**CHAPTER 1: INTRODUCTION**

**Background and Rationale**

The attitudes that veterinary students develop during their education are paramount to how they will interact with and treat the animals that will receive their care when they work in the profession. Assessing these attitudes during their educational careers enables the identification of areas where improvements could be made.

In Israel, there is only one veterinary school. Since its founding in 1985, there has been no academic research conducted among its students examining their attitudes on animal-related issues or the students’ mental wellbeing during their studies. This stands in stark contrast to medical students preparing to be physicians for humans, who have been the subject of many studies in Israel and around the world.

Recently, there has been an increase in scientific research on animal welfare, due to ethical concerns (Fraser et al., 1997; Main et al., 2005; Siegford et al., 2005). The public increasingly turns to scientific sources for guidance on the concerns raised about animals’ quality of life. International professional organizations of veterinarians, who are policymakers on these issues, recently updated their position (source) and stated that veterinarians have an obligation to be primary activists for the promotion of animal welfare (Endenburg et al., 2020). This shift has taken place in the context of a changing academic, professional, and social reality. In the past fifteen years, following recommendations from international institutions on veterinary education, courses dedicated to the subject of animal welfare have been introduced into the curricula of veterinary schools in many developed countries. In some schools, these courses are compulsory.

There have been few longitudinal studies that examine how students in veterinary schools perceive animals’ mental and emotional capabilities. In particular, little attention has been given to their attitudes regarding farm animals versus companion animals. Similarly, only a small number of studies have addressed the ethical dilemmas faced by medical students during the year of their clinical training, or the impact of these dilemmas on students' stress levels, although previous research has linked university students’ high levels of stress with depression, anxiety, decreased self-esteem, impaired quality of life, and other negative effects.

The current research is designed to examine these issues quantitatively, longitudinally, and laterally. The research processes are designed to assess the knowledge and attitudes of Israeli veterinary students regarding issues related to animal welfare. Further, the findings may indicate areas in which a change or adaptation of information transmitted to this population is necessary, given their distinctive nature and location in the Middle East. In this way, I hope to make an innovative and enriching contribution to the field of veterinary education in Israel.

**Research Goals and Questions**

There is no existing data on Israeli veterinary students’ attitudes towards their chosen profession or towards animal welfare in particular. Nor is there any data on their mental wellbeing or the ethical dilemmas they face during their studies, and specifically in the clinical training year (the fourth year of their studies). To address this gap, I will focus on the following research questions.

1. What are the attitudes held by veterinary students in Israel on issues of animal welfare? Do these attitudes change during the years of study at the veterinary school, and if so, how?
2. What are the interrelationships between students’ background characteristics (gender, marital status, previous academic studies, area of residence, religious beliefs, past experiences with animals, nutrition) and their attitudes on issues of animal welfare?
3. How do students perceive their mental wellbeing during their studies at veterinary school? How, and in what directions, do these perceptions change throughout the years of their studies?
4. What ethical dilemmas do students encounter during the clinical year of study? What are the interrelationships between these ethical dilemmas and students’ mental/emotional state?

**LITERATURE REVIEW**

In this literature review, I explore previous research in the following areas:

**Background Data on Veterinary Students Around the World and in Israel**

The veterinary profession in most developed countries is undergoing significant change. One of the most notable changes is the greater representation of females in this profession (Allen, 2016; Sans et al., 2011). In the US and UK, veterinary medicine was traditionally dominated by men, but currently women make up about 80% of veterinary students. In EU countries, 82% of veterinarians under the age of 30 are women (FVE, 2019) and in Australia the figures are similar (AAVMC, 2018; Brown and Silverman, 1999; RCVS, 2015). The population of veterinarians in most developed countries is characterized by ethnic and cultural homogeneity (Elmore, 2003; Greenhill et al., 2007). The socio-demographic profile of students is predominantly white, middle-class children of parents with higher-than-average education (Heath, 1997; Sans et al., 2011; Tomlin et al., 2010). The average age of applicants for veterinary studies in the US is on the rise and currently stands at 25 (Kerr, 1995). In Europe and the UK, the average age of entry into veterinary studies is 19-22 (Andrews, 2009; Sans et al., 2011).

In Israel, the ratio between male and female students has changed from 80:20 in favor of males in 1985 (at the time of the establishment of the school), to 20:80 in favor of females by 2006. The average age of Israeli veterinary students is 26, which is somewhat older than in many other countries. The reasons for this are military service, the culturally-popular extended travels following military service, and the requirement to complete undergraduate studies prior to being admitted to veterinary school. Therefore, upon entering veterinary school, Israeli students tend to be older than their peers in the United States and Europe. Many of them are married and some have children (Shahar and Bark, 2006). They have high expectations for the veterinary school. Most veterinary students are characterized as highly accomplished, competitive, motivated, goal-oriented, and determined, with above-average academic achievements (Brown and Silverman, 1999; Kerr, 1995; Zenner et al., 2005).

