross anatomy dissections in the first semester of the academic calendar. All students attended two three-hour anatomy classes per week. The content of the practical sessions were pre-determined by Faculty within the Department of Clinical Anatomy at the beginning of the academic semester. All anatomy practical sessions took place in the traditional setting of the dissecting laboratory where students had full access to resources including whole body cadaveric prosections and skeletons. Students were also given access to three-dimensional plastic models and anatomy videos to supplement cadaveric dissection in this setting (plastic torsos with muscles and ligaments, including heart and lung models). Teaching methods utilised in the dissection laboratory included small group teaching with up to 11 students per cadaver. Demonstrator-led classes (overseen by lecturers) were conducted by post-graduate students having majors in Anatomy.

The primary outcome measure of this study was student opinion of dissection-laboratory experiences related to the teaching and learning of anatomy. With the approval of the University of KwaZulu-Natal's Ethics Committee (BE386/15), all of the above students were invited to partake in the study by giving their written consent. Students were not compelled to provide demographic data in this study. Completion of the journal was purely on a voluntary basis with no compulsion on the student and was not a component of the assessment criteria of the course. With this design in mind, we chose to focus on the completed journals and evaluated student perceptions of their dissection room experiences without any extrinsic effects from assessment or course requirements.

The first (LL) and second (RS) authors summarised all narrative interpretations which were coded using a grounded theory approach [83]. Thematic content analysis was employed to identify recurring words and categories which emerged from the data and these were subsequently organised into themes. The various themes were reviewed and discussed until the authors identified an overarching theme that they felt represented the large majority of journals reviewed. The data was analysed by frequencies and percentages of the themes using QSR NVivo 10 software package.

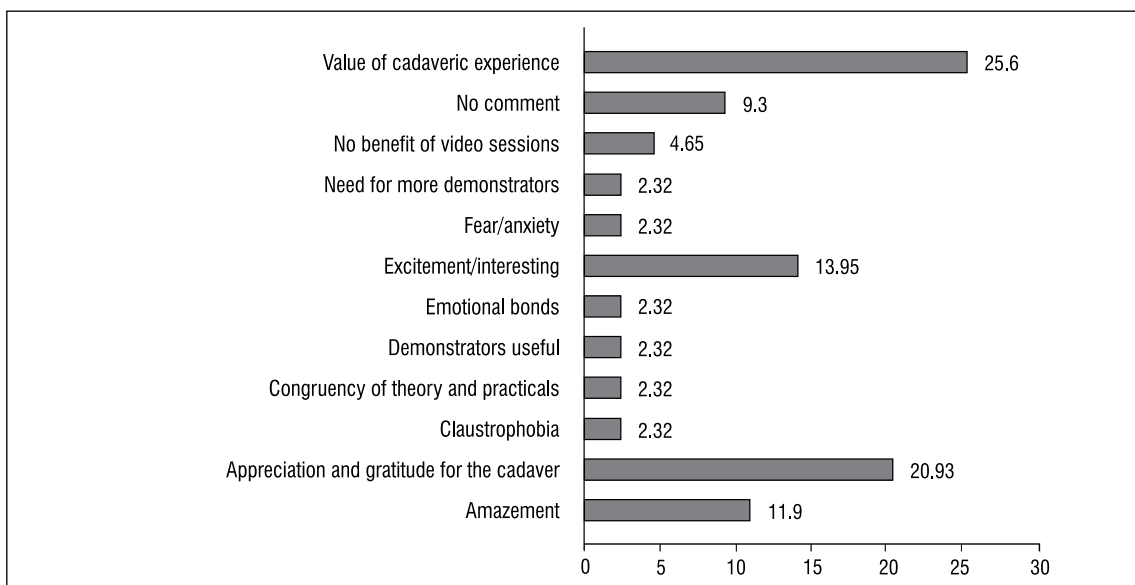


Figure 1. Summary of coding categories for MBCHB students (n = 10).

