

Knowledge on Ethics and Biosafety in a Veterinary School

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Abstract

In this study, a diagnosis of the level of knowledge, skills and attitudes on ethics and biosafety of students, teachers and administrative staff of a Veterinary and Zootechnics Medicine School was made, in order to contribute to the improvement of its study plans. A total of 194 students, 10 professors and five administrative personnel participated in this cross-sectional, qualitative and quantitative research. The results showed a low level of knowledge and practices in biosecurity measures and biosafety issues, as well as in the adoption of ethical measures for the management of domestic animals. This research contributes to the proposal of implementing a transversal axis or subjects related to ethics and biosafety in the curricula, as well as the need to take urgent actions in the training of zootechnician veterinarians in México.

Keywords: knowledge, ethics, biosafety, veterinary.

INTRODUCTION

The teaching of ethics in the training of zootechnician veterinarians is paramount for them to act responsibly, since they often face ethical conflicts upon animal, human and environmental welfare [1, 2]. It is urgent for students to become more aware of the implementation of biosafety measures for the prevention of accidents during their professional training [3].

There are more than 40 institutions that offer a career in Veterinary Medicine and Animal Husbandry, in Mexico. The acquisition of values is considered in all of them. However, only nine of them have implemented a mandatory course in ethics in their study plans, unlike the faculties of Spain where, they all have implemented a mandatory course for the formation of ethical values [4, 5]. Nevertheless, not all health programs have been implemented with ethics and biosafety courses; therefore, it is an urgent need for veterinary medicine students to achieve these knowledge, skills and attitudes [6, 7, 2]. The aim of this training is for them to raise awareness of the problems, and to develop the capacity to create and take preventive measures [8, 9, 10].

So, it is important to carry out a diagnosis to identify the level of knowledge, skills and attitudes on ethics, biosafety issues of all the community members of a Veterinary Medicine and Zootechnics School, in order to design basic learning units on ethics and biosafety to incorporate them in the curriculum.

MATERIALS AND METHODS

Type and design

A descriptive, qualitative and quantitative cross-sectional study was carried out from March 2016 to March 2017. The recognition of the study area, which included a visual inspection tour, documented with photographs, was carried out to identify the ethical-environmental and biosafety issues in the Veterinary Medicine and Zootechnics School.

All the students, teaching and administrative personnel were surveyed. The information was also obtained through interviews to the personnel responsible for each area of the school, to deepen, clarify doubts and complement information.

Later on, the Environmental Self-Assessment Guide of the Federal Procurator's Office for Environmental Protection (PROFEPA, for its name in Spanish, 2016) was applied to the personnel in charge of each area.

Population and study area

The population considered for this study were 194 students, 10 teachers and 5 administrative elements of the Veterinary Medicine and Zootechnics School Number 3 (ESMVZ-3, for its university code and name and Spanish) of the Autonomous University of Guerrero, which is located in the municipality of Tépican de Galeana, in

the State of Guerrero, in México; on Km 106 + 900 Federal Highway Acapulco-Zihuatanejo .

Measurement tools

The PROFEPA's Environmental Self-Assessment Guide that was applied, taking into account only the following environmental aspects: waste such as non-hazardous waste, hazardous waste, temporary storage of hazardous waste, recycling, return of hazardous waste and biohazard hazardous waste; environmental risk and environmental emergencies.

Structured surveys, which contained open, closed questions and Likert-type scaling with four response options, were applied to students , with the aim of gathering information on hygienic habits in the handling of animals (25 questions), personal hygiene habits (five questions) and knowledge about ethics and biosafety (20 questions).

Structured surveys were conducted for teachers and administrative workers, with open, closed questions and Likert-type scaling with four response options, to obtain information on what knowledge the students had about ethics and biosafety (five questions). The teachers' level of knowledge on the subjects (15 questions) and actions carried out in the educational institution regarding biosafety measures (30 questions) were also documented.