*1.1 Motivations for choosing a profession*

The leading motivations for choosing veterinary studies are the desire to work with animals, interest in the profession, and fondness for animals (Dally and Erickson, 2012; Serpell, 2005; Sprecher, 2004; Tomlin et al., 2010). For many students, the decision to study veterinary medicine is made at a young age (8-12), influenced by their attitudes towards animals (Amass et al., 2011; Fraser et al., 2008; Heath et al., 2006). Most had extensive prior experience with animals as children, and primarily grew up in urban rather than rural localities (Heath et al., 1996; Morin et al., 2020). Previous studies have found that over 80% of veterinary students had pet dogs and/or cats (Dally and Erickson, 2012; Izmirli et al., 2014; Sans et al., 2010). These data are consistent with the findings of Serpell (2005), which indicate that interactions with animals, especially pets, have a significant effect on values. Further, choosing a medical profession in early childhood is likely to have significance in terms of individuals’ commitment, motivation, and investment in education (McHarg et al., 2007). Having pets in childhood and previous experience with animals has a great impact on the desire to be a veterinarian among both sexes. Males are much more likely than females to choose their profession out of a desire to work as scientists, due to the prestige of the profession, and due to the challenge of being accepted into the profession (Tomlin et al., 2010). The number of veterinary students whose parents are veterinarians is relatively low. This is in stark contrast to medical and dental students, for whom the proportion of physicians among their parents is quite high (Heath et al., 2006; Sprecher, 2004). Positive and influential experiences with veterinarians and the veterinary profession, such as watching a veterinarian in action, or volunteering or working with a veterinarian, encourage the choice to be a veterinarian (Amass et al., 2011; Morin et al. 2020). Other factors include the influence of parents and friends, even among families in which the parents did not receive higher education (Tomlin et al., 2010).

*1.2 Animal welfare studies and curricula in veterinary schools around the world and in Israel*

1.2.1 Changes in veterinary education around the world

The traditional concept guiding the veterinary curriculum since the inception of the field was to train veterinary students to be experts in working with all animals including small animals, horses, and food-producing animals (Pritchard, 1989). Two influential reports published in Europe (Association of Establishments for Veterinary Education, 1990; Pew Report European, 1988) recommended abandoning the idea that veterinary schools should impart to each individual the necessary knowledge and skills in all, or even most, areas of veterinary medicine. At the beginning of the millennium, these early reports were supported by recommendations in subsequent reports and studies on the economic aspects of veterinary medicine. Recommendations were made to add to the curriculum training hours on generic, nontechnical skills, such as communication, problem-solving, business and management, computer skills, research skills, ethics and values, critical thinking, etc. (Brown and Silverman, 1999; Gardner et al., 2001; Jaarsma et al., 2008; Lewis, 2002; Zenner et al., 2005).

At five North American veterinary medical institutions, the perceptions held by faculty members regarding the importance of nontechnical competencies in veterinary graduates and the inclusion of nontechnical competency development in veterinary education were assessed. Mean ratings of importance were above neutral for all competencies. Ratings were highest for ethics, critical thinking, and interpersonal and intrapersonal skills. Development of these competencies was favored in pre-veterinary and veterinary training. Female faculty members were more likely to emphasize nontechnical competency development throughout the educational process (Lane and Grady Bogue, 2010).

In the context of animal welfare issues, Knight (2010) notes that despite the growing public interest in animal welfare issues (Galon, 2009) and the public’s expectation that veterinarians will be competent in these matters, knowledge about animal welfare is not a requirement for admission in the way that these schools require other prerequisite courses.

The European Directive of 1978 (European Directives, EEC 1027/78), which is still valid, requires the training of veterinarians in all branches of veterinary medicine. In contrast, veterinary schools in Western countries are beginning to implement the recommendations noted above. This change is reflected in the gradual transition to a curriculum that includes modular courses with elective tracks, so students can plan their future according to the wide range of specializations that have developed in the veterinary field (Karg, 2000; van Beukelen, 2003), and other factors such as the financial market (American National Academy of Science, 2011; Fernandes, 2005; Shimshoni, 2009).

*1.2.2 Veterinary education in Israel*

The Koret School of Veterinary Medicine (KSVM) is the only institute to train veterinarians in Israel. KSVM is part of the Faculty of Agriculture of the Hebrew University of Jerusalem (HUJ). It was named in honor of the Koret Foundation of San Francisco, its major benefactor. Since its establishment in 1985, the school has received academic and financial support from abroad, especially from the United States. KSVM strives to be a high-quality institute of veterinary education and research center in the Middle East, and aspires to be ranked among the top veterinary schools in the world. The advisory committees advised in favor of a four-year curriculum similar to that in the US veterinary education system, rather than following the European veterinary education system, based on a five- to six-year program.

Since 2003, applicants are required to complete a Bachelor of Science (BSc) degree in life sciences, including biology, medical sciences, animal sciences, zoology or other paramedical professions prior to application (Shahar and Bark, 2006). Acceptance is based purely on academic achievement, with a minimum score of 650 in a national psychometric examination (similar to the American Graduate Record Examinations [GRE]). Following the three years necessary to complete the BSc, the core veterinary curriculum lasts an four additional years. The study program is intensive, with over 1100 hours per year of theoretical and supervised practical training in the first three years of the Doctor of Veterinary Medicine (DVM) cycle. The final fourth year consists of 3.5 semesters of exclusively clinical work. This means that the core veterinary curriculum lasts 9.5 semesters and includes many more weekly hours of contact time than in most (if not all) of the European faculties. Therefore, the Israeli veterinary curriculum may be considered equivalent to the five-year curriculum required in the EU directive 2005/36. All university students in Israel pay a flat tuition fee equivalent to €2600 per annum (meaning there are no specific financial restraints for veterinary students).

The first year of the curriculum consists of pre-clinical studies. Then, pre-clinical studies are combined with applied courses in the second year, theoretical clinical courses in the third year, and twelve consecutive months of clinical training at the Hebrew University Veterinary Hospital in the fourth year. Since its founding, the school’s curriculum has been dynamic, reflecting the changes that have taken place in veterinary studies in the United States and Europe over the past twenty years, alongside practical and budgetary considerations (Shahar and Bark, 2006; Galon, 2009). KSVM places great emphasis on the practical and clinical education of its students, with the aim of adequately preparing them to approach and solve clinical and surgical cases upon graduation. The entire faculty is dedicated to and serious about this effort, even though their already-heavy clinical work load is further increased by the expectation that they will also make significant contributions in the research field.