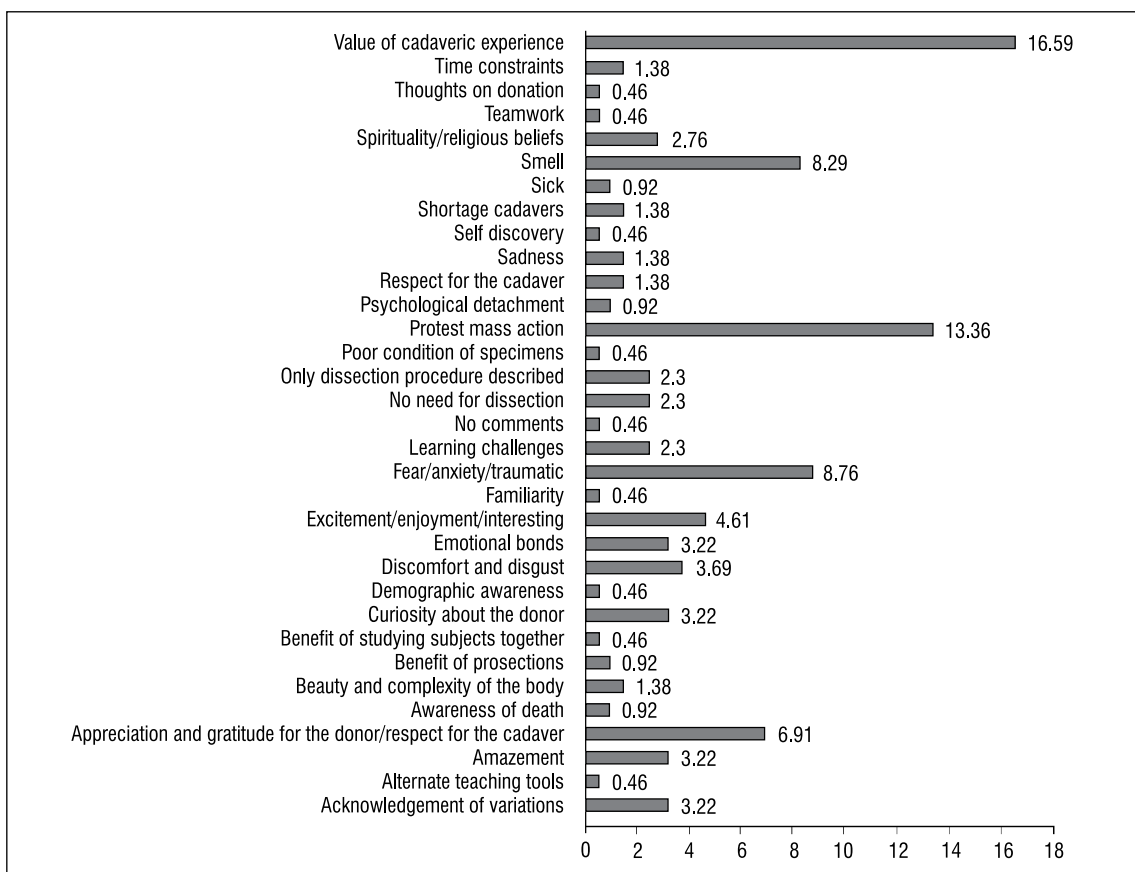


Figure 2. Summary of coding categories for allied health science students (n = 65).

RESULTS

A total of 75 journals were collected from students and analysed. The format varied widely from some highly reflective accounts of the writer’s feelings to factual records of students’ experiences in the dissecting room.

A total of 217 responses were extracted from the journals. Figures 1 and 2 illustrate the coding categories of responses obtained from medical and allied health science students, respectively. From these, a total of 9 themes emerged (Table 1) from the data. In order to adequately

Table 1. Thematic areas identified

Thematic area	Incidence (%)
I. Dissecting room stressors	60 (27.6%)
II. Educational value of dissection	57 (26.3%)
III. Appreciation, gratitude, respect and curiosity for the cadaver	41 (18.9%)
IV. Sentiments expressed in dissecting room:	
Positive emotion	29 (13.4%)
Negative emotion	27 (12.4%)
V. Organised learning and camaraderie	10 (4.6%)
VI. Spirituality/religious beliefs	8 (3.7%)
VII. Shared humanity and emotional bonds	8 (3.7%)
VIII. Acknowledgment of human anatomical variations	7 (3.2%)
IX. Beauty and complexity of the human body	4 (1.8%)
X. Psychological detachment	2 (0.9%)

explain each of these themes, direct quotations have been extracted from the journals as follows.

