Article

Conscientious Objection to Animal Testing: A Preliminary Survey Among Italian Medical and Veterinary Students

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Abstract

The use of animals for educational and research purposes is common in both veterinary and human medicine degree courses, and one that involves important ethical considerations. The aim of this study was to assess the extent of differences between the knowledge and attitudes of veterinary students and medical students on animal bioethics, on alternative strategies and on their right to conscientiously object to animal experimentation. To this end, a questionnaire was completed by 733 students (384 human medicine students (HMS) and 349 veterinary medicine students (VMS)). VMS were more aware than HMS (72.2% and 59.6%, respectively) of the existence of an Italian law on the right to conscientiously object to animal experimentation. However, very few of them had exercised this right. Many VMS (43.3%) felt that animal bioethics courses should be mandatory (only 17.4% of HMS felt the same way). More VMS than HMS (81.7% and 59.1%, respectively) expressed an interest in attending a course on alternatives to animal experimentation. The data suggest the need for appropriate educational interventions, in order to allow students to make choices based on ethical principles. Fostering close collaborations between departments of human medicine and veterinary medicine, for example, through shared study modules, could promote the development of ethical competence as a basic skill of students of both veterinary and human medicine courses.

Keywords

animal experimentation, conscientious objection, ethical educational system, medical education, veterinary education

Introduction

Training in veterinary medicine and human medicine have much in common. Indeed, many subjects, such as biology, genetics, microbiology, medical statistics, organic and inorganic chemistry, physics and biochemistry, are fundamental and compulsory aspects of both degree courses. In most faculties, basic humanities are also taught. Similarly, both the veterinary and human medical professions involve critical decisions concerning life and death, though there are obvious differences between the two types of patients and their needs. Moreover, these professions involve similar responsibilities, and the need to deal with new challenges and comply with ethical obligations.[1]

The use of animals for educational and research purposes is common to both degree courses, but this use has to be ethically justified.[2] In veterinary and medical schools, animals are used to help students and researchers understand anatomical and physiological principles and to acquire technical skills for use in clinical interventions and surgical procedures.[3] In research, millions of animals are used in invasive experimental procedures, to learn more about human

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biology and health and to develop new medical treatments.[4] While both human and veterinary medicine and basic sciences have undoubtedly benefitted in the past from the use of various animal models, debate has arisen with regard to the use of animal dissection and experimentation as educational tools: Are these methods still appropriate instruments for learning and skills development,[5] or are these educational methods inconsistent with the concomitant teaching of the intrinsic value of life?[3] Furthermore, there is increasing awareness that the conduct of harmful procedures on animals could compromise students' sensitivity as well as their moral or religious values.[6] Many students have openly opposed animal dissection, and many teachers have recognised that students can learn equally well through the use of modern non-animal alternatives.[7]

The ethics of experimental animal use are neatly conveyed by the concept of the Three Rs (*Replacement, Reduction, Refinement*), as originally outlined by Russell and Burch in 1959.[8] According to these principles, it must first be shown that there is no alternative to the use of animals, and then the strategies to minimise the numbers used and the suffering inflicted must be considered in detail. This approach therefore expresses a specific ethical vision, whereby moral reasons of a deontological type are given to support the choice of animal use, according to the perspective of bioethics, as "the systematic study of the moral dimensions — including moral vision, decisions, conduct, and policies — of the life sciences and health care, employing a variety of ethical methodologies in an interdisciplinary setting".[9]

Growing opposition to the use of animals in education has encouraged the development and use of humane teaching methods and the introduction of conscientious objection policies in many countries (including Argentina, Australia, Brazil, Denmark, Mexico, Norway, Peru, Russia, Switzerland and the Netherlands). In Italy, the recent *Law 26/2014* (*Implementation of the Directive 2010/63/EU on the Protection of Animals Used for Scientific Purposes*) placed a general ban on practices involving animals in educational activities in university courses.[10] Indeed, Article 5 of this law states that procedures involving the use of animals for scientific or teaching purposes cannot be authorised "during teaching activities carried out in primary, secondary and university courses". However, Article 5 exempts from this ban "university training in medicine and veterinary medicine, as well as the high-level training of doctors and veterinary surgeons". Furthermore, the previous Italian legislation (*Law 413/1993, Norms on Conscientious Objection to Animal Experimentation*) established students' right to exercise conscientious objection to animal experimentation (COAE) without suffering discrimination, as well as their right to be offered non-animal alternatives to help achieve their learning objectives.[11]