Recently, KSVM’s curriculum committee has been preoccupied with questions regarding the global trend for students to move away from traditional specializations such as livestock animals, towards specializations in companion animals and pets (Haarhius et al., 2003; Lenarduzzi et al., 2010; National Academy of Science USA, 2011). This creates a shortage of veterinarians in the non-governmental clinical arena and the public and governmental arena (Gal-On, 2009). In light of this trend, there is a lively and ongoing discussion about defining the core curriculum and increasing elective courses.

**Overview of Curriculum Related to Animal Production and Farm Animals**

*Animal Production in Israel*

The term animal production is used to describe the broad discipline regarding food-producing animals, including their breeding, rearing, and slaughter for food or disposal as waste. Therefore in the current study of this subject, the major food-producing species in Israel must be covered. As of 2019, the livestock population in Israel included: 546,000 cattle (119,000 dairy cows), 477,000 sheep, 108,000 goats and 120,000 pigs. In Israel, as in other Mediterranean countries, all dairy cows are kept indoors throughout the year (Mandel et al., 2016).

The milk yield per cow in Israel is one of the highest in the world, with an average yield of 12,000 kg / yea. In 2018, 750 dairy farms operated in Israel, compared to 1,250 in 2001. During that period, the number of dairy cows rose from 116,000 to 128,000. The increase in the number of dairy cows, despite the decrease in the number of dairy farms, was due to an increase in the output of the production unit, to efficiencies and to the reform that took place in the dairy industry in Israel in 1999-2008. Although Israel’s dairy industry is relatively small compared to other countries, it is considered one of the world leaders in the field in terms of efficiency, production, and sustainability.

*Public perceptions of livestock stockmanship in Israel*

Most animal production in Israel take place in collective settlements (*moshavim*) and communities (*kibbutzim*). Traditionally, kibbutz members acquired animal husbandry skills at young ages through their communal work duties, which, in many kibbutzim, included livestock agriculture (For further reading about livestock agriculture in Israeli kibbutzim see ….). To paraphrase English et al. (1992), awareness of animals’ behaviour and needs and animal-handling skills were developed through direct experience and via the instruction and guidance of other kibbutz members. These methods generally developed good stockmanship. Yet, congruent with global changes in livestock agriculture (Farm Animal Welfare Council, 2007, 1) social, cultural and economic changes caused livestock farming in Israel to become less profitable. It became perceived as a low-status job with unfavorable hours and poor working conditions. This led to reduction of the staff in order to lower costs, and recruiting unskilled workers with minimal, if any, first-hand experience working with livestock (English et al., 1998; Galon, 2019).

***Theoretical and clinical training on animal production at KSVM***

KSVM places great emphasis on the practical clinical education of students. The goal of the four-year curriculum is to prepare students to approach and solve clinical/surgical cases upon graduation. The entire staff is dedicated to this goal and takes it seriously, even if their clinical workload is already heavy due to their need to also perform in the research field (EAEVE/FVE Report 2011).

The first year includes theoretical and practical training and courses in the subject of animal production and management (i.e. clinical methods in working with farm animals), farm animal nutrition, animal welfare (since 2011), veterinary ethics (since 2005) and hands-on experience in management of farm animals, including supervised rotations with the dairy herd at the Volcani Center Agricultural Research Organization, and participation in milking and general farm duties.

In the second year, students further develop their skills through hands-on experience and training in handling farm animals, administration of treatments, and sampling procedures. Students are trained on-farm to collect case histories, clinical and epidemiological data (including digital data) and biological samples for laboratory analysis. This training is complementary to six hours of lectures in clinical pharmacology of farm animals. The lectures introduce students to concepts of prophylactic and individual treatments in food-producing animals. They take into consideration issues such as economics and cost/benefit calculations, residues, animal welfare, and the awareness among consumers and the public regarding health and environment.

Most of the specific clinical teaching regarding farm animals is done during the third year. Students visit farm animal facilities (dairies, feedlots, sheep farms, and porcine breeding and production facilities) around the country as part of the course. Teaching is coordinated with courses in animal production and management, nutrition, zoonotic diseases, epidemiology, public health and food technology, which are inextricably related to the clinical teaching regarding farm animals.

In the fourth year of the veterinary curriculum, students spend a minimum of 14 days in a highly intensive, around-the-clock clinical rotation with four staff veterinarians. In this rotation, major emphasis is devoted to farm management, animal breeding and reproduction, nutrition, and herd health. Students are also familiarized with farm management software, and perform supervised analyses of indicators of animal health, reproduction, and production.

There is a dairy farm available for use by the veterinary school within walking distance from the teaching hospital, where the students learn to handle livestock. Later, the students have intensive training on farms, where they are faced with all the real problems of animal production. Thus, the balance between lectures and practical teaching leans towards practical work.

Some information on animal production was taught during the BSc-cycle, such as animal production systems and environmental pollution, dairy and beef cattle husbandry, farm animal welfare (elective course) and environmental consequences of ruminant feeding. During the veterinary school curriculum, students can apply this knowledge during the farm visits. Special attention is given to animal transportation and principles of certification, because Israel imports many agricultural animals.

*Jewish ritual slaughter*

An important event in the clinical rotation is the visit to a slaughterhouse, where the students observe Jewish ritual slaughter (*shechita* in Hebrew). Ritual slaughter is done to produce meat in accordance with the laws of *kashrut*, the Jewish dietary regulations for making meat kosher for consumption. In the *shechita* procedure, a sharp, non-serrated blade is used to make a single cut across the animal’s neck, which goes through the veins, arteries, trachea, and esophagus, followed by complete draining of the blood. A blessing is recited before an uninterrupted period of slaughter of more than one animal.

Jewish ritual slaughter is a non-stun slaughter, in contrast to conventional commercial slaughter practiced in many modern slaughterhouses, in which animals are stunned prior to slaughter, to render them unconscious and incapable of feeling pain.