THEME I: DISSECTING ROOM STRESSORS (27.6%)

The majority of respondents cited protest mass action as a cause of limited time in the dissecting room.

"Dissecting the lower limbs felt quite rushed since we had many disruptions due to the strikes."

The smell of the dissecting room caused physical discomfort with some students

"Our cadaver is very potent and after 2 hours the smell is unbearable, the chemicals are making your nose run and your eyes burn and everyone is unhappy."

"The size of the groups I feel are way too large. For example when it came to removing the heart every single group member insisted on cutting one vessel. This kinda ruined the learning experience as everyone was pushing each other out of the way in order to get to the cadaver. Therefore, no one really got to see what was going on."

Learning challenges

"We did the anterior and posterior compartment [of the lower limb]. I found this to be challenging because there are various new names of muscles we need to know. Also trying to understand the function of each muscle is difficult as we are trying to understand the movement of the muscle, origin and insertion without actually seeing the cadaver move."

Shortage of cadaveric material and poor quality of specimens

"I didn't like the condition that some of the specimens were in. They were tattered and this made it difficult for me to identify the structure as a whole."

THEME II: EDUCATIONAL VALUE OF DISSECTION (26.3%)

A total of 26.3% of journal responses referred to the cadaver as a useful tool for learning. The cadavers were depicted and viewed as a source of knowledge that ultimately helps others.

"It was nice to see the muscles in real life, and not only in a book."

"I felt working on the cadavers and dissecting was very helpful with understanding the body as a whole."

"Learning theoretically is just knowing what everything is but seeing, touching and identifying with variation is making a person understand the function relating to structure and how the structure is a certain way to perform a specific function."

THEME III: APPRECIATION, GRATITUDE, RESPECT AND CURIOSITY FOR THE CADAVER (18.9%)

Students' dominant positive emotion toward the cadaver was one of appreciation and gratitude. The responses expressed specific gratitude for the cadaver's role in contributing to the graduating of future "doctors and health practitioners."

"I think those who have donated have done a noble act and deserve honour and praise because they did something right which will not only improve the knowledge of students but it also prepares future doctors and other health practitioners."

Students were portrayed as respectful and compassionate people who were curious about the lives of the donors and who tried to get emotionally close to the cadaver. There was a feeling of wanting to further protect the cadaver from any harm.

"...I couldn't help but realize that this person had once had a life, filled with happiness and joy as well as pain and sadness."

"I believe that those that donate their bodies to medical research are the real heroes here. If it wasn't for them, then medicine wouldn't be where it is today. We need these selfless individuals and their families. Our responsibility as researchers is to respect their bodies by not doing anything insulting regardless of the fact that the human soul is no longer within them."

THEME IV: SENTIMENTS EXPRESSED IN THE DISSECTING ROOM (25.8%)

Positive emotion towards cadaver (13.4%)

The cadaver often evoked positive feelings of amazement, excitement and interest in students. Dissection became the vehicle that allowed the discovery of this marvel.

"Dissecting was an amazing experience of a lifetime although it can be frightening and exciting at the same time."

"It is exciting to open the human body, it inspires and improves knowledge."

Negative emotion towards cadaver (12.4%)

Dissection also appeared to arouse negative feelings of fear and anxiety, sometimes even revulsion and disgust, in some students.

"It was quite a shock seeing our cadaver for the first time. It was a very scary thing. I have never seen a dead person before, and found it very emotional to be by one. I was okay with the cadavers wrapped up, but seeing the flesh made me nauseous and emotional."

"...the sight of the cadaver makes me sick, the smell is even making things worse."

THEME V: ORGANISED LEARNING AND CAMARADERIE (4.6%)

Students mentioned aspects such as the advantages of prosected specimens, assistance from table demonstrators in the laboratory, benefits of learning theoretical information together with the practicals enhancing the learning experience and the importance of team work.

"It's always fun dissecting at the DH with my fellow classmates as we are able to prioritize and also make time for a little laughter. We always work as a team and this enables us to also learn faster."

"It was useful to have a lecture on the same subject matter in the morning before DH."

THEME VI: SPIRITUALITY/RELIGIOUS BELIEFS (3.7%)

In a student body characterized by religious diversity, some students made reference to their religious and cultural beliefs. These students thought about the souls of the deceased. However, the overall impression was that there seemed to be no contradiction or conflict between their faith and their science and they understood the benefit of the cadaver.

