Received: 22 August 2023 | Revised: 10 November 2023 | Accepted: 17 November 2023

DOI: 10.1002/vetr.3712

Vet Record

ORIGINAL RESEARCH

How do veterinary students perceive and prepare for compulsory slaughterhouse visits?

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Abstract

Background: Veterinary students in the UK must visit a slaughterhouse as part of their studies. There is currently limited evidence exploring how students perceive these visits or which activities have been implemented to support learning during a visit that may be emotionally challenging.

Methods: Veterinary students at the Royal Veterinary College and the University of Glasgow were invited to complete an online survey and participate in follow-up focus groups.

Results: Participants appreciated the important role that veterinarians play in the slaughterhouse. Most (69%) agreed that in-person visits are important and would choose to visit, with around half (49%) thinking it should be optional. Previous slaughterhouse experience improved students' views towards compulsory in-person visits. Teaching events covering the slaughter process, videos and discussion sessions were perceived as useful preparatory activities. Anxiety was the most common emotion associated with visits.

Limitations: The response rate was low, at 15.6%, and a small number of students participated in focus groups. Data on diets and gender were not collected.

Conclusion: Slaughterhouse visits are valued by students, although they can cause negative emotions. Managing expectations and increasing awareness of visitation requirements during the application process and subsequent studies may improve the educational and emotional experience of visits.

INTRODUCTION

Veterinary professionals play a vital role in the slaughterhouse. They safeguard animal health and welfare, ensure food safety and help maintain public trust in food production.[1] It is important, therefore, that those training to be veterinary professionals are provided with the knowledge and experiences necessary to be able to undertake such roles upon graduation. The Royal College of Veterinary Surgeons (RCVS) regards slaughterhouse visits as a necessary part of veterinary education. Within their accreditation standards, it states that 'Clinical education in veterinary public health (VPH) training must be complemented by direct exposure in commercially run, approved abattoirs'.[2] Practical work in slaughterhouses as a core component of undergraduate veterinary training is also required in the European Union,[3] and it is included in the World Organisation for Animal Health (WOAH) recommendations to achieve Day 1 competences.[4] As a result, all veterinary students in the UK must visit a slaughterhouse at least once during their undergraduate studies.

Students typically enter veterinary medicine because they love animals and want to care for them,[5] with the majority of students at UK veterinary educational establishments (VEEs) envisioning a career in clinical practice upon graduation.[6] Recent reports suggest that the levels of vegetarianism and veganism among UK veterinary students are higher relative to those within the general population.[7] This is fairly unsurprising, while there are multiple motivations for a meat-free diet, ethical issues remain as the primary reason for the majority.[8] As described by Gadenne,[9] the objectives of the veterinary profession (in its dedication to the care of animals) and the ideology of

ethical vegans (in opposing the harm of animals) are somewhat congruous.

Although it is widely regarded that the slaughter of animals for food is an emotive topic, there is currently limited literature regarding how veterinary students perceive slaughterhouse visits. Anecdotal reports describe veterinary students as 'uninspired' and 'disinterested' at the beginning of slaughterhouse visits, although they gain confidence throughout the placement,[10] while Seguino et al.[11] reported that 98% of students included in their study found the slaughterhouse visit an interesting experience. The emotional impact of animal slaughter on Dutch veterinary students has been studied in more depth by Hulsbergen et al.[12] The authors reported that 'tense' and 'insecure' were the most frequently reported emotions by students prior to their slaughterhouse experience. It is noted, however, that Dutch veterinary students carry out the slaughter of an animal, which is not normally the case at UK VEEs.

Negative emotions, especially when experienced at a high intensity, can be detrimental to learning.[13] Previous studies have described that unfamiliar environments, unclear expectations,[14] lack of preparation time and lack of self-confidence[15] can be significant sources of negative emotions for veterinary students. Recently, technologies such as e-learning[16] and virtual reality[11,17,18] (VR) have been developed to enhance the learning experience of veterinary students in slaughterhouse operations. However, the impact of these tools on the emotional preparedness of students for an in-person visit to a slaughterhouse is not clear.

Therefore, this study had three aims:

1. Evaluate students' perceptions of slaughterhouse visits as part of their core curriculum.
2. Assess what emotions are associated with a slaughterhouse visit.
3. Identify resources currently used to improve student learning and emotional experience during a slaughterhouse visit.

METHODS

To address the aims of this study, quantitative and qualitative data were obtained through an online anonymous survey, followed by a focus group. Two UK VEEs participated in this project: the School of Biodiversity, One Health and Veterinary Medicine at the University of Glasgow (SBOHVM) and the Royal Veterinary College (RVC).

Survey development and distribution

A combined approach using review and summarisation of the scientific literature and anecdotal reports, alongside expert opinion elicitation, was used in the identification of suitable questions to be used in a survey. The survey was anonymous and conducted online using Jisc Online Surveys software.[19] It was piloted with a group of six SBOHVM students prior to distribution, which resulted in minor changes being made to the layout and wording of the questions.

The survey consisted of 15 questions, including single-answer responses, Likert items and open-text questions, distributed in three main sections:

1. Participant information—included questions regarding, age, year of study, nationality, whether the participant had previously been to a slaughterhouse and whether they were aware that slaughterhouse visits are required during their veterinary training.
2. Views on slaughterhouse visits as a learning event and activities used by students to prepare for the learning experience.
3. Views on the emotional impact of slaughterhouse visits and the activities used by students to emotionally prepare for the visit.