To date, no studies have investigated the extent of differences between the knowledge and attitudes of veterinary students and medical students on animal bioethics, on alternative strategies and on their right to exercise COAE. Specifically, the aim of this study was to survey the opinions of students of veterinary and human medicine at Italian universities on various aspects of:

- the knowledge of the right to exercise conscientious objection to animal experimentation;
- the importance of being able to exercise this right;
- the potential critical issues surrounding this decision; and
- their general interest in animal bioethics and non-animal alternatives.

The use of animals in education and research is of central importance in veterinary and human medicine degree courses. In both cases, students can declare that they wish to conscientiously object to animal experiments, and the universities are deemed to have common obligations regarding this right, namely the attendance of laboratory training sessions in which animals are used must be optional; alternative teaching methods must be provided, to enable students to fulfil their learning objectives; and the right to exercise COAE must be fully publicised in the institution.

Considering that both degree programmes are medical courses (one focusing on animals and the other on humans), their primary purpose is the care and well-being of living beings. Therefore, a holistic approach to these medical disciplines would involve defining the moral responsibility of individuals regarding the relationship between human and animal well-being. Veterinary medicine deals with animal health, while human medicine focuses on the health and well-being of people. This difference prompts an interesting exploratory comparison of the two student populations. Ascertaining the attitudes that the students of both courses have towards the use of animals in education and research will identify any significant differences between them. This knowledge will help in the exploration of a possible overlap in certain study modules between both courses.

Materials and Methods

Survey

The survey was sent to 2798 students attending either the School of Medicine at the University of Genoa, the School of Veterinary Medicine at the University of Parma or the School of Veterinary Medicine at the University of Turin. An email was sent to undergraduates in all study years, explaining the purpose of the survey and inviting them to participate. A week later, another email was sent with a link to a self-administered questionnaire. Participation was voluntary and fully anonymous. The survey system Google Forms (Google LLC, Mountain View, California, USA)

was used to administer the online questionnaire from 1 March to 31 May 2016.[12] The link expired approximately 3 weeks after sending out the second email.

Questionnaire

The working hypothesis of the research study was that statistically significant differences between human medicine students (HMS) and veterinary medicine students (VMS) would be identified, with regard to both their knowledge of COAE and the Three Rs concept, and their attitudes towards the use of animals in education and research. The focus of the research on COAE was motivated by the need to investigate the ethical implications of the students' views and their relationship to the ethical stance of the general public.[13]

Owing to the multidisciplinary nature of the study, a working group of experts in various fields was set up. The group, which consisted of six Italian experts (in bioethics, medicine, surgery, veterinary medicine, alternative methods and biostatistics), drew up an 18-item questionnaire, which was then used to test the above-mentioned working hypothesis. A Questionnaire Appraisal Coding System was also used. The final questionnaire was released after five plenary meetings and many individual consultations, and once the expert panel had reached a reasonable agreement that the final questionnaire met the required standards of content, cognition and usability.

The questionnaire consisted of four sections, concerning: (i) the students' sociodemographic data (age, gender, university faculty/location, year of study, nationality, religion); (ii) generic knowledge of Italian *Law 413/1993*; (iii) personal attitude to the right to exercise COAE; and (iv) interest in animal bioethics. There were 10 multiple-choice questions — eight requiring a single answer and two allowing multiple answers (see Table 1).

Table 1. The survey questions posed to the students.

	Question
Q1	Are you aware of the existence of a law that protects the right of students and workers to conscientiously object to animal experimentation?
Q2	In the case of a positive response to Q1, please state where you learnt this information.
Q3	Have you ever exercised COAE?
Q4	Do you feel it is important to be able to exercise COAE?
Q5 (multiple answers allowed)	What do you think are the main reasons for exercising COAE?
Q6	During your studies, have you been introduced to the issues of animal bioethics?
Q7	Do you think that the teaching of animal bioethics can lead to critical reflections that would otherwise not be considered?
Q8 (multiple answers allowed)	What do you think COAE is primarily able to protect?
Q9	Do you think that by exercising COAE you would be prevented from working in a research laboratory where animals are used?
Q10	Do you think that professionals in your field of study should be allowed to exercise COAE?
Q11	Would you be interested in attending a course on alternative methods to animal experimentation?
Q12	Do you think that an Animal Bioethics module should be included in your degree course?