"I was scared at first when I saw the cadavers covered in the plastic bag like I used to see it in the movies."

I couldn't believe that those were dead people and I was going to touch and see. But there was a little excitement to see the body and dissect and see all these structures we learn in theory. But when I reported at home that I am doing this, it caused a big argument between me and father as he believes in ancestors. He told me that I am disturbing the peaceful soul as the person I am dissecting, he or she will come into my dreams. I also believe in ancestors so this made me thinking a lot about the excitement of seeing the internal organs and vessels."

"In my culture, it is pretty taboo to donate your body to science as it is believed that once you die, you are supposed to be buried with your forefathers and with all your organs intact and present. If your organs are missing, the elders believe that your soul won't be recognized by your ancestors and in effect your soul will never find peace and will roam freely and cause disruptions because it is restless and searching for their own."

THEME VII: SHARED HUMANITY AND EMOTIONAL BONDS (3.69%)

Connection was also expressed through recognizing the shared humanity of cadaver and student. Some students commented on the presence of nail polish on the cadaver's fingers. Such evidence of the cadaver's personhood triggered imagery about the life of the cadaver.

"Our first experience in the dissection hall was really emotional. I had mixed emotions as I was partially excited to see a real human body's anatomy first hand, but I was also sad when I saw the cadaver for the first time. I was able to man up and swallow my fears but when I saw our cadaver's hands, she had pink cutex and that humanized me more which brought on the waterworks."

Some students created an emotional bond with their cadaver by naming it and reflected on how access to this material had affected them personally.

"Chandler Bing is what I named our cadaver. Reason for his unique name: To give him a bubbly personality, as I imagined him to have had when he was alive."

THEME VIII: ACKNOWLEDGEMENT OF HUMAN ANATOMICAL VARIATIONS (3.2%)

Students also acknowledged the presence of anatomical variations.

"Discovered interesting variation of the left brachial artery. Trifurcated as opposed to bifurcated. Also does so in the arm as opposed to the cubital fossa. Such a discovery would not be possible without the use of cadavers."

Table 2. Positive sentiments expressed by students towards the cadaver

	Author (year)	Sample size (n)	Incidence (%)
Eager and excited	McGarvey et al. (2001) [52]	188	95
	Cahill and Ettarh (2009) [12]	166	19.2
	Mulu and Tebagu (2012) [55]	147	53.7
	Oyeyipo and Falana (2012) [62]	60	70
	Karau et al. (2014) [42]	75	85.3
	Kumar (2015) [45]	150	60
	Purvi et al. (2015) [71]	150	70.6
Enjoyable/fascinating/interesting	Cahill and Ettarh (2009) [12]	166	48.4
	Dubhashi et al. (2011) [20]	415	80
	Mulu and Tebagu (2012) [55]	147	91.8
	Kumar (2015) [45]	150	40
Surprise	Purvi et al. (2015) [71]	150	17.3
Helpful	Dubhashi et al. (2011) [20]	415	67
Sense of gratitude to people who donated their bodies	Dubhashi et al. (2011) [20]	415	8
Overall weighted mean			55.0

THEME IX: BEAUTY AND COMPLEXITY OF THE HUMAN BODY (1.8%)

Students were able to appreciate the complexity of the human body.

"Seeing the detail of the organs without the busi-ness of dissection and fear of the cadavers was fan-tastic as we could focus better on studying carefully the detail and appreciating our bodies' make-up"

THEME X: PSYCHOLOGICAL DETACHMENT (0.9%)

Some students felt that they had to separate themselves from the cadaver in order for them to get on with the job.

"I felt I had to separate myself from the cadaver and not think too much about the 'person' it once was but think of it as a 'body'."

DISCUSSION

The results of this study, following thematic analy-ses, illustrated that student participation in the journ-aling process promoted self-reflection about anatomy and health care, examined the student-cadaver re-lationship, probed questions about spirituality and religion and explored the emotional responses to dissection. Our study compares favourably with that reported by Shapiro et al. [78], who cited that stu-dents actively engage in reflecting on the meaning and significance of anatomy — with some students having a tendency to emotionally over — identify with cadavers, whilst others were more likely to imagine them humanistically.