*Porcine Medicine in the KSVM Curriculum*

Pigs are the only species who are stunned before slaughter, because their meat cannot be kosher. Pigs are slaughtered by trained non-Jewish workers, in designated slaughterhouses. The slaughter of pigs in Israel involves a pre-slaughter electric stunning to induce unconsciousness, and it is done in accordance with conventional commercial slaughter practices. For further reading about slaughter practices of different faiths in various countries see Aghwan and Regenstein, 2019)

In Israel, pigs have the status as being one of the most powerful symbols of defilement and impurity in the Jewish holy and literary sources. This has been incorporated into state law, contemporary culture, and collective memory (Barak-Erez, 2007). Owning, raising and slaughtering pigs in Israel is forbidden by law, with these exceptions: 1) specified localities populated mainly by Christians, as approved by the law, 2) scientific and research institutions and 3) public zoos. One consequence of these limitations is that there are few veterinarians specializing in medical care for pigs in Israel, and most of these are Christians who received their veterinary degree in other countries. As of 2011, the veterinary curriculum at KSVM dedicated few lessons to medical care for pigs, with hardly any clinical medicine, and no information on their welfare or training in their slaughter.

A report following a full on-site EAEVE/FVE visit to KSVM in 2011 included a strong recommendation to drastically intensify the theoretical teaching and especially the hands-on clinical training for this species, and make it mandatory for all students (EAEVE/FVE report on KSVM, 2011).

As of 2012, this lacuna has been corrected during the pre-clinical years and in the fourth clinical year (for further reading about the changes incorporated into the porcine medicine curriculum see EAEVE report, 2017, p.7).

*1.2.3 Establishment and expansion of animal welfare as a curricular and research topic*

Scientific research on animal welfare began in order to address ethical concerns about animals’ quality of life and to provide the public with a scientific basis for forming guidelines related to these concerns. (Fraser et al., 1997; Main et al., 2005; Siegford et al., 2005). Animal welfare is defined by the American Veterinary Medical Association (2015) as “how an animal is coping with the conditions in which it lives.” Animal welfare is rated on a spectrum from poor to excellent (AVMA, 2015). Animal welfare is a multidimensional issue that includes ethics, values, science, economics, and politics (Lund et al., 2006). Animal welfare has been divided in to three primary areas of concern: the animal’s basic health and functioning, its affective states (such as pain, hunger, stress, and pleasure), and the animal’s environment in terms of the animal’s ability to perform its natural behaviors (Fraser, 2008). While there is significant overlap between these three areas, emphasizing one over the others can lead to significantly different conclusions about animal welfare. In other words, how animal welfare is defined has direct implications on how scientific research on animal welfare is conducted and how animal welfare is ultimately assessed. Using the three approaches presented here, different people could assess the same animals and come to different conclusions. This could ultimately affect how those animals and others are kept and treated subsequently.

The 1965 Brambell Report by the UK Farm Animal Welfare Advisory Council (Brambell, 1965) was one of the first attempts to identify areas of concern regarding animal welfare among farm animals. This report included the Five Freedoms of Animal Welfare, which serve as a basis for international dialogue on animal welfare. The Five Freedoms are reflected in guidelines, recommendations, codes, and legislation prepared by countries in Asia, Australasia, the European Union, and North America, and by the World Organization for Animal Health (Office International des Epizooties, OIE), to address animal welfare issues. The Five Freedoms refer to idealized states of welfare rather than standards. They emphasize that the welfare of an animal includes its physical and mental state. Good animal welfare implies both fitness and a sense of wellbeing. They developed requirements that any animal kept by humans must be protected from unnecessary suffering, at the minimum.

The Five Freedoms of Animal Welfare are:

1. Freedom from hunger and thirst: There must be ready access to fresh water and a diet that maintains full health and vigor.
2. Freedom from discomfort: An appropriate environment should be provided, including shelter and a comfortable resting area.
3. Freedom from pain, injury, or disease: This includes prevention, prompt diagnosis, and treatment.
4. Freedom to express natural behavior: This is accomplished by providing sufficient space, proper facilities, and the company of the animal’s own kind.
5. Freedom from fear and distress: This is done by ensuring conditions and treatment which avoid mental suffering.

Critics of the Five Freedoms note the focus on elimination of negative aspects of animal welfare, with no consideration for positive animal welfare (McCulloch, 2012). Additionally, this provides a theoretical framework for thinking about animal welfare, rather than a practical tool for animal welfare assessment (McCulloch, 2012). While animal welfare science provides data, the acceptable ranges for these data can only be answered with animal ethics (Fraser et al., 1997). Ultimately, a combined approach using scientific inquiry and ethical reflection regarding animal use is required to fully investigate animal welfare, since neither science nor ethics can resolve animal welfare issues alone (Fraser, 1999).

While veterinarians’ role as guardians of animal health is clearly established, their role in animal welfare is less obvious (Wilkins, 20008). This distinction has proven to be particularly noticeable following the revision of the veterinary oath by AVMA in 2010 to include the protection of animal health and welfare (Nolen, 2011). It is not surprising, then, that there is self-criticism among the veterinary community due to the mismatch between public expectations of them and the knowledge and response they are able to provide in this area (Appleby, 2004; Hewson, 2003, 2004). The addition of animal welfare to the curriculum at veterinary schools has been debated by educators for over thirty years (Gumbrell, 1983), but change in institutional policy in this area has been slow. The AVMA Council on Education (COE) now requires veterinary curricula of veterinary colleges eligible for AVMA accreditation to provide “knowledge, skills, values, attitudes, aptitudes, and behaviors necessary to address responsibly the health and wellbeing of animals in the context of ever-changing societal expectations” but any mention of training in animal welfare science is absent from these listed requirements (AVMA, 2017). Furthermore, most veterinary schools in the United States still offer few, if any, guidelines in this area (Johnstone et al., 2019). In contrast, in most veterinary schools in Europe, Latin America, the UK, Australia, and New Zealand, animal welfare is a standard part of the curriculum (Estol, 2004; Fogle, 1999; Gumbrell, 1983; McGreevy and Dixon, 2005). In recent years, there has been increasing pressure to make animal welfare an integral part of veterinary education from various stakeholders including the public (Colonius and Swoboda, 2010) and the international professional community (Illman et al., 2014; OIE, 2012). There have been shifts in government policy, changing expectations among students, and changes in industry standards regarding animal welfare (Shivley et al., 2016).