The open questions on biosafety and ethics were grouped into two categories. For biosafety, the first group included standards, measures and/or procedures, and risk protection, in the second one. For ethics, values, discipline and individual behavior were considered in a group; in the second one, ethics was considered as a professional value.

Based on the results obtained in surveys that were applied to teachers and administrative personnel, an in-depth interview guide was designed to apply it to the key actors.

Analysis of data

The data obtained through the surveys were captured in Microsoft Excel and descriptively analyzed with the SPSS version 23.0 statistical program. Interviews' data was analyzed in a descriptive way, by using quantitative and qualitative data analysis software (Gephi version 0.9.1).

RESULTS

The school has a chemical-biological laboratory that it shared with the Faculty of Sustainable Development. It has minimum equipment that includes two bacteriological ovens, a Bunsen burner, centrifuge, autoclave, three sinks, glassware

material, an emergency shower and chemical substances (solids, liquids or prepared solutions). As well as, six work-tables that had out-of-service gas and water installations.

It was noted that the laboratory's emergency shower was obstructed. The chemical substances were not classified by type and degree of danger; that did not have any extractors, warning symbols, nor evacuation route signs or a valid first-aid kit, fire extinguishers and neither a biosafety and sight hygiene regulation.

In the areas where infectious biological hazardous wastes (RPBI, for its name in Spanish) are generated, the temporary storing of the sharp material is kept in the red rigid container. The school has no perimeter fence and this facilitates the entrance of passers-by who practice recreational activities in the nearby river. The presence of a clandestine open-air dump and the burning and recurrent dispersion of municipal solid waste (MSW) were noted, as well as byproducts of hazardous waste (HW) such as motor oil bottles and animal carcasses.

In accordance with the Guide (PROFEPA 2016), the school does not have a MSW management plan; their disposal is done through the municipality's collection service. The collection program of PET material is not continuous. Concerning to the handling of HW, the chemical substances are in their original containers, but they are not classified as they should be, according to the Official Mexican Standard 052-SEMARNAT-2005. Regarding the handling of the RPBI, the NOM-087-SEMARNAT-SSA1-2002 is partially complied. The personnel in charge mentioned that they did not have an adequate RPBI's management plan.

In relation to environmental risk, it was noted that they did not have an accident prevention program. Neither did they have the necessary equipment to prevent and fight fires, nor first aid, evacuation of buildings, search and rescue in case of emergency procedures or regulations.

Table 1. Veterinary Medicine and Zootechnics students' ratings on Biosafety and ethics training, in Guerrero, México, 2016.

Students by semester	Biosafety training (%)	Biosafety training rating (%)			
		No response	Fair	Good	Very good
First	97%	3%	11%	57%	29%
Second	97%	3%	6%	54%	36%
Third	85%	16%	20%	49%	15%
Students by semester	Ethics training (%)	Ethics training rating (%)			
		No response	Fair	Good	Very good
First	78%	22%	11%	48%	19%
Second	84%	16%	3%	46%	35%
Third	85%	17%	20%	56%	7%

Among the 194 students who were surveyed, 74% of first semester, 67% of third semester and only 41% of the fifth semester said to have social security coverage. While 97% of the students of first and third semesters and 85% of the fifth semester mentioned that they had received biosafety training. Students of first semester (78%), third semester (84%) and fifth semester (85%) received training on ethics. A total of 49% of the students rated the biosafety training they had received at school, as good and 46% rated the ethics training as good (Table 1).

According to the training received, 70% of the students in first, third and fifth semesters showed that they did not know that zootechnician veterinarians are ruled by a Code of Ethics. Neither 70% of the students knew the veterinarian’s professional Oath.

By semester, 51% of students in the first one, 57% in the third one and 61% in the fifth one did not know the laws that would rule them to act, within the regulations, during the performance of their profession.