Students were able to articulate awe and wonder at the intricacies of the human body and express apprecia-tion for the gift of the donor. In this study, students were able to appreciate the value of dissection concurring with numerous studies in the literature that advocate the use of dissection as a teaching tool [3, 12, 39, 40, 53, 97].

Stressors associated with dissection have been well-documented and available literature suggests that the majority of students studying anatomy adapt well to these stressors for the duration of their course [14, 25, 66, 75].

The present study, following an extensive literature survey, illustrates that students experience an array of positive (Table 2) and negative (Table 3) sentiments to-wards dissection. A calculated overall weighted mean of the positive sentiments (55%) compared favourably to the sentiment of eagerness and excitement as reported by Mulu and Tebagu [55] (Table 2). Students' positive attitudes towards dissecting human cadavers could be related to a representation of the body, life and death leading to a future professional assuming a more humane relationship with his/her future patients [29]. In this study, an overall weighted mean of 37.4% obtained for negative emotions towards cadaveric dissection concurred with feelings of fear and anxiety as expressed by Oyeyipo and Falana [62], as well as that of hesitancy to dissect the cadaver as reported by Izunya et al. [37] (Table 3).

An overall calculated weighted mean of 15.2% for a diverse range of physical effects experienced by students in the dissecting laboratory was similar to that reported by various authors in the literature, viz. loss of appetite [45], dizziness [64], palpitations [27] and restlessness

Table 3. Negative sentiments expressed by students towards cadaver

	Author (year)	Sample size (n)	Incidence (%)
Fear/anxiety	Javadnia et al. (2006) [38]	68	32
	Dubhashi et al. (2011) [20]	415	61
	Gualdrón et al. (2011) [29]	904	23.3
	Naz et al. (2011) [56]	500	16
	Bernard (2012) [6]	212	60
	Mulu and Tebago (2012) [55]	147	12.2
	Oyeyipo and Falana (2012) [62]	60	36.7
	Patel et al. (2012) [64]	150	24
	Agnihotri and Sagoo (2010) [2]	300	86.7
	Bob et al. (2015) [8]	138	40.6
	Kumar (2015) [45]	150	61.3
	Saha et al. (2015) [74]	99	3
	Somanath et al. (2015) [82]	141	14 (M); 17 (F)
Emotional shock	Izunya et al. (2010) [37]	104	53
	Karau et al. (2014) [42]	75	30.7
	Somanath et al. (2015) [82]	141	24 (M); 35 (F)
	Naz et al. (2011) [56]	500	16.2
Stress	McGarvey et al. (2001) [52]	188	2
Hesitancy to dissect the cadaver	Izunya et al. (2010) [37]	104	35
	Dubhashi et al. (2011) [20]	415	40
	Saha et al. (2015) [74]	99	24.2
	Somanath et al. (2015) [82]	141	41 (M); 50 (F)
Depression	Kumar (2015) [45]	150	14.7
Horror	Purvi et al. (2015) [71]	150	12
Sense of feeling sad	Evans and Fitzgibbon (1992) [23]	167	41
	Oyeyipo and Falana (2012) [62]	60	46.7
	Patel et al. (2012) [64]	150	21.3
Overall weighted mean			37.4

[2, 38] (Table 4). Table 5 outlines a number of physical and psychological factors emanating from student-cadaveric interaction. Many students complained of the “smell” of the dissecting laboratory (Bataineh et al. [5] (58.5%), Mulu and Tebago [55] (52.4%) and thoughts about the donor [64]; these studies are akin to the calculated overall weighted mean of 55.8% culled from the literature.

In this study, students took it upon themselves to name the cadaver, thereby connecting emotionally with the donor (3.7%). This concurs with that reported by Williams et al. [93], who stated that the practice of naming cadavers is an extremely prevalent occurrence among medical students and that this sort of inventive naming serves as a beneficial coping mechanism. Naming “allows students to acknowledge the cadaver’s personhood, while psychologically shielding themselves enough to be comfortable with the dissection” [93]. Our study also highlighted an urgent need to know, in the form of

curiosity, details regarding the life of the donor (18.9%), concurring with that reported by Fitzgerald [26].