The World Veterinary Association and the World Organization for Animal Health recommend that animal welfare studies, as a distinct subject, should be mandatory, and discuss using a multidisciplinary approach (for more on the nature of these courses see Schneider, 2004; Shivley et al., 2016; Siegford et al., 2004). animal welfare. Tesanimal welfare educationA structured curriculum usually provides scientific evidence and ethical discussion of animal welfare, but can also include a broader range of topics such as regulatory, professional, and philosophical subjects (AVMA, 2017; Magalhães-Sant’Ana, 2014).

*Animal welfare and ethics in veterinary education Israel*

At KSVM, animal welfare is included in the curriculum as part of the field of non-clinical skills, along with health management, economics, ethics, interactions with customers, etc. (Phillips, 2008). Mandatory studies in veterinary ethics and animal welfare have been gradually introduced into the veterinary curriculum in Israel. Since 2005, a course on veterinary ethics has been held at KSVM, which is taught in the first year. Since 2011, a course on animal welfare has also been taught to first-year students.

Both courses have undergone changes in their format in order to best adapt them to the student population. The current form of the Veterinary Ethics course is based on frontal lectures. Small groups of students give a presentation to the class and are awarded a grade. This project is designed to train students to read about a significant ethical issue regarding animals, intelligently present the issue to the class and conduct an ethical discussion based on professional information. The objectives of this introductory course, according to the presenting lecturer at KSVM, are:

To clarify *for ourselves* what we believe, in an informed manner. To elicit a sense of responsibility in the participant. My aim is not to reach a particular conclusion. It is to raise arguments that lead us to think about an issue in a different manner or take into consideration issues that we did not consider before. To show that there are ethical issues involved where it seems that there are none. To expose hidden ethical decisions. To know your fellow classmates better. And especially, to become aware of the diversity of values of your colleagues and in society.

The Animal Welfare course was included in the curriculum, as part of the requirements for accreditation from the European Association of Establishments for Veterinary Education/ Federation of Veterinarians of Europe (EAEVE/FVA) course. As part of the research work for this study, I participated in the course. In its initial format, the semester-long course was based on presentations by guest lecturers who deal with various aspects of animal welfare as part of their veterinary work. Significant emphasis (four lessons) was placed on the welfare of farm animals, in particular the welfare of cows in the dairy industry, laying hens in the egg industry, and raising livestock or poultry in the meat industry. Two lessons were devoted to the welfare of dogs and cats. One lesson was devoted to the welfare of racehorses. Three lessons were devoted to animals in captivity. There was an introduction to the field of animal welfare (history, philosophy, and law). At the end of the course, the class went on a tour, lasting several hours, to a modern dairy farm in central Israel and the Biblical Zoo in Jerusalem. The test in the course included both open-ended and multiple-choice questions about the material studied. In the years since the course was first delivered, it has undergone major changes in terms of the material it covers. Currently, it is almost entirely devoted to the welfare of farm animals. This is one of the few courses for veterinary students that is not taught by veterinarians, but rather by an interdisciplinary researcher who specializes in the welfare of farm animals.

*Why study attitudes of veterinary students?*

In the field of psychology, “Attitude is a psychological construct. It is a mental and emotional entity that inheres in, or characterizes, the person,” (Perloff, 2016, p. 86). Attitudes about an object are assembled from three types of information: beliefs about the object’s positive or negative characteristics; feelings and emotions about the object; and information about past and current actions toward the object. Once an attitude has been formed, it becomes closely linked to the representation of the object (Smith and Mackie, 2000)

The current study investigates the attitudes of veterinary students and their relationship with behavioral intentions. Azjen and Fishbein’s (1980) Theory of Reasoned Action states that attitudes relate to intentions regarding how people will behave. However, external obstacles may impede the ability to act on intentions (Eagly and Chaiken, 1993). One potential obstacle may be cognitive dissonance (Festinger, 1957; Smith and Mackie, 2000). For example, if people need to act in a certain way to perform tasks, but those actions do not correspond with their attitudes, they may alter their attitudes through rationalization, so as to reduce cognitive dissonance and discomfort.

Attitudes toward animals are important in influencing the way animals are treated [[2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B2-vetsci-06-00019)]. Several studies have indicated how a variety of factors influence attitudes and sensitivities of a veterinary practitioner towards animal welfare issues, including: gender [[3](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B3-vetsci-06-00019),[4](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B4-vetsci-06-00019)], animal’s disease and state of health [[5](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B5-vetsci-06-00019)], professional discipline [[6](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B6-vetsci-06-00019)], perceived responsibility, being a pet owner, membership in a society [[4](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B4-vetsci-06-00019)], and country of residence [[7](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B7-vetsci-06-00019)]. Veterinarians’ attitudes towards animal welfare derive, at least partially, from their training [[8](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B8-vetsci-06-00019),[9](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B9-vetsci-06-00019)]. Veterinary students are expected to demonstrate a high degree of professional interest in the welfare of animals. Therefore, according to Heleski et al. [[10](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6466256/" \l "B10-vetsci-06-00019)], the understanding of veterinary students’ attitudes and perceptions towards these issues is fundamental, as it may be an indirect measure of the adequacy and effectiveness of their education.