At the end of the survey, participants were invited to enter their email addresses should they wish to be invited to follow-up focus groups.

The survey was distributed to all students enrolled in the veterinary medicine course at the SBOHVM during April and May 2022 and the RVC during November and December 2022. The survey was distributed by sending a weblink via email to the students to allow them to participate at a convenient time. The survey was open for a 4-week period and a 'reminder' email was sent 2 weeks prior to the survey closing.

Following data collection, the raw data were exported from JISC to Microsoft Excel (version 2305, build 16.0.16501.20074). Cleaned quantitative data were then exported to IBM SPSS Statistics (version 26, IBM). Mann–Whitney *U*-tests were used to test for differences in the distribution of answers to the Likert scales between respondents who had previous slaughterhouse experience and those who did not.

The data from participant responses to the open-ended text questions were analysed using an inductive, manifest content analysis[20] to identify themes in responses to each open-text question. Themes were included in the analysis if they were present in more than 3% of responses.

Focus groups

Participants who entered their email addresses were invited to attend a focus group. The aim of the focus groups was to gather further data on student views of slaughterhouse visits by encouraging participants to elaborate on questions included in the survey. The focus groups took place on Zoom (Zoom Video Communications, https://zoom.us/). At the SBOHVM, five focus groups were run in July 2022, each with two students. At the RVC, two focus groups were run in June 2023, each with three students. Focus groups were conducted by authors S.S. and L.F., who at the time of data collection were veterinary students at the SBOHVM. These students were given training prior to

facilitating the first focus group. All focus groups lasted between 45 minutes and 1 hour.

Focus group sessions were recorded, and the transcripts were analysed using NVivo 12 software (QSR International, version 12, 2018) to identify themes in the qualitative data. Two authors (E.W. and S.S.) independently coded the data to allow for cross-matching of themes. Representative participant quotes included in subsequent sections have been anonymised.

RESULTS

Participants

A total of 340 participants completed the survey; 38.8% (132) were from the SBOHVM and 61.2% (208) were from the RVC. All respondents completed the majority of the questions; therefore, all were included in the analysis. Third-year students were the most represented at 30.6% (104) of respondents, followed by fifth-year students at 19.7% (67), fourth-year students at 19.4% (66), second-year students at 15% (51), first-year students at 13.2% (45) and 'other' at 2.1% (7). Over two-thirds of the respondents, 69.1% (235), were in the 20–25 years age bracket, with 17.1% (58) in the 26–30 years bracket, 8.5% (29) under 20 years, 3.2% (11) in the 31–35 years bracket, 1.8% (6) in the 36–40 years bracket and 0.3% (1) over 40 years. The majority of respondents were from the UK (57.6%, 196), followed by 32.4% (110) from the Americas, 5% (17) from Asia and 5% (17) from the rest of Europe. Over one-third (37%, 125) had previous experience in a slaughterhouse prior to completing the survey, and 13.8% (47) had slaughterhouse experience during their veterinary studies.

A total of 16 students participated in the focus groups. The majority of those participating in the focus group had no previous slaughterhouse experience[10]; one focus group participant was in their second year of study, eight in their third year, five in their fourth year and two in their fifth year.

Survey responses

Students' perceptions of slaughterhouse visits as part of their veterinary school curriculum

Of the total study population, 31% (105) of participants were not aware of the requirement to visit a slaughterhouse as part of the veterinary curriculum. Seven respondents expanded on this in the open-text questions:

> 'I was not aware of mandatory slaughterhouse visits. I am now in third year'.

> 'Before completing this survey I did not know that I needed to visit a slaughterhouse'.

> 'The first thing I knew of it being part of my vet training was in the email I received with this survey. I knew some vet schools had it as compulsory but I didn't know it was compulsory at RVC'.

Overall, 94% (320) of respondents either agreed or strongly agreed that veterinarians have an important role to play in the slaughterhouse, 69% (236) agreed or strongly agreed that a slaughterhouse visit is important in their education and 51% (175) disagreed or strongly disagreed that classroom learning would be sufficient (Table 1). There was a significant difference in the distribution of answers between respondents with previous slaughterhouse experience and those without for all Likert items (Table 1). Compared to those without, a higher percentage of participants with previous slaughterhouse experience agreed that a visit is important, is a valuable learning opportunity, that veterinarians have an important role in the slaughterhouse and would choose to visit a slaughterhouse. A lower percentage of those with previous experience agreed that classroom-only teaching is sufficient.

'Importance' and 'good learning experience/helpful' were themes in the open-text responses to the questions 'Imagine you have been told you are visiting a slaughterhouse tomorrow; how would you feel?' (Table 2) and 'Any other comments?'. Out of a combined total of 483 responses to those questions, 23% (109) mentioned 'importance' and 5% (23) mentioned 'good learning experience/helpful'.

Sixty-two percent (210) of respondents either agreed or strongly agreed they would choose to visit a slaughterhouse as part of their training. However, 49% (165) agreed or strongly agreed that the visits should be optional. There was a significant difference in the distribution of answers between respondents with previous slaughterhouse experience, in which a higher percentage disagreed that visits should be optional, and those without previous experience, and a higher percentage of those with previous experience would choose to visit the slaughterhouse (Table 1).