Our students come from various socio-economic backgrounds and belong to a wide range of religious and cultural groups [10]. In this investigation, students commented on issues of spirituality and cultural beliefs as stressors to dissection. Sobnach et al. [80] highlighted the importance of an intact body in certain religious groups. This belief is associated with respect for the ancestors and the idea of an after-life [46, 48]. We made similar observations in our study, where students who believed in an after-life (the concept of ‘amadlozi’) (3.7%) were significantly affected by cadaveric dissection.

The interpretation of student journal writing suggests a variety of expressions experienced by students. Inviting students to reflect is asking students to share their deepest thoughts [21]. Students appreciated the opportunity to share their emotions and reflect on the

Table 4. Physical effects experienced by students in the dissecting room

	Author (year)	Sample size (n)	Incidence (%)
Fainting	Mulu and Tebagu (2012) [55]	147	2
	Patel et al. (2012) [64]	150	2
	Getachew (2014) [27]	206	3.4
	Purvi et al. (2015) [71]	150	1.3
Loss of appetite	Abu-Hijleh et al. (1997) [1]	205	22.5
	Patel et al. (2012) [64]	150	2.7
	Getachew (2014) [27]	206	38.8
	Kumar (2015) [45]	150	12
Dizziness	Javadnia et al. (2006) [38]	68	2.9
	Agnihotri and Sagoo (2010) [2]	300	2
	Patel et al. (2012) [64]	150	12
	Getachew (2014) [27]	206	24.3
	Kumar (2015) [45]	150	2.7
Nausea	Javadnia et al. (2006) [38]	68	29
	Agnihotri and Sagoo (2010) [2]	300	30
	Mulu and Tebagu (2012) [55]	147	0.7
	Patel et al. (2012) [64]	150	22
	Getachew (2014) [27]	206	30.1
	Kumar (2015) [45]	150	3.3
	Patel et al. (2012) [64]	150	2
Vomiting	Getachew (2014) [27]	206	2.4
	Mulu and Tebagu (2012) [55]	147	36.1
Sweating	Patel et al. (2012) [64]	150	8
	Getachew (2014) [27]	206	21.4
	Kumar (2015) [45]	150	35.3
	Mulu and Tebagu (2012) [55]	147	5.4
Palpitation	Patel et al. (2012) [64]	150	0.7
	Getachew (2014) [27]	206	15
	Patel et al. (2012) [64]	206	2
Insomnia	Getachew (2014) [27]	206	9.2
	Javadnia et al. (2006) [38]	68	38.7
Lack of concentration	Agnihotri and Sagoo (2010) [2]	300	40
	Javadnia et al. (2006) [38]	68	19
Restlessness	Agnihotri and Sagoo (2010) [2]	300	18.7
	Mulu and Tebagu (2012) [55]	147	27.2
Eye irritation	Kumar (2015) [45]	150	63.3
	Kumar (2015) [45]	150	10
Headache	Mulu and Tebagu (2012) [55]	147	10.9
	Kumar (2015) [45]	150	9.3
Desire to leave the dissecting room	Cahill and Ettarh (2009) [12]	166	17.4
	Patel et al. (2012) [64]	150	39.3
No symptoms			
Overall weighted mean		15.2	

humanistic dimension of anatomy as illustrated by this quotation, *"I am thankful for this journal because it allows me to express my thoughts and feelings about my journey since it's difficult to speak to anyone else without freaking them out"*. Research that provides insight into the undergraduate student experience, perceptions and outcomes of reflective-journaling, is required to validate

the continued use of reflective-journaling as a way to develop reflective skills.

RECOMMENDATIONS FOR FUTURE RESEARCH

Since this was the first time that such journal writing was conducted in our Discipline at our University,