*Attitudes of veterinary students towards animal welfare issues and formal education*

In the last 20 years, several surveys have been conducted to better understand veterinary students’ knowledge of welfare issues, their attitudes towards animal welfare education and their capacity for empathy towards animal suffering, pain, and overall compromised wellbeing (Abood and Siegford, 2012; Hazel et al., 2011; Levine et al., 2005; Lord et al., 2010; McGreevy and R. J. Dixon, 2005; Paul et al., 2000; Verrinder and Phillips, 2015). Surveys analyzing responses by DVM students enrolled in animal welfare courses have generally found that the courses have effectively challenged students to improve their ability to identify compromised welfare and discuss solutions, and have encouraged ethical considerations.15,17

In a survey on animal welfare knowledge conducted in 32 veterinary schools in the US, 83% of students responded that they see animal welfare as important, and noted the lack of adequate academic guidance on the subject. However, the survey indicated a large gap between the students’ high assessment of their knowledge on the subject and confidence in discussing it with future clients, as compared to their actual knowledge, which was significantly lacking (Colonius and Swoboda, 2010; Johnson et al., 2009).

In terms of gender distribution with respect to animal welfare, Serpell (2005) found that female first-year veterinary students showed significantly higher levels of concern for animal welfare and animal rights in all categories examined, as compared to male students. These findings confirm previous research on gender bias in relation to attitudes regarding the welfare and rights of animals (Driscoll, 1992; Furnham and Heyes, 1993; Galvin and Herzog, 1998; Herzog et al., 1991; Hills, 1993; Kellert and Berry, 1980; Kruse, 1999; Paul and Phillips et al., 2011; Phillips and McCulloch, 2005; Podberscek, 2000; Serpell, 2004; Shurtleff et al., 1983).

Paul and Podberscek (2000) conducted an experiment examining attitude shifts among veterinary students. They recruited 319 students from two British universities to examine beliefs about animal sentience and empathy with animals. Students in their later years of study rated animals as having lower levels of sentience than did students in the early years of their program. (This was tested by asking students’ opinion about whether animals felt pain and/or boredom in ways similar to humans.) Furthermore, male students in their later years of study showed lower levels of empathy towards animals than did male students in the early years of their study. There was not a comparable significant attitude shift in the female population over time. This pioneering research was a cornerstone in the study of veterinary students’ attitudes towards animal welfare, and specifically to the possible associations between year of study in veterinary school and changing perceptions about animals. It was followed by several studies examining the attitudes of veterinary students towards the welfare of farm animals (Heleski et al. 2005; Magnani et al., 2017; Ostović et al., 2016) and the use of animals for research (Sabuncuoglu and Coban, 2008). There is still a paucity of longitudinal studies dealing specifically with veterinary students’ attitudes towards farm animals’ pain and sentience, and perceptions of affective traits in different species of farm animals. In the following section, I describe the main findings published regarding attitudes of veterinary students to FAW.

*DVM students’ attitudes towards farm animals’ welfare, pain, and sentience*

Recognition of animal pain is an essential prerequisite for the treatment of pain in animals (Hewson et al., 2007a; Huxley and Whay, 2006; Paul and Podberscek, 2000). Belief in “animal mind” or animal sentience refers to beliefs about the emotional lives of animals, and their capacity to think and experience feelings and emotions (Thompson, 2016, p. 144). These beliefs are likely to be important in the formation of attitudes towards animals (Hills, 1995; Knight et al., 2004) and how people interact with and treat them (Morris et al., 2012). Belief in animal mind has been found to be a strong determinant of attitudes towards animals (Herzog and S, 1997; Knight et al., 2004) and to positively correlate with concern for animal welfare (Broida et al., 1993).

Assessment of animal pain depends on veterinary medical education, year of graduation, attitudes to animal pain, career choice, sex, age, and empathy of the individual (Capner et al., 1999; Doohoo and Doohoo 1996; Ellingsen et al., 2010; Fajt et al., 2011; Huxley and Whay, 2006; Lascelles et al., 1999; Raekallio et al., 2003). However, most research on this subject was carried out among veterinary surgeons, not veterinary students. The few studies that tested the DVM student population were not unanimous in their findings, indicating contradicting associations between year of study and evaluation of pain across different species of animals.

In a study conducted by Cleere at al. (2012) at the College of Agriculture and Life Sciences and the College of Veterinary Medicine at Texas A&M University, researchers surveyed 201 undergraduate and graduate students in the animal sciences and students of veterinary medicine. Sixty-one percent of the participants were females. The aim of the study was to gather data on perceptions regarding animal welfare and attitudes held by future agricultural professionals. Students' overall perceptions indicated they believed animal-production agriculture was doing a good job related to animal welfare, and their attitudes concerning production agriculture indicated no disagreement with current practices. The students strongly agreed that professionals in production agriculture are knowledgeable regarding animals' physical and psychological needs and use of humane practices.

Hellyer et al. (1999) carried out an exploratory survey at the Colorado State University Veterinary Teaching Hospital, to determine whether animal-related factors (such as species and breed, behavior, and clinical circumstances) and level of professional veterinary medical training were associated with attitudes towards pain management in animals. Students in the College of Veterinary Medicine and Biomedical Sciences, clinical faculty, house officers, and support staff were surveyed anonymously. There was a high degree of concordance among survey participants regarding the overall importance of treating pain in animals. The extent to which pain should be alleviated and animal factors accounted for much of the discordance among survey groups. Fourth-year veterinary students indicated that they were somewhat less likely to treat animals for pain than were second- or third-year veterinary students. The diversity of opinions regarding the necessity or desirability of treating pain in animals and the apparent decrease in the likelihood of senior veterinary students to treat animals for pain under certain circumstances raised concern regarding their competencies in pain treatment in the future (Hellyer et al., 1999).