'Making visits optional' was identified as a theme in the responses to three of the open text boxes: What could you suggest to your veterinary school in order to improve the learning experience either before, during or after a slaughterhouse visit organised as part of your course? (Table 3). What could you suggest on how your veterinary school could help improve how emotionally prepared you are for a slaughterhouse visit? (Table 4). Any other comments? Of a total of 499 responses to these questions, 103 (20.6%) mentioned that visits should be optional. Eleven responses (2.2%) mentioned that visits should be mandatory.

What emotions are associated with a slaughterhouse visit?

Sixty percent (204) of respondents answered that their emotions would be impacted by visiting a slaughterhouse, with 62% (211) agreeing or strongly

TABLE 1 Responses to Likert item questions as percent (*n*).

	Previous slaughterhouse experience	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean[a]	Significance, *p*
Visiting a slaughterhouse is an important part of my veterinary education.	No	14.9 (32)	15.8 (34)	6.5 (14)	34.9 (75)	27.9 (60)	3.45	<0.0001
	Yes	10.4 (13)	3.2 (4)	5.6 (7)	30.4 (38)	50.4 (63)	4.07	
	Total	13.2 (45)	11.2 (38)	6.2 (21)	33.2 (113)	36.2 (123)	3.68	
Visiting a slaughterhouse will provide a valuable learning opportunity.	No	12.1 (26)	9.3 (20)	12.1 (26)	34.4 (74)	32.1 (69)	3.65	<0.0001
	Yes	7.3 (9)	6.5 (8)	8.1 (10)	25.0 (31)	53.2 (66)	4.10	
	Total	10.3 (35)	28.2 (28)	10.6 (36)	30.9 (105)	135 (39.7)	3.82	
We can be taught everything we need to know about slaughterhouses in the classroom environment.	No	7.9 (17)	35.3 (76)	17.2 (37)	22.3 (48)	17.2 (37)	3.06	<0.0001
	Yes	19.2 (24)	46.4 (58)	11.2 (14)	16.0 (20)	7.2 (9)	2.46	
	Total	12.1 (41)	39.4 (134)	15 (51)	20 (68)	13.5 (46)	2.84	
Veterinarians have an important role to play in the slaughterhouse.	No	0.4 (1)	1.9 (4)	4.7 (10)	30.7 (66)	62.3 (134)	4.53	<0.0001
	Yes	0.4 (1)	0 (0)	3.2 (4)	15.2 (19)	80.8 (101)	4.75	
	Total	0.6 (2)	1.2 (4)	4.1 (14)	25 (85)	69.1 (235)	4.61	
Given the choice, I would visit the slaughterhouse.	No	28.8 (62)	9.8 (21)	4.7 (10)	29.3 (63)	27.4 (59)	3.17	0.01
	Yes	16.1 (20)	6.5 (8)	6.5 (8)	28.2 (35)	42.7 (53)	3.75	
	Total	24.1 (82)	8.5 (29)	5.3 (18)	28.8 (98)	32.9 (112)	3.38	
Visits to the slaughterhouse should be optional.	No	8.8 (19)	19.1 (41)	16.3 (35)	25.6 (55)	30.2 (65)	3.49	<0.0001
	Yes	25.8 (32)	23.4 (29)	14.5 (18)	16.9 (21)	19.4 (24)	2.81	
	Total	15.0 (51)	20.6 (70)	15.6 (53)	22.4 (76)	26.2 (89)	3.24	

Note: Significance in differences of distribution of answers between participants with and without previous slaughterhouse experience calculated using Mann–Whitney *U*-test.
[a]Likert scale from 1 (strongly disagree) to 5 (strongly agree).

TABLE 2 Open-ended responses to the question 'Imagine you have been told you are visiting a slaughterhouse tomorrow; how would you feel?'

Theme	Example quote	Percentage of responses
Nervous/anxious	I would feel quite apprehensive	31
Sad/unhappy	I think that emotionally I will be upset by the experience	19.8
Important	I feel it is important to understand the roles of veterinarians outside of general practice	19.1
Fine	Would have no strong feelings either way	17.5
Interested	I would be interested to understand the processes that minimise stress for the animal	12.9
Excited	Since farm animal medicine is a future prospect I am excited to visit a slaughterhouse	10.6
Useful/good learning experience	Feel like you can only learn properly by visiting in person	9.6
Unprepared	Ill prepared for what I would see	8.9
Uncomfortable	Uncomfortable	5.6
Look forward	I would look forward to learning more about it	5.3
Do not want to go	Do not want to see the slaughtering of animals	5.3

Note: Theme included in the table if mentioned in over 3% of responses ($n = 303$).

agreeing that they felt some apprehension about visiting the slaughterhouse. Just over one-third (116) felt positive about a slaughterhouse visit (Table 5). There was a significant difference in the distribution of answers between respondents with previous slaughterhouse experience and those without for all Likert items (Table 5). Compared to those without, a higher percentage of participants with previous slaughterhouse experience felt positive about a visit, and a lower percentage felt apprehensive or unsure of what to expect.

Open-ended responses to the question 'Imagine you have been told you are visiting a slaughterhouse tomorrow; how would you feel?' are given in Table 2. The key comments were that respondents felt nervous/anxious and sad/unhappy about the visit. Other responses were more positive describing feelings of excitement and the importance of a visit.