The level of knowledge upon the meaning of animal welfare is shown in Figure 1. The students consider one to two freedoms; they know the meaning of animal welfare and consider from 3 to 5 freedoms. But 10% of them have the idea that animal welfare is reduced to the appropriate methods that are carried out for a quick death, without causing any suffering and with the minimum stress for animals, according to Official Mexican Standard 033-SAG / ZOO-2014.

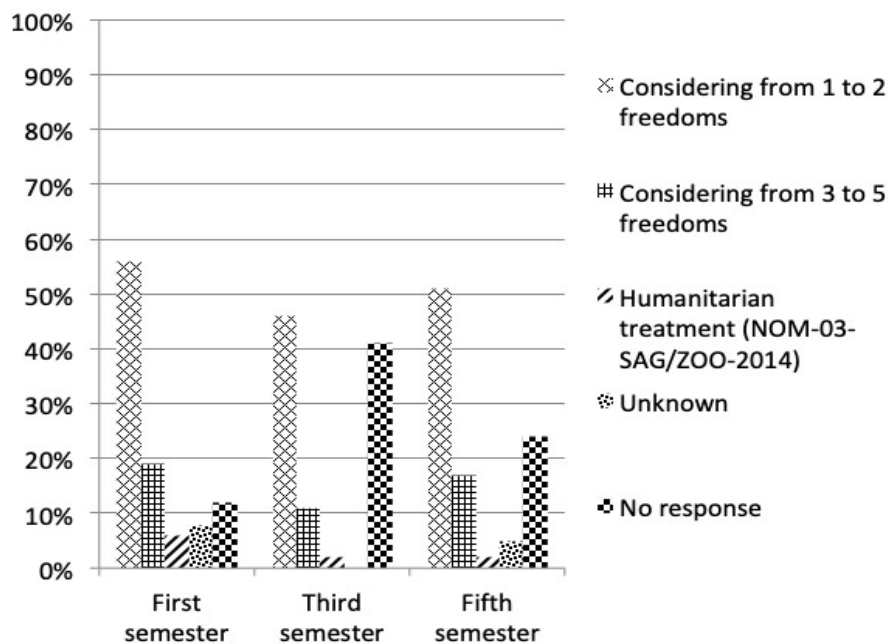


Figure 1. Knowledge of the meaning of the concept of animal welfare of the students of Veterinary Medicine and Zootechnics, Guerrero, México, 2016.

Concerning the knowledge on specific Mexican Official Norms for the protection and welfare of animals, NOM-033-SAG / ZOO-2014, NOM-045-ZOO-1995, NOM-051-ZOO-1995, NOM-062-ZOO- 1995, 50% of the first and fifth semester students and 47% of the third one knew them. Regarding the official Mexican standard 087-SEMARNAT-SSA1-202 for the management of RPBI, 68% do not know this regulation.

Table 2 shows the attitudes in relation to the adoption of ethical measures for the management of domestic animals, which students take when they have a practice with these in some of their learning units. Also, timely information about instructions for animal handling (Table 2).

Table 2. Attitudes, for the adoption of ethical measures when handling domestic animals, of the students of Veterinary Medicine and Zootechnics, Guerrero, México, 2016.

Attitudes:	First semester	Third semester	Fifth semester
Do you apply ethical measures for the handling of domestic animals?			
Always	28%	29%	29%
Almost always	20%	25%	29%
Sometimes	31%	19%	29%
Never	21%	27%	12%
Are you given the activity instructions in advance?			
Always	89%	94%	66%
Almost always	8%	3%	22%
Sometimes	2%	3%	10%
Never	1%	0	2%

When they are going to have a laboratory practice, more than 80% of the students always use gown and gloves as a mandatory biosafety measure; 83% of the students

considered that these school’s biosafety measures were enough, while 54% of the fifth semester students considered that individual protection measures were not.

All of the teachers (100%) and 60% of administrative staff have postgraduate studies. 50% are zootechnician veterinarians and also, 40% of administrative staff workers (Table 3).

Table 3. Teachers and administrative staff of Veterinary Medicine and Zootechnics’ degree levels and academic training of the, Guerrero, México, 2016.