COAE: conscientious objection to animal experimentation.

Statistical analysis

The results obtained were expressed as the mean ± standard deviation, median, count and percentage. Continuous variables were evaluated for normal distribution by using the Shapiro–Wilk test and were compared by using the Mann–Whitney test. Categorical variables were compared by using the χ^2 test. Statistical analysis was performed with R software/environment (version 3.4.2[14]), and statistical significance was assumed for p values < 0.05.

Results

Sociodemographic data

Of the 2798 students contacted by email, 733 (26.2%) completed the questionnaire (207 males, 526 females; mean age = 22.8, range 18–47 years). Specifically, the questionnaire was completed by 21.6% of the contacted HMS and 34.3% of the contacted VMS. Details of the students' sociodemographic features are shown in Tables 2 and 3.

Generic knowledge of Italian Law 413/1993

Of the 733 students surveyed, 481 (65.6%) were aware of the Italian law that regulates their right to conscientiously object to animal experiments (Table 4, question 1). Most had become aware of the law through their teachers (n = 168), many through the university website (n = 139), their peers (n = 74) or other sources (n = 79). Further analysis of these data showed that students who had received tuition in the area of animal bioethics during their course (question 6) were more aware of the existence of *Law 413/1993* (had received tuition = 210 (76.6%), had not received tuition = 271 (59.0%), $p < 0.001$). Also, it was apparent that a higher proportion of VMS knew about *Law 413/1993*, as compared to the proportion of HMS (VMS = 252 (72.2%), HMS = 229 (59.6%), $p = 0.00046$). However, according to question 9 answers, only 123 HMS (32.0%) and 101

Table 2. The demographics of the student population who participated in the survey.[a]

Characteristic	*n* (%)
Age (years)	22.79 ± 2.87
Female	526 (71.8%)
Male	207 (28.2%)
University Faculty	
Human Medicine	384 (52.4%)
Veterinary Medicine	349 (47.6%)
Location	
Genoa	384 (52.4%)
Parma	128 (17.5%)
Turin	221 (30.1%)
Year of study	
I	137 (18.7%)
II	140 (19.1%)
III	124 (16.9%)
IV	113 (15.4%)
V	108 (14.7%)
VI	67 (9.1%)
Behind schedule	44 (6%)
Nationality	
Italian	718 (98%)
Other	15 (2%)
Religion	
Catholic Christian	408 (55.7%)
Orthodox Christian	4 (0.5%)
Muslim	4 (0.5%)
Jewish	2 (0.3%)
Other	21 (2.9%)
None	289 (39.4%)
Not reported	5 (0.7%)

[a]Percentage values indicate the proportion of respondents out of the total 733 respondents.

Table 3. A comparison of the demographic characteristics of the survey participants.[a]

Characteristic	HMS	VMS	*p*
Age (years)	22.63 ± 2.54	22.95 ± 3.19	0.860
Gender, *n* (%)			
Female	247 (64.3%)	279 (79.9%)	<0.001
Male	137 (35.7%)	70 (20.1%)	0.021
University Faculty/location, *n* (%)			
Human Medicine, Genoa	384 (52.4%)	0 (0%)	0 (0%)
Veterinary Medicine, Parma	0 (0%)	128 (17.5%)	0%
Veterinary Medicine, Turin	0 (0%)	221 (30.1%)	0%
Year of study, *n* (%)			
I	67 (17.4%)	70 (20.1%)	0.652
II	79 (20.6%)	61 (17.5%)	0.553
III	56 (14.6%)	68 (19.5%)	0.558
IV	48 (12.5%)	65 (18.6%)	0.318
V	61 (15.9%)	47 (13.5%)	0.663
VI	67 (17.4%)	0 (0%)	0 (0%)
Behind schedule	6 (1.6%)	38 (10.9%)	0.494
Nationality, *n* (%)			
Italian	379 (98.7%)	339 (97.1%)	0.389
Other	5 (1.3%)	10 (2.9%)	0.812
Religion, *n* (%)			
Catholic Christian	228 (59.5%)	180 (51.6%)	0.158
Orthodox Christian	1 (0.3%)	3 (0.9%)	0.852
Muslim	4 (1%)	0 (0%)	0.869
Jewish	1 (0.3%)	1 (0.3%)	1.000
Other	10 (2.6%)	11 (3.1%)	0.885
None	138 (36%)	151 (43.3%)	0.225
Not reported	2 (0.6%)	3 (0.9%)	0.972