TABLE 3 Open-ended responses to the question 'What could you suggest to your veterinary school in order to improve the learning experience either before, during or after a slaughterhouse visit organised as part of your course?'

Theme	Example quote	Percentage of responses
More lectures/content/information	More info about the slaughtering process and what particular aspects we should be observing	17.6
Discussions/Q&As	A discussion with staff members who have spent time in a slaughterhouse before and after the visit would be helpful	16.4
Not go/alternative option	Make the visit optional with online material in replacement	15.1
Know what to expect/how to act	Briefing of what to expect and ways to cope in case something unexpected happens	8.4
Videos	Show more videos	8.0
Already good	Think our veterinary school has gone into great detail about slaughterhouse practice and so I do not think we would need any additional experience before seeing it in person	5.4
Virtual reality	The 3D goggles experience was brilliant	5.4
Warning	They should plan for a date weeks or months ahead to allow students to prepare	5.0
Emotional support	Offer sessions to allow students to cope with their emotions pre and post visit	4.2
More/earlier visits	I think the visit to a slaughter house could come earlier in our time at university. Multiple visits to different slaughter house types could be beneficial	3.7

Note: Theme included in the table if mentioned in over 3% of responses ($n = 238$).

TABLE 4 Open-ended responses to the question 'What could you suggest on how your veterinary school could help improve how emotionally prepared you are for a slaughterhouse visit?'

Theme	Example quote	Percentage of responses
Discussions with staff/students	To discuss the various emotional and mental impacts	17.5
Emotional support	Make sure students are aware of the support they can get	14.1
Videos	Videos honestly help	10.3
Review of material/more information	Lectures on the topic, explain what happens and also why	7.7
Not the role of the University/nothing can be done	I think that is a deeply personal issue and not one the school has the capacity to aide	6.0
Acknowledgement of emotions by staff	Tell us that our feelings are understandable and valid	5.6
Give clear expectations	Give the real view rather than a loose overview of the experience	5.1
Make the visit optional	Option to opt out of visit	5.1
Give warning	Give us warning of how the visit may make us feel	3.8
Virtual reality	The virtual reality content was the best was to prepare me	3.4

Note: Theme included in the table if mentioned in over 3% of responses ($n = 234$).

What resources are used to improve student learning and emotional experience during a slaughterhouse visit?

Lectures and videos were the activities most used by respondents to prepare for learning during a slaughterhouse visit. They were also reported as the most useful activities, with 86.7% (235) and 82.9% (213) of respondents reporting them as very helpful or somewhat helpful, respectively. Virtual tours (3D) were the most unhelpful activity to prepare the respondents, with 21.4% (35) reporting them as very unhelpful or somewhat unhelpful; however, in general, all of the activities included in the survey were deemed helpful (Figure 1).

Open-ended responses to the question 'What could you suggest to your veterinary school in order to improve the learning experience either before, during or after a slaughterhouse visit organised as part of your course?' are given in Table 3. More learning materials, discussions and question-and-answer sessions were the most prevalent responses.

Respondents considered videos and farm animal practicals/extramural studies (EMS) as the most useful activities to emotionally prepare them for a slaughterhouse visit, with 66.2% (172) and 62.7% (145) of respondents, respectively, reporting them as very helpful or somewhat helpful. Lectures were the most unhelpful activity to emotionally prepare the respondents, with 28.8% (76) reporting them as very

TABLE 5 Responses to Likert item questions as percent (*n*).

	Previous slaughter-house experience	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean[a]	Significance, *p*
I feel positive about visiting the slaughterhouse.	No	31.1 (67)	19.5 (42)	20.9 (45)	19.5 (42)	8.8 (19)	2.55	<0.0001
	Yes	16.1 (20)	9.7 (12)	29.8 (37)	23.4 (29)	21.0 (26)	3.23	
	Total	25.6 (87)	15.9 (54)	24.1 (82)	20.9 (71)	13.2 (45)	2.8	
I have some apprehension about visiting the slaughterhouse.	No	6.5 (14)	9.8 (21)	10.2 (22)	37.7 (81)	35.8 (77)	3.87	<0.0001
	Yes	15.3 (19)	23.4 (29)	18.5 (23)	29.0 (36)	13.7 (17)	3.02	
	Total	9.7 (33)	14.7 (50)	13.2 (45)	34.4 (117)	27.6 (94)	3.56	
My emotions will not be impacted by the prospect of visiting a slaughterhouse.	No	36.3 (78)	30.7 (66)	12.1 (26)	13.5 (29)	7.4 (16)	2.25	<0.0001
	Yes	19.4 (24)	29.0 (36)	16.9 (21)	16.9 (21)	17.7 (22)	2.85	
	Total	30.0 (102)	30.0 (102)	13.8 (47)	14.7 (50)	11.2 (38)	2.47	
I am not sure what to expect on my slaughterhouse visit.	No	9.3 (20)	20.5 (44)	22.8 (49)	36.3 (78)	11.1 (24)	3.20	<0.0001
	Yes	33.0 (41)	38.7 (48)	17.7 (22)	8.1 (10)	2.4 (3)	2.08	
	Total	17.9 (61)	27.1 (92)	20.9 (71)	25.9 (88)	7.9 (27)	2.79	

Note: Significance in differences of distribution of answers between participants with and without previous slaughterhouse experience calculated using Mann–Whitney *U*-test.
[a]Likert scale from 1 (strongly disagree) to 5 (strongly agree).