Schooling	Bachelor’s Degree	Master’s	Doctorate				
Teachers	20%	50%	30%				
Administrative Personnel	40%	60%	0				
Academic instruction	Zootechnician Veterinarian	Pharmacist Chemist Biologist	Biologist	Communications	Administrator	Computer engineer	Lawyer
Teachers	50%	20%	10%	10%	10%	0	0
Administratives	40%	0	0	0	20%	20%	20%

Seventy percent of the teachers have defined the concept of biosafety, norms or measures for the protection of some physical damage. Ethics is a professional value for them (table 4).

Table 4. Teachers and administrative personnel of Veterinary Medicine and Zootechnics’ knowledge of the concept of biosafety and ethics, in Guerrero, México, 2016.

What do you mean by?	Teachers	Administrative staff
Biosafety:		
Norms, measures and/or procedures	70%	80%
Risk protection	30%	20%
Ethics:		
Values, discipline and individual behavior	40%	60%
Professional value	60%	20%
Unknown	0	20%

Sixty percent of the teachers mentioned that they did not have a learning unit and/or a propaedeutic course on biosafety. However, 70% of them apply biosafety measures when entering the laboratory, the veterinary office and when carrying out field practices. The individual protection measures that are used are gown, mouth covers, latex gloves, a short-sleeve shirt known as “Filipina” and overalls. Nevertheless, to 70% of the teachers these individual protection measures are not enough.

The teachers said that the ESMVZ-3 curriculum had a learning unit and/or an ethics preparatory course. Sixty percent of the teachers said that they adopted ethical measures for the handling of domestic animals and 90% mentioned that they informed their students, in advance about the instructions they would have to take during the practice with domestic animals; so they could adopt appropriate ethical measures. Also, 70% considered the welfare of domestic animals when assessing their students while they performed a practice to urge them to handle them properly.

Regarding the knowledge of the regulations for the management of RPBI (NOM-087-SEMARNAT-SSA1-2002), 80% of teachers knew about this norm, but 80% did not apply it, because RPBI are not handled properly. Teachers pointed out that out of the RPBI generated in the laboratory, clinic and field practices, they buried 30% of them, 20% of the sharps were delivered to the red rigid container of the community health sector, 10% said that they sent them directly to the dumpster and 40% did not know about the final disposition of the RPBI that were generated in the ESMVZ-3.