HMS: human medicine students; VMS: veterinary medicine students.
[a]Percentage values indicate the proportion of respondents within the particular student group (i.e. HMS or VMS).

VMS (28.9%) were aware that discrimination in the workplace after a declaration of COAE is prohibited under *Law 413/1993* (Article 4).

Students' attitudes to the right to exercise COAE

Of the 733 students, only 33 (4.5%) had exercised their right to conscientiously object to animal experimentation: 32 females and only 1 male ($p = 0.002$). However, 534 students (72.8%) recognised the importance of being able to exercise this right if they so chose. When grouped according to gender and degree course, female students of veterinary medicine proved to have the most positive attitude towards COAE (VMS = 276 (79.1%), HMS = 258 (67.2%), $p = 0.002$; females = 415 (78.9%), males = 119 (57.5%), $p < 0.0001$).

When asked about the main reason for exercising COAE (Table 1, question 5), 290 students (39.6%) answered that they thought the main reason was 'a sense of respect for animals' (see Table 4). When grouped according to degree course, no significant differences were apparent in the responses to this question (HSM = 150 (39.2%), VSM = 140 (40.1%), $p = 0.862$). With regard to the students' opinions of what COAE aims to protect, personal freedom of thought was the most frequently indicated option, as selected by 231 students (31.5%). When respondents were grouped according to degree course, there were no significant differences in the answers given (HSM = 134 (34.9%), VSM = 97 (27.8%), $p = 0.262$).

Although the overall attitude to the right to exercise COAE was positive, VMS seemed more inclined to recognise the importance of the right to exercise COAE to professionals in their own field than did the HMS (question 10; HMS = 236 (61.5%), VMS = 265 (75.9%), $p < 0.0001$). When grouped according to gender, female students were significantly more inclined to respond positively to this question than were male students (females = 383 (72.8%), males = 118 (52.2%), $p < 0.0001$).

The influence of religious beliefs was evaluated by comparing the answers given by Catholics with those of

Table 4. Distribution of the answers to each of the questions in the survey.