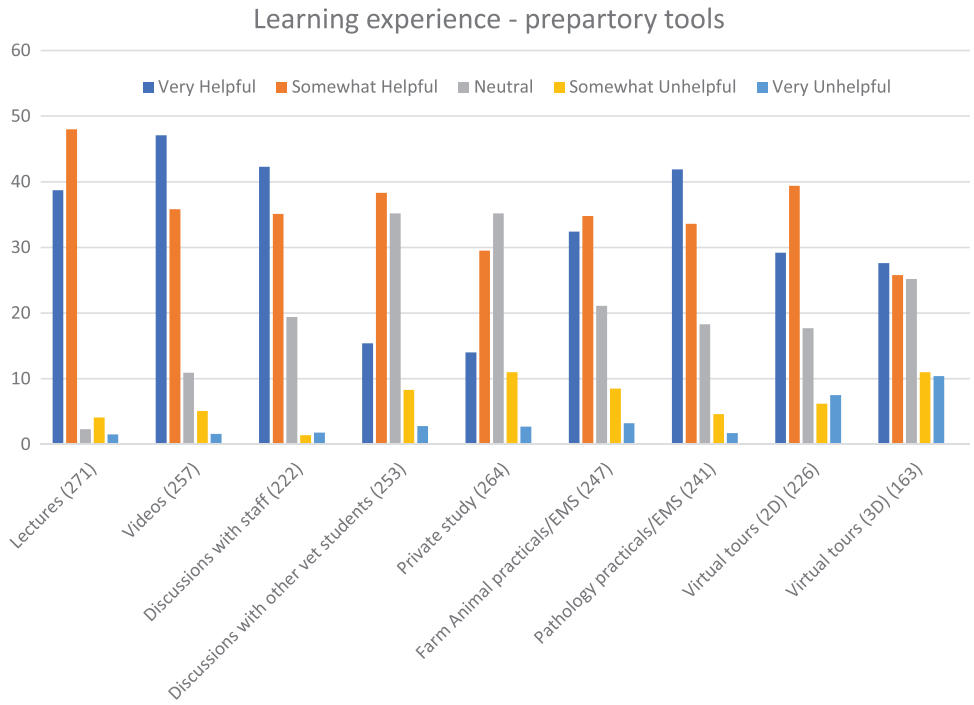

FIGURE 1 Perceived helpfulness of different activities in improving the student learning experience of slaughterhouse visits, given as a percent of respondents who have experience with the activity. The number of respondents who had reported experience of each activity is given in brackets on the *x*-axis. EMS, extramural studies

unhelpful or somewhat unhelpful. All activities included in the survey were deemed helpful overall (Figure 2).

Open-ended responses to the question 'What could you suggest on how your veterinary school could help improve how emotionally prepared you are for a slaughterhouse visit?' are given in Table 4. Discussions with staff and/or students, specific emotional support and videos were the most prevalent responses.

Focus group responses

In the analysis of the focus group data, three themes were identified. These were:

1. The necessity for in-person slaughterhouse visits.
2. Feelings of anxiety/nervousness associated with slaughterhouse visits.
3. Methods for improving in-person slaughterhouse visits.

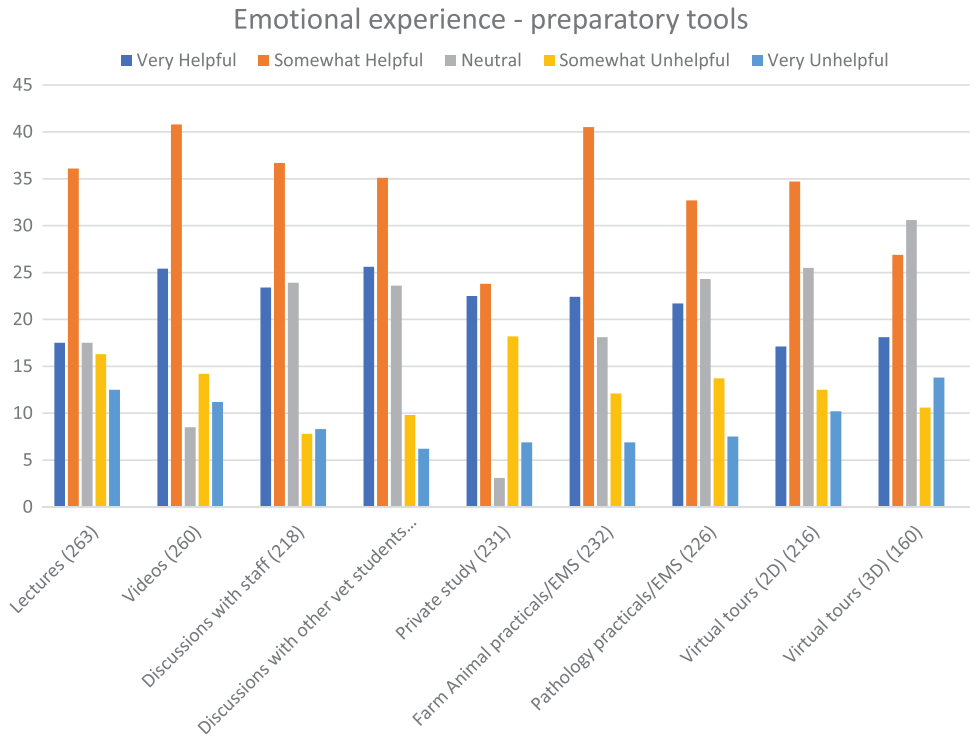

FIGURE 2 Perceived helpfulness of different activities in improving student emotional preparedness for slaughterhouse visits, given as a percent of respondents who have experience with the activity. The number of respondents who had reported experience of each activity is given in brackets on the *x*-axis. EMS, extramural studies