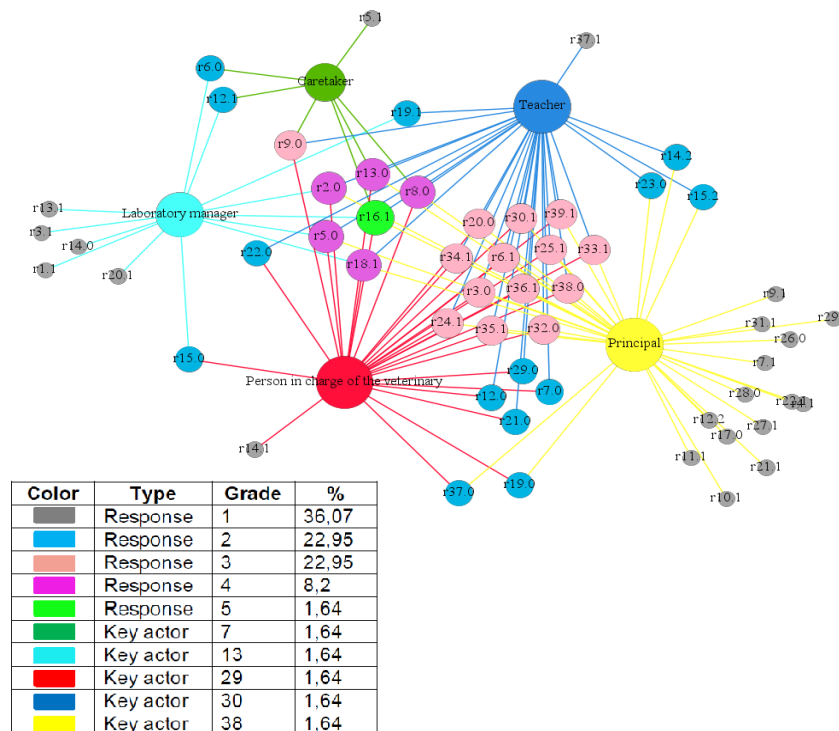


Figure 2. Bipartite graph that shows the relation of the responses of the key actors who were interviewed, Veterinary Medicine and Zootechnics, Guerrero, México, 2016.

Figure 2 shows the bipartite graph, which demonstrates that the lack of communication by the director results in an inadequate work in different areas of the school. They pointed out that out of the MSW that they generated, they were latex gloves, cover mouths and gauzes, and that out of the RPBI's, they only generated gauzes and syringes. The RPBI's elimination procedure consisted in placing the sharp objects in a red rigid container and other objects, such as gauzes, compresses, venoclysis equipment, and bloody cottons were mixed with the MSW.

The cleaning of work areas, salons, veterinary offices, surgery and laboratory areas was carried out daily. The inputs that the caretaker has to clean the areas were a broom, a mop and commercial liquid.

The ESMVZ-3 does not have a biosafety manual for each work area. The teachers explained that they did not have these manuals because they were a newly created school.

Principal, teachers and the person in charge of the veterinary office knew professional values, rights and obligations of zootechnicians and veterinarians. During their lessons, they transmitted this knowledge to the students; as well as, the dignified treatment of domestic animals in accordance with ethical standards. These key players informed students of the physical and chemical risks, and the consequences they might have, if they did not manage the animals properly.

They said that, nowadays, zootechnical veterinarians have shown more concerned about curing than applying preventive measures. They determined the need of training on biosafety and ethics issues.

DISCUSSION

Biosafety and biosecurity are fundamental issues in teaching and for Veterinary Medicine profession [11] and although the students stated that they received biosafety training, teachers pointed out that they did not have a learning unit on the subject, because few individual protection measures were accomplished. This coincides with, what Flores and Samalvides state [12] about, the need to teach and implement universal biosafety norms and training on the possible risks to which students are exposed.

The biosafety measures are insufficient due to the lack of inputs and written protocols, as indicated by the students and the administrative staff, similar results to those found by Sanmiguel *et al.* [13] in a study carried out in veterinary clinics.

As noted, teachers knew the regulations for the management of HWs and RPBI's, but did not apply them, due to high costs, coinciding with what was reported by Valdovinos-Núñez in 2003 [14], who evaluated knowledge and compliance with the NOM -087-SEMARNAT-SSA1-2002 by hospital workers in Mexico City, and also detected incongruence between knowledge and the application of the norm.

In 2014, Signorini and collaborators [15] found that 97% of veterinarians had suffered an accident during their professional practice, frequently presenting puncture wounds

and contusions. By not having the necessary measures of individual protection during laboratory practices and in the field, students of advanced semesters are exposed to suffer this type of accidents. It is essential to teach about biosafety measures and ethical values, in order to avoid risks for the benefit of animal and human welfare [4, 11, 16, 17, 18].

The students showed little knowledge on the ethics code, their rights and obligations as veterinarians and zootechnicians, the specific official norms on animal welfare, which showed that they did not have a uniform concept of animal and ethical welfare. When recognizing these deficiencies, schools should include or reinforce the curricula's ethics and veterinary legislation learning unit, applying it in the transversal manner that several authors have indicated [19, 20, 21, 22, 23, 24, 25].

CONCLUSIONS

There is a low level of knowledge and practices in biosafety conditions, as well as in the adoption of ethical measures for the management of domestic animals.

The results of this study show the need to implement educational ethics and biosafety programs, as well as ongoing training for teaching and administrative staff.

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