	Number of responses, *n* (%)[a]	HMS, *n* (%)[b]	VMS, *n* (%)[b]	*p*
Q1	Yes: 481 (65.6%)	229 (59.6%)	252 (72.2%)	0.006
	No: 252 (34.4%)	155 (40.4%)	97 (27.8%)	0.054
Q2	University website: 139 (30.2%)	46 (21.1%)	93 (38.4%)	0.046
	Teachers: 168 (36.5%)	112 (51.4%)	56 (23.1%)	<0.001
	Fellow students: 74 (16.1%)	30 (13.8%)	44 (18.2%)	0.649
	Other: 79 (17.2%)	30 (13.8%)	49 (20.2%)	0.499
Q3	Yes: 33 (4.5%)	13 (3.4%)	20 (5.7%)	0.697
	No: 700 (95.5%)	371 (96.6%)	329 (94.3%)	0.102
Q4	Yes: 534 (72.8%)	258 (67.2%)	276 (79.1%)	0.002
	No: 98 (13.4%)	70 (18.2%)	28 (8%)	0.215
Q5	Love for animals: 65 (8.9%)	38 (9.9%)	27 (7.7%)	0.761
	Respect for animals: 290 (39.6%)	150 (39.2%)	140 (40.1%)	0.862
	Religious reasons: 8 (1.1%)	3 (0.8%)	5 (1.4%)	0.934
	Don't know: 45 (6.2%)	24 (6.3%)	21 (6%)	0.967
	Multiple answers: 283 (38.6%)	146 (38.1%)	137 (39.2%)	0.863
Q6	Yes: 274 (37.4%)	133 (34.6%)	141 (40.4%)	0.394
	No: 459 (62.2%)	251 (65.4%)	208 (59.6%)	0.271
Q7	Yes, a lot: 248 (33.8%)	96 (25%)	152 (43.5%)	0.004
	Probably: 347 (47.3%)	191 (49.7%)	156 (44.7%)	0.354
	Little: 81 (11.1%)	60 (15.6%)	21 (6%)	0.250
	In no way: 27 (3.7%)	19 (5%)	8 (2.3%)	0.723
	Don't know: 30 (4.1%)	18 (4.7%)	12 (3.4%)	0.791
Q8	Respect for fundamental ethical values in a pluralistic and democratic society: 71 (9.7%)	44 (11.5%)	27 (7.7%)	0.650
	The freedom of thought of the person: 231 (31.5%)	134 (34.9%)	97 (27.8%)	0.262
	The freedom of religion: 3 (0.4%)	2 (0.5%)	1 (0.3%)	0.959
	Animals: 54 (7.4%)	30 (7.8%)	24 (6.9%)	0.900
	Don't know: 21 (2.9%)	11 (2.9%)	10 (2.9%)	0.999
	Other: 7 (0.9%)	5 (1.3%)	2 (0.6%)	0.961
	Multiple answers: 346 (47.2%)	158 (47.9%)	188 (53.9%)	0.267
Q9	Yes: 272 (37.1%)	122 (31.8%)	150 (43%)	0.064
	No: 224 (30.6%)	123 (32%)	101 (28.9%)	0.629
	Don't know: 237 (32.3%)	139 (36.2%)	98 (28.1%)	0.197
Q10	Yes: 501 (68.3%)	236 (61.5%)	265 (75.9%)	<0.001
	No: 123 (16.8%)	73 (19%)	50 (14.3%)	0.469
	Don't know: 109 (14.9%)	75 (19.5%)	34 (9.7%)	0.240
Q11	Yes: 512 (69.8%)	227 (59.1%)	285 (81.7%)	<0.001
	No: 129 (17.6%)	94 (24.5%)	35 (10%)	0.081
	Don't know: 92 (12.6%)	63 (16.4%)	29 (8.3%)	0.299
Q12	Yes, mandatory: 218 (29.7%)	67 (17.4%)	151 (43.3%)	<0.001
	Yes, optional: 462 (63%)	274 (71.3%)	188 (53.9%)	0.562
	No: 42 (5.7%)	36 (9.4%)	6 (1.7%)	0.562
	Don't know: 11 (1.5%)	7 (1.8%)	4 (1.1%)	0.903

HMS: human medicine students; VMS: veterinary medicine students.
[a]Percentage values indicate the proportion of respondents out of the total 733 respondents.
[b]Percentage values indicate the proportion of respondents within the particular student group (i.e. HMS or VMS).

students who professed no religion, as these two groups combined accounted for the majority of the study population (95.1%). From this comparison, it was concluded that religious belief was not associated with a greater awareness of the importance of this specific right.

Interest in animal bioethics

With regard to the idea raised by question 7, that the teaching of animal bioethics could lead to critical reflections that might otherwise not be considered, most of the respondents completely agreed ($n = 248$ (33.8%)) or fairly agreed ($n = 347$ (47.3%)). Complete agreement was expressed more frequently by VMS than by HMS (VMS = 152 (43.5%), HMS = 96 (25.0%), $p = 0.004$) and more by females than by males (females = 211 (40.1%), males = 37 (17.9%), $p = 0.011$).

Accordingly, a large proportion of the respondents proved to be interested in attending a course on alternatives to animal experimentation, with VMS expressing more

interest than HMS (VMS = 285 (81.7%), HMS = 227 (59.1%), $p < 0.001$) and females more than males (females = 404 (76.8%), males = 108 (52.2%)). However, only 218 students (29.7%) thought that the teaching of animal bioethics should be compulsory; the majority (63.0%) thought that it should be optional. There were significant differences within the groups: VMS were more in favour of mandatory teaching than were HMS (VMS = 151 (43.3%), HMS = 67 (17.4%), $p < 0.001$), who in turn were more in favour of optional teaching (HMS = 274 (71.3%), VMS = 188 (53.9%), $p < 0.001$). Female students were more in favour of mandatory teaching than were male students (females = 179 (34.0%), males = 39 (18.8%), $p < 0.0001$).