Table 5. Physical and psychological factors emanating from cadaver interaction

	Author (year)	Sample size (n)	Incidence (%)
Complaints of smell	Abu-Hijleh et al. (1997) [1]	205	91
	Bataineh et al. (2006) [5]	145	58.5
	Agnihotri and Sagoo (2010) [2]	300	66.7
	Dubhashi et al. (2011) [20]	415	78
	Mulu and Tebagu (2012) [55]	147	52.4
	Patel et al. (2012) [64]	150	42.7
	Getachew (2014) [27]	206	60.2
	Saha et al. (2015) [74]	99	61.1
Fear of infection	Abu-Hijleh et al. (1997) [1]	205	62
	Bataineh et al. (2006) [5]	145	50.3
	Patel et al. (2012) [64]	150	4
	Getachew (2014) [27]	206	33.5
Recurring visual images of the cadaver	Abu-Hijleh et al. (1997) [1]	205	38
	Agnihotri and Sagoo (2010) [2]	300	90
Negative influence on routine activities	Dubhashi et al. (2011) [20]	415	52
Thoughts of leaving the course	Dubhashi et al. (2011) [20]	415	5
	Saha et al. (2015) [74]	99	4
	Naz et al. (2011) [56]	500	18.6
Conflict with religious beliefs	Naz et al. (2011) [56]	500	37.6
Curiosity or thoughts about the donor	Dubhashi et al. (2011) [20]	415	95
	Gualdrón et al. (2011) [29]	904	84.7
	Patel et al. (2012) [64]	150	58.7
Overall weighted mean			55.8

understanding undergraduate student experiences and perspectives could inform guiding principles and strategies that could serve to make reflective journaling more valuable and desirable. Some recommendations are as follows.

Even though Dedication Ceremonies are held at the beginning of the anatomy academic calendar, these pre-education sessions must be handled delicately and sensitively. Pre-education must include a professional counsellor so that students can opt for individual counselling if need be. The authors support the views expressed by Jones et al. [41] regarding implementation of memorial ceremonies for body donors in the anatomy programme. These ceremonies should be student driven to explore learners' reflections on humanity, respect, gratitude and personal growth.

Students should be advised to prepare mentally and emotionally before entering the dissecting laboratory so that they are emotionally involved and stimulated. Better preparation and debriefing for coping with dissection is required as there is some evidence to suggest that individuals can be "inoculated" against the stressful effects of handling a dead body [51]. Hafferty [31] referred to the cadaver as the "ambiguous man" to highlight its material (i.e. of being a teacher and not

viewed as a mere medical object) as well as its personal qualities (name, age, cause of death). Several authors suggest that supplying as much personal and medical history of the cadaver would reinforce respect and compassion to interested students [19, 69, 86, 88–90]. This may alleviate some of the stresses experienced by students. We also support the recommendations by some researchers that there is a need for the inclusion of courses on emotions and how to manage them in the anatomy curriculum [50] and concur with Nnodim [59] that a formal course on death and dying should begin at the pre-clinical level and extend into the clinical years.

We support the views expressed by Weeks et al. [89] that students should be encouraged to talk about the thoughts and feelings aroused by dissection and to reflect on these experiences. The authors propose that a commemoration ceremony be held at the end of an emotionally and intellectually demanding course to give students closure.

One limitation of this study is that we did not have detailed statistical socio-demographic data on the students to weight the results for representativeness. However, a strength of the study is the successful implementation of a research tool to document student-dissection room experiences. In future studies, we

would like to investigate the possible role of creative journaling as a component of the course assessment.

Educators need to hold onto their ideals and continue to “teach to change the world” [21] and we support Hildebrandt’s [33] recommendation that “it is the duty of anatomical educators to prepare, accompany and support students during the challenging situation of the dissection course”. Perhaps developing a method where students are given more information about their cadaver, while protecting the anonymity of the donor and family would be beneficial in alleviating strong emotional student responses. Anatomy educators are correct in pursuing the teaching and learning of reflection in undergraduate education and it behoves them to utilise various tools and strategies to facilitate the growth of students into reflective practitioners. Reflective activities provide students with opportunities to think critically and can provide personal learning, transformation and better understanding leading to self-actualisation. Such a student with improved personal attributes will be better positioned to provide excellent healthcare. If reflective learning is to be made a course requirement, it is important that the assessment is formative and does not distort the demonstrated benefits. Anatomists need to explain in detail the steps necessary for dissection and that dissection is performed with the respect of legislation, ethics and human rights.

CONCLUSIONS

We believe that our study offers essential information on encouraging self-reflection regarding anatomy and health care, examining the student-cadaver relationship, probing questions about spirituality and religion and exploring the emotional responses to dissection. This study also indicates that such journal writing may be a way of assisting students who experience anxiety and stress to first explore and then reduce these negative emotions. Integrating creative projects such as journal writing into anatomy courses should be encouraged as it provides a means of enhancing and enriching student awareness on issues that many students wonder about but cannot express easily.

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