In another study, Huxley and Whey (2006) surveyed veterinarians in Great Britain and Northern Ireland who were members of the Boehringer Ingelheim mailing list. Respondents answered questions about the pain scores they would attribute to various procedures and conditions in cattle, and frequency of medication use for pain mitigation. There were significant differences between male and female practitioners’ responses regarding pain scores. Moreover, more recent graduates of veterinary schools indicated higher pain scores, a finding found in surveys performed in recent years as well. Surveys performed in New Zealand and Scandinavia also found that younger veterinarians were more concerned about pain among cattle.

Clarke et al. (2017) conducted a longitudinal study among veterinary students in the UK, to test possible cohort effects of the influential cross-sectional study conducted by Paul and Podberseck (2000). The aim was to clarify whether the findings reported by the original study simply detected belief differences between student cohorts that may, for other reasons, have differed at various points during their university careers, or whether they indicated a genuine change in the beliefs of individual students during their veterinary education. The longitudinal study sampled the same students at the beginning and end of their four-year veterinary education, in regard to their belief in animal sentience. They assessed the relationship between students’ responses and their year of study. Participants in the study were enrolled at the School of Veterinary Sciences in Bristol in 2004, 2006, and 2007. The results indicate no decline in beliefs about animal sentience in general, and an increase in ratings of sentience among pigs across the same period. As found in many other studies, female students rated some species as having a greater capacity for sentience than did male students (Clarke et al., 2017).

A survey conducted in Australia (Verrinder and Phillips, 2015) yielded data that seemingly opposed the findings of Paul and Podberscek (2000). Both first-year and final-year veterinary students were found to be compassionate towards animal issues and ethical violations. However, students admitted to feeling underprepared and inexperienced in taking action to correct compromised welfare and injustice.

Another study sought to develop a tool for assessing farmers’ attitudes towards cattle pain conditions. The tool was tested among Norwegian veterinary students (Kielland et al., 2009). It was found that female students gave higher scores to farm animals’ pain as compared to male students, which is similar to previous findings in the field (Capner et al., 1999; Glaser et al., 2007; Lascelles et al., 1999; Mich et al., 2010). It also found that male students who were fathers rated the level of pain caused by various procedures in farm animals as higher compared to their peers who did not have children (Kielland et. al., 2009).

A recent large-scale study conducted in the UK and Ireland surveyed students studying animal-related subjects (Spencer-Thompson, 2016). The online questionnaire utilized the Five Freedoms animal welfare framework to assess students’ perceptions. Over 2,500 students from seventeen academic institutions across the UK and Ireland participated, including over 1,400 veterinary medicine students from six of the seven veterinary schools within the UK. Participants were asked to rate:

1. Freedom: They rated how acceptable they think it is it for farm animals to sometimes be denied each of the Five Freedoms.
2. Capacity to feel pain: How they perceive the capacity of various species (humans, sheep, cattle, pigs, dogs, horses, chickens, and fish) to feel pain (ranging from “*Feels no pain”* to *“Capacity to feel the worst pain”).*
3. Attitudes towards pain in livestock (APL): This section assessed their level of agreement with four statements about pain in farm animals on a 5-point Likert scale: “*Farm animals benefit from pain alleviation; Some degree of pain is beneficial to the animal; Pain relieving drugs are not necessary for farm animals; It is difficult to recognize pain in farm animals.”*
4. Belief in Animal Mind (BAM). This assessedtheir level of agreement with four statements pertaining to animal sentience.

Overall, the surveyed students expressed their belief that livestock can feel pain and a strong belief in animal mind. Agriculture students however, had the lowest APL and BAM scores, and did not show any change between years of study. In contrast, veterinary students had higher APL and BAM scores and also demonstrated increased scores in their later years of study.

All of the seven animal species presented were viewed as having the capacity to feel pain. However, perceived differences between species were evident, with fish and chickens being perceived as having a lower capacity for pain than the five mammal species. Veterinary students made even greater distinctions among the mammal species, viewing the pain capacity of cattle and sheep as significantly lower than that of pigs and horses.

*Categories of animals and the relationship with perception of acceptable welfare standards*

A pilot survey (Levine et al., 2005), conducted at Cornell University’s College of Veterinary Medicine, examined lower levels of concern for livestock animals among veterinary students who wish to work in food-animal industries. The survey attempted to discover a difference between veterinary students’ beliefs about the cognitive and emotional abilities of different species, specifically small companion animals as compared to livestock. The survey included questions regarding the humaneness of procedures for farm and companion animals and the cognitive abilities of these two groups of animals. Of the respondents, 10.5% were interested in practicing medical care for food animals and 49% were interested in small animal medicine. Of the students interested in small animal medicine, 15% rated procedures such as banding and castration of animals at less than one week of age as humane, as compared to 56% of students aspiring to work with food animals. Overall, students interested in small animal practice rated procedures on farm and companion animals as less humane as compared to students who intended to focus on medical care for livestock. In addition, Levine et al. (2005) found that less than 90% of students believed that farm animals had cognitive abilities. Respondents also were less likely to believe that poultry and ruminants had emotional abilities as compared to dogs and cats. The study indicates strong inconsistencies between veterinary students in their perceptions of animal pain, acceptable welfare practices, and cognitive abilities of different animal species (Levine et al., 2005).

In a study conducted by Cleere at al. (2012) at the College of Agriculture and Life Sciences and the College of Veterinary Medicine at Texas A&M University, the researchers surveyed 201 animal science graduate and undergraduate students and veterinary medicine students. Sixty-one percent of the participants were females.

The aim of the study was to gather animal welfare perceptions and attitudes of future agricultural professionals. Students' overall perceptions indicated they believed production agriculture was doing a good job related to animal welfare, and their attitudes concerning production agriculture indicated no disagreement with current practices. The students strongly agreed that production agriculture is knowledgeable of animals' Physical and psychological needs and uses humane practices.