Discussion

The higher percentage of female students who responded to the questionnaire is in line with the increasing number of women in the medical and veterinary professions in Italy, as is the case in much of Western Europe and the United States.[15–17]

Analysis of the survey results revealed major gaps in the students' knowledge of COAE, confirming that Italian universities often neglect their duty to inform students about the current legislation in this area.[11] This lack of knowledge, and the scant consideration of the importance of COAE, are particularly evident among HMS and could be ascribed to the exclusive focus of medical schools on ethical issues specifically associated with human medicine, such as informed consent, prognosis communication, treatment obstinacy and beginning and end-of-life decisions. Moreover, this inadequate knowledge could impair the students' ability to make well-informed ethical choices, potentially giving rise to personal conflict with regard to the individual's own morality, religion, beliefs or sensitivities. By contrast, adequate information and promotion of the right to exercise COAE could foster the inclusion of animals within our moral sphere and lead to increased social and scientific interest in alternatives to animal experimentation. While university intranet websites generally constitute a good channel of communication between faculty and students, lecturers still play a fundamental role in encouraging the critical analysis of such information during the training process.

Although more than two-thirds of respondents were aware of the existence of a law on COAE, the survey registered very few conscientious objectors among the HMS and VMS. The limited exercise of COAE by VMS could be related to the decision of the Faculty Councils of Veterinary Medicine of Parma and Turin, to waive the use of animals for educational purposes, which is permitted for Medicine and Veterinary Medicine according to *Law 26/2014*.[18] Moreover, the widely held conviction that animals constitute an indispensable and incontrovertible model could also affect the level of exercise of COAE. However, a lack of funding and scant knowledge of the available alternative methods are the main reasons why few laboratories in Italy currently use alternative approaches.[19] Indeed, for the 3-year period 2014–2016, *Law 26/2014* assigned only €500,000 for this purpose, to be divided among the 10 Experimental Zooprophylactic Institutes (Article 41). The subsequent Italian decree of 24 December 2015 (*Distribution Among the Regions of the Funds Allocated to the Research and Development of Alternative Methods to the Use of Animals for Experimental Purposes*) confirmed this allocation of funds to facilities currently carrying out animal research, to ensure training of the staff in these facilities in the use of alternative methods and to promote the possibility of setting up scientifically valid new models to replace, or at least reduce, animal testing. This financing strategy does not encourage the development of dedicated centres with research programmes based exclusively on alternative methods, and it confirms that alternative methods are viewed by many as merely complementary. Therefore, the doubts expressed by the respondents regarding the possibility of performing research as a conscientious objector seem highly justified.

A non-negligible percentage of the students still attribute little importance to the right to exercise COAE. However, awareness of this right correlated significantly with both female gender and the type of degree course (veterinary medicine degree), which is in agreement with other studies on empathy towards animals.[17,20]

The uncritical use of animals in medical education could convey an implicit message that becomes part of the so-called 'hidden curriculum', which imparts the idea that only humans are worthy of moral consideration.[21] This anthropocentric vision might be the main cause of the scant attention traditionally devoted to alternative methods by Italian politicians and researchers.[22] Academic courses on alternatives to animal experimentation could constitute a good starting point for educational campaigns on the Three Rs concept and the recognition of its importance.[23–26] Indeed, the literature reveals that students are often the main advocates of alternative teaching practices that do not employ animals.[27]

When students are provided with little, if any, information on COAE, their critical assessment and views on the use of animals for education and research purposes may be derived from personal experience and/or research that they have carried out on the subject. In the light of such experiences, students may come to regard the stereotypical view that animal experimentation is indispensable as a prejudice. This might prompt them to reflect on the moral questions raised by the use of animals in education and research.