The necessity for in-person slaughterhouse visits

Within this theme, there were two distinct and opposing viewpoints from the focus group responses. Some students believed that in-person slaughterhouse visits are an important requirement for all veterinary students to complete, with the reasons given including the role of the veterinarian in public education, the use of animal products in pet food and getting a well-rounded educational experience. Meanwhile, others expressed the feeling that in-person slaughterhouse visits may be more important for some veterinary career paths than others. While a veterinarian should know aspects of each species, including the final path of production animals, it would be less necessary for someone who aspires to work as a small animal practitioner. Nine focus group participants stated that visits should be optional. Multiple participants suggested that there be an option for moral, religious or emotionally distressing excusal, with a potential substitution using another related activity so that educational content regarding the slaughterhouse is still delivered to that student, without the potentially negative emotional or mental impact. However, it was identified by participants that a virtual experience does not fully capture the experience of an in-person visit, for example:

> 'There are some things I don't think the virtual will necessarily capture. Well, like something that threw me off was the sheep had a lot of like postmortem what it's called, but like muscle fasciculations like they twitched so much after death. It was something I personally never seen before. I don't think a simulation can really kind of prepare you for like how fast the cow drops … but just like what it takes to slaughter a cow … you have to open the neck, and then go … it's a very unique experience … like there's just some things that you won't be able to capture in a virtual sense. So I think at least one [visit] is necessary'. Participant F

Other participants agreed and commented that the academic benefits they get from online resources feel significantly lower than those they get from in-person experiences:

> 'I think the most clear thing is that when you're watching something online, it can be a little bit less engaging maybe a little bit more boring, and maybe you don't pick up on all of the things'. Participant L

A number of participants used examples from small animal practice when describing their views on in-person slaughterhouse visits as a learning experience, for example:

> 'like doing a spay, like you know I'm not going to really learn how to actually do it in you know unless I'm in the surgery room doing it, and so, seeing it in person is very important'. Participant G

> 'It's like I wouldn't want anyone going into smallies who'd never experienced a euthanasia in person. I wouldn't want anyone going into farm who had never been to a slaughterhouse'. Participant E

Feelings of anxiety/nervousness associated with slaughterhouse visits

Five participants described feelings of nervousness or anxiety at the prospect of visiting a slaughterhouse, and one described a visit as 'upsetting and kind of an emotional drain' (Participant B). The other 10 participants admitted to not feeling apprehensive and having no distinct feelings towards a visit. Some participants acknowledged that even if it did not impact them, others may find a slaughterhouse visit emotionally difficult.

> 'I feel fine with it. from my perspective I think, if you're willing to be a person that eats meat or something that requires a living creature to die, you should be willing to be the person that does that process yourself … I don't know if there's certain cultures or religions that would have their own adversities to all that, their own views against that kind of thing. So, I would suggest that maybe there could be an exemption for those types of things rather than what career path someone would think they'd go down'. Participant P

Methods for improving in-person slaughterhouse visits

The methods used by students differed depending on the participant's stage within the veterinary programme. Those further along in their studies commented that preparation for slaughterhouse visits via lectures, self-directed learning and assignments is useful:

> 'But I think that, I mean I think they've given me it just about as much as they could have without actually taking me out to one. Aside from the virtual tour I don't think there's much more that they could have shown me'. Participant C

Focus group participants in earlier years of the programme commented that the disclosure of the slaughterhouse visit requirement should be clearer and earlier in the course of their studies.

> 'They could tell students what to expect … they can just be a little bit more upfront about what's going to happen when. I'm not so concerned specifically about the slaughterhouse visit like if I found out in third year, even if I found out the beginning the fourth year, I don't think it's going to change much about what happens, or what I do. I do think it will make me make me feel a little bit more comfortable in general'. Participant L

Discussion sessions before and, in some suggestions, after the visit to help students process what they are about to see, what they have seen, and how they feel about it were also discussed.

> 'It would be nice if we're going to have a little talk before, about what you're worried about and what you can expect from those worries, are we gonna have a little talk afterwards to talk about the emotions that you're feeling and then it's okay to feel that way'. Participant I

All but one participant mentioned the value of discussions. Participant F stated they would feel 'incredibly uncomfortable in that kind of a situation' and therefore suggested that discussion sessions either with staff or other students should be optional.

DISCUSSION

To our knowledge, this study is the first to collect data from UK veterinary students regarding their views of in-person slaughterhouse visits. The number of veterinary students in the UK is increasing, with two new institutions accepting students for the first time in 2023. In order for both new and existing veterinary schools to comply with national[2] and international accreditation standards,[21] all their students must visit a slaughterhouse in person. The knowledge gained from this research project could be valuable in understanding how students perceive these visits and how to improve their preparation for a better experience and learning opportunity.