The lack of academic focus on animal bioethics is in contrast with the growing need to improve ethical competencies.[28] Awareness of the relevance of bioethics is not always reflected in the curricula of Italian health and biological science degree courses, where the subject is often

limited to issues of medical bioethics.[29] An approach limited to medical bioethical issues does not sensitise students to two important points: (i) the epistemological and methodological aspects of scientific research; and (ii) the moral status that we should attribute to non-human subjects. If research is regarded as being independent of ethics, then the students' enthusiasm for research may give rise to a reifying view of animals, whereby no intrinsic value is attributed to their lives and they are not deemed worthy of moral consideration.[30,31]

In general, the lack of structured bioethics teaching is particularly evident in veterinary sciences.[32] This is in contrast with the growing awareness of the need for ethical decision-making skills and of the role of veterinarians in social education, as stated in recommendations on the competencies of graduating veterinarians ('Day 1 graduates') by the World Organisation for Animal Health (OIE[33,34]). Indeed, having to face ethical challenges increases stress and burnout in veterinary surgeons and support staff.[35,36] These professionals, whose studies are oriented towards the care of animals, are continually faced with animal suffering, which is often underestimated on a social level. In fact, veterinarians can suffer more easily from severe compassion fatigue than physicians because they are not only responsible for animal care and end-of-life decisions, but they also have the power to perform euthanasia. Moreover, veterinarians daily face the limited ethical competence of many of those who use animals in their work or who keep them as domestic pets.

Contrary to the scant consideration that the academic system gives to the teaching of bioethics, the students interviewed stated that such teaching might prompt critical reflections that would otherwise elude their attention. However, the fact that a high percentage of HMS and VMS (significantly higher among the former) thought that such teaching should be optional suggests the need to develop their ethological knowledge of animals and the ethical implications of such knowledge.[37] In accordance with the definition of bioethics,[9] training in bioethics based on an interdisciplinary approach would also require the establishment of heterogeneous study groups composed of VMS and HMS. Indeed, such an approach could encourage the development of an integrated medicine that is able to care for both humans and animals as components of a single ecosystem.

Strengths and limitations of the study

Despite the positive contributions of the current investigation, a number of important limitations need to be considered. Firstly, the study was conducted on a sample of students enrolled in only one School of Medicine and two Schools of Veterinary Medicine, which may therefore not be representative of the entire Italian student population. Secondly, there are further limitations associated with the use of self-reporting instruments and multiple-answer questions that should not be overlooked. These limitations include the asynchronous administration of the questionnaire and the substantial heterogeneity in both the question structure and the response options.

Conclusions

The right of individuals to act in accordance with their conscience and freedom of thought, on which the right to exercise COAE is based, are upheld by both HMS and VMS. However, VMS, who directly experience ethical issues concerning the use of animals in education and research during their undergraduate education, have a more favourable attitude towards the teaching of animal bioethics and are more interested in attending courses on alternatives to animal experimentation.

Knowledge of the law on COAE is a reference point in the development of ethical reflection within the academic community. Experience and awareness of how animals can potentially be used in education can also stimulate moral reflection. This knowledge is also relevant from the point of view of public ethics regarding freedom of conscience, pluralism and the adoption or otherwise of a controversial practice, such as the use of animals for educational or research purposes. Thus, the law on COAE appears to constitute a specific implementation of the principle of political neutrality with respect to the controversial concept of good.[38] The data obtained from the survey show that, according to the perception of a high percentage of students, this principle, which is fundamental in a pluralistic society, is often ignored.

In general, the outcomes of the survey suggest that a common educational pathway should be created in bioethics, in order to foster interaction among the various disciplines and promote dialogue and the critical analysis of the ethical dilemmas that arise in daily practice. These dilemmas pose questions both from the point of view of the deontological principle (i.e. regarding our duties towards animals) and from the consequentialist point of view, with particular reference to the relationship between the aims of scientific research and the tools and methodologies used.

The deepest moral dilemma that arises from the use of animals in the service of humans is whether the suffering to which animals are subjected actually leads to significant benefits for humans. In other words, the problem of sustainability arises both from the theoretical point of view and, in scientific practice, in this case, in the analogy between animal and human models. The relevance of moral issues and questions of public ethics posed by the use of animals would require, in the light of our findings, the teaching of bioethics to be introduced or strengthened. Therefore, close collaboration should be fostered among the departments of human medicine and veterinary medicine — for example, through the potential adoption of shared teaching

programmes. This approach should enhance specific knowledge and skills, and focus on the implementation and development of ethical competence as a basic requirement for students of both human and veterinary medicine.

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Ethics approval

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Informed consent

Informed consent was not required for this systematic review.

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