Student views on slaughterhouse visits as part of their veterinary school curriculum

Just under one-third (31%) of participants were unaware that they were required to visit a slaughterhouse. In general, the awareness of the requirement increased in the later years of the course, which is unsurprising given that in both the RVC and SBOHVM the VPH teaching, including slaughterhouse operations, is concentrated in years 3–5 of the programme. Being aware of an upcoming potentially emotionally challenging event can give students time to prepare[22] and that additional time to emotionally prepare may enhance learning.[23] In subsequent sections of this survey, participants commented that giving 'warning' of a visit would be valuable in helping them prepare

both emotionally and to facilitate learning. Therefore, ensuring that students are aware of slaughterhouse visits earlier in their studies would likely be beneficial. It should be noted that most UK VEEs do highlight slaughterhouse visits in their application process as a potential activity to carry out as part of their work experience prior to applying to a veterinary school and as potential extramural placements during the veterinary course. Additionally, UK VEEs who have licenced slaughterhouses highlight them as part of their teaching facilities.[24]

Participants widely perceived slaughterhouse visits as important, both in the responses to the Likert items and the open text questions, with the majority (62%) choosing to visit if presented with the choice of doing so. Having previous slaughterhouse experience had a significant impact on responses to all Likert items in the survey, with participants with previous experience more likely to agree that a visit is important and that the veterinarian plays an important role in the slaughterhouse. They are also more likely to choose to visit. This subsection of participants was also more likely to disagree that visits should be optional and that everything can be taught in the classroom. There are several possible reasons for the difference. First, those seeking specific slaughterhouse experience, especially prior to commencing their studies, are perhaps already of the opinion that a visit would be beneficial for their future career. Second, as described in the focus group responses, there are aspects to a visit that cannot be 'prepared for' or appreciated unless experienced firsthand. A third explanation may be that experiencing slaughter may cause a shift in emotions and a reduction in apprehension.[12]

Although visits were viewed as important, around half (49%) of participants agreed they should be optional, and this was also mentioned in the open-text responses and during the focus groups. Reasons given included ethical or religious objection, emotional distress and a visit not being relevant for the student's anticipated career path. In reference to career path, graduates of RCVS-accredited veterinary schools must meet the outlined Day 1 competences,[25] which are aligned with international standards and recommendations (e.g., European Association of Establishments for Veterinary Education, Federation of Veterinarians of Europe and WOAH) and must cover all areas of learning relevant to the profession (basic sciences, clinical sciences, animal production and food hygiene). Students' preferences for specific career paths during their undergraduate studies may not reflect their actual career progression after graduation; additionally, an important proportion of students may not be clear about the career paths they would like to explore,[26,27] and job opportunities outside of general practice are less well recognised or understood.[28] Exposing students to the wide variety of career options available in the profession contributes to increasing awareness and interest in these areas.[29–31] A recent RCVS report[32] highlighted that, since 2018, there has been a notable increase in veterinarians leaving the UK-practising category of registration. A majority of these leavers (45%) had been in the profession for 4 years or less, with the most common reason given by those leaving the profession being poor work–life balance (60%). Ensuring the role of the veterinarian in meat production is presented as an option during university may provide opportunities for alternative career pathways to those who select a role in veterinary clinical practice after graduation but later experience it as not a good fit.

In the open-text responses, many of those who expressed that visits should be optional also mentioned that alternative (online, self-directed) learning materials should be made available as a replacement. However, according to experiential learning theory,[33] experience is a central and necessary part of the learning process, and there are benefits for learning by physically being out of the classroom and in a contextually rich learning environment.[34]

What emotions are associated with a slaughterhouse visit?

Although experiential learning theory may advocate for improved learning in the slaughterhouse, the emotions of the students need to be considered both in relation to learning and mental wellbeing. Anxiety/nervousness was the most common emotion mentioned both in the responses to the survey and in the focus groups. Anxiety is considered to be a universal adaptive response to a threat; however, it can become maladaptive when the anxiety is out of proportion to the threat or when the symptoms are unacceptable.[35] Although a certain level of anxiety has benefits,[36] high levels of student anxiety can negatively impact long-term memory, spatial learning[37] and academic achievement.[38]

A recent survey at one English veterinary school suggested that around one-third of veterinary students had moderate to severe anxiety.[39] Stressors predicting anxiety in veterinary students can be social (e.g., not fitting in), personal (e.g., physical health) and academic (e.g., unclear expectations and heavy workload).[40,41] Although student anxiety around slaughterhouse visits was reported in our study, the slaughterhouse is not the only learning environment veterinary students encounter that may lead to negative emotions. The surgical environment,[42] the dissection room[43] and EMS[14] can all be a source of anxiety and stress. In line with the results of this study, lack of time to prepare, unclear expectations and lack of self-confidence were all sighted as sources of negative emotions in these other environments. Furthermore, dealing with ethical dilemmas, particularly those involving the killing of healthy animals for disease control, slaughtering for food consumption or euthanasia due to welfare or economic constraints[5,44] is part of the profession and can result in stress and emotional discomfort, especially for those with certain ethical viewpoints (e.g., veganism).[9] Graduates should

be aware of these situations and how to manage the impact on themselves.[45,46]

Resources used to improve students' education and emotional experience of slaughterhouse visits

Provision of discussion sessions was suggested by participants as a resource that may improve both the learning and emotional experience of a slaughterhouse visit. Although not directly related to the topic of slaughterhouse visits, a previous study by Kasch et al.[47] also suggested that veterinary students perceived increased discussion during class time to improve learning and help explore topics from different perspectives. However, the authors of the study did describe that some students may not express critical statements and questions during discussions due to fear of being further questioned, being embarrassed, upsetting staff members or of negative consequences in an examination. Discussion sessions, especially in small groups, have a number of described pedagogical benefits, including uncovering knowledge gaps,[48] encouraging interactions[49] and enhancing learning.[50] Peer and tutor-student discussions have been described as methods to reduce stress on medical students prior to medical dissection courses.[51] Our results suggest that videos may also improve both the learning and emotional aspects of a slaughterhouse visit, which is supported by a recent study in which videos effectively reduced anxiety scores and improved emotional preparedness of veterinary students prior to anatomy teaching.[43]

The participants in this survey were more likely to have experience with traditional educational activities, such as lectures and videos, compared to more novel technologies such as VR. At both the RVC and the SBOHVM, the VR slaughterhouse tour is only available to final-year students, which may somewhat explain these results. There has been previous work demonstrating that VR and e-learning can be used to familiarise students with the slaughterhouse environment, and thus better prepare them for a visit.[11,16] Recent work has explored the use of a virtual slaughterhouse simulator (VSS) by UK veterinary students.[18] It was reported that the VSS was considered useful for learning but had a lesser impact on student anxiety levels. This was somewhat supported by the results of the current study; however, due to the relatively low number of participants with VR experience, further study is warranted to fully understand the impact of slaughterhouse VR on preparing students for in-person visits.

Limitations of the study

There are a number of limitations to this study. First, the response rate for the survey was relatively low, at approximately 15.6%, and the numbers agreeing to participate in the focus groups were also small. As the focus groups were conducted in July 2022 (SBOHVM) and June 2023 (RVC), students were likely busy with exam preparation or EMS. In future studies, data collection in person prior to slaughterhouse visits could be considered to improve response rate and reduce selection bias; however, this may result in response bias, especially if a lecturer or a staff member was present.

Demographic data regarding gender identity or dietary preferences were not collected for the survey participants. Female veterinary students are more likely to have higher levels of anxiety than males[52]; therefore, should a higher proportion of females have responded to our survey than what is present in the veterinary student population, the results may have been skewed. Additionally, there is a potential gender bias associated with female veterinary students tending to assign greater importance to animal welfare topics than male veterinary students.[53] Finally, those who follow a vegan or vegetarian diet are more likely to hold an animal rights ethical viewpoint[54] and be opposed to the slaughter of animals. Therefore, a higher proportion of vegan/vegetarian responses than what is present in the veterinary student population may have also skewed the results.

During the COVID-19 pandemic, most slaughterhouses in the UK prevented all but essential visits, and therefore visits for educational reasons, such as those for veterinary students, stopped. This may have impacted the number of students able to visit a slaughterhouse, both prior to and during their studies, and affected student awareness regarding visitation requirements. It is not known whether the number of participants with slaughterhouse experience prior to taking part in the study would have been higher without the impact of the pandemic.

Finally, although this study gathered useful data on activities that veterinary students perceive to be useful in improving slaughterhouse visits, further work is required to fully understand the impact of such activities and how they are best incorporated into the student experience.

CONCLUSIONS

The results of this study suggest that veterinary students recognise the importance of slaughterhouse visits as part of their education. Much of the emotional connotations of a visit are based around apprehension and anxiety, particularly for those without previous experience. It is important for veterinary schools to facilitate a safe and effective learning environment and therefore adequately prepare students for learning activities. It is recommended that students be made aware of the requirements for slaughterhouse visits at the start of their course, or during the application process. Finally, the introduction of discussion

sessions prior to visits may be a beneficial preparatory activity. Further work will continue to develop the understanding of how specific preparation activities are best incorporated into the veterinary educational curriculum.

AUTHOR CONTRIBUTIONS

Study conception and design: Eleanor E. Wigham. *Questionnaire development*: Eleanor E. Wigham, Noelia Yusta and Rodrigo J. Nova. *Data collection*: Eleanor E. Wigham, Sydney M. Sweet, Lauren Francesca and Nikolaos Dadios. *Data analysis*: Eleanor E. Wigham and Sydney M. Sweet. *Draft manuscript production*: Eleanor E. Wigham, Lauren Francesca, Nikolaos Dadios and Rodrigo J. Nova. All authors approved the final version of the manuscript.

ACKNOWLEDGEMENTS

The authors would like to thank all the participants who contributed to this study.

CONFLICT OF INTEREST STATEMENT

The authors declare they have no conflicts of interest.

FUNDING INFORMATION

The authors received no specific funding for this work.

DATA AVAILABILITY STATEMENT

Data are available upon reasonable request. Deidentified participant data can be obtained by emailing the corresponding author.

ETHICS STATEMENT

The project gained ethical approval from the University of Glasgow Medicine, Veterinary and Life Science College Ethics Committee (project codes 200210081 and 200210148).

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How to cite this article: Wigham EE, Yusta N, Sweet SM, Francesca L, Dadios N, Nova RJ. How do veterinary students perceive and prepare for compulsory slaughterhouse visits?. Vet Rec. 2023;e3712. https://doi.org/10.1002/vetr.3712