Mariti et al. (2018) observed that veterinary students in Italy gave greater consideration to the welfare of companion animals than that of food animals. This may affect their perception and understanding of animal welfare issues regarding food animals. Other variables associated with lower levels of concern for farm animals’ welfare among veterinary students include rural-style upbringing, and extent of experiences with farm animals. For example, Croatian veterinary students expressed decreased levels of concern for farm animals (Ostović et al., 2017; Serpell, 2005). In contrast, students from urban locations showed greater concern (Kendall et al., 2006; Vanhonacker et al., 2007), despite having lower levels of knowledge regarding animal welfare issues (Miele et al., 2011).

Students who had some contact with Animal Welfare Organizations (AWOs) showed greater concern about animal use (Knight et al., 2010).

() found that students who expressed a desire to specialize in medical care for livestock animals were mostly men, and were more likely than other groups to cooperate with the clients’ desire, for example, to remove the vocal cords in dogs or cut their ears or to euthanize healthy animals. Other studies found that students aspiring to careers caring for livestock animals pay less attention to certain aspects of the human-animal relationship (Martin et al., 2003; Martin and Taunton, 2006). Hazel et al. (2011) found that in general, students seeking to work with livestock maintained lower attitude scores towards both pets and animals raised for profit.

Serpell (2005) found that owning livestock animals in the past was significantly correlated with less-negative attitudes towards performing cosmetic procedures in animals, as well as the perception that animals experience pain differently than humans. Mich et al. (2010) found that on the continuum of awareness of pain and sensitivity, students in the small-animal track were at the upper end of the spectrum, students in the general-animal track were in the middle, and students in the large-animal track were at the lower end of the spectrum.

**Empathy for Animals among Veterinary Students**

Recent definitions of empathy involve a multidimensional construct of the concept (e.g., Alterman et al. 2003; Cohen and Strayer 1996; Davis 1980). Empathy involves cognitive and affective abilities, including the ability to recognize the feelings of others, take the perspective of others, distinguish the experience of others from one’s own, and manage one’s own distress (Dunsmore, 2001). In the current study, empathy will be defined as the ability to understand and share in another’s emotional state (Eisenberg and Strayer 1987).

The development of empathic abilities during the education of professionals in any healthcare discipline plays a crucial role, since these abilities have been associated with better clinical and ethical competencies, resulting in the ability to communicate more effectively with patients and clients (Calderón-Amor et al., 2017).

Research on self-reported empathy towards animals among veterinary students suggests that empathy for animals and belief in animal sentience declines markedly between the early years of a veterinary science degree and the second year after graduation (Hazel et al., 2011; Paul and Podberseck, 2000). Additionally, female veterinary students show a higher level of empathy for animals than do male students, as seen among students in various countries (Menor-Campos et al., 2019; Pollard-Williams et al., 2014).

In veterinary medical education, students are frequently required to undertake procedures that can cause animals pain (de Boo and Knight, 2005). Some may need to use healthy animals to practice clinical, surgical, or anesthetic abilities, including terminal procedures (Calderón-Amor et al., 2017). Few studies have sought to understand empathy among veterinary students and its relationship with their attitudes toward animals and various types of uses of animal (Menor-Campos et al., 2019).

Previously, it was found that “animal welfarists” (active members of AWOs) are more empathetic toward animals, and they show more concern regarding the use of animals for medical research, entertainment, and animal management practices (Knight et al., 2010). They tend to support animal rights over the human benefits of their use (Baldwin, 1993; Herzog, 1990; Knight et al., 2010). They have greater levels of belief in animal cognition and animal sentience (Knight et al., 2009). Beliefs about animals and concerns about animal use are likely to lead to contact with AWOs, or vice versa (Menor-Campos, 2019).

**NGOs in Israel Promoting Animal Welfare**

In 1994, Animals Now (formerly Anonymous for Animal Rights) was established as a non-profit organization in Israel. The organization which expressed concern regarding the plight of animals in industrialized farms in Israel**,** and led a struggle on their behalf.The association's best-known achievement is the cessation of fattening of geese and ducks in Israel, which was the fourth largest producer of foie gras in the world. An intensive campaign that included widespread public protest and legal and political action led to a 2003 High Court ruling that the Ministry of Agriculture's regulations for fattening geese were contrary to the Animal Cruelty (Animal Protection) Law, and should be repealed. The ban on fattening geese came into force in 2006.

The media is a key player in advancing animal rights agendas in Israel and around the world (source). For the past 15 years, covert investigations in industrialized farms have received extensive media coverage, including on prime-time television. Two covert investigations conducted by Animals Now were conducted in the years during which the current study took place (2010-2014). The first was an undercover investigation at Adom Adom, the largest cattle and sheep slaughterhouse in Israel. The story aired on December 6, 2012 on prime-time television, and revealed severe violence against calves and lambs. The exposure received an unprecedented wave of reactions from the media, authorities, and consumers. The second undercover investigation took place at a slaughterhouse managed by the Zoglowek company, one of the largest manufacturers and marketers of meat products in Israel. The story revealed severe abuse of chickens and turkeys, and was broadcast on October 29, 2013 on a program with high viewing indices. The broadcast drew a wave of reactions in the media, and led to the proposal of two new bills to increase animal protection, and to temporarily suspend activities at the investigated slaughterhouse.

In parallel with these exposés, in September 2012, the non-profit association Vegan Friendly was established. This association works to promote and advance a vegan lifestyle in Israel, along with outreach activities and high public visibility to increase awareness of the suffering of animals in industrialized farms in Israel.

In 2004, 5% of the population of Israel (approx. 300,000 individuals) said they were, making it the country with the highest per capita population of vegans in the world. A 2015 survey by Globes and Israel's Channel 2 News similarly found that 5% of Israelis were vegan. Veganism has increased among Israeli Arabs. The Israeli Defense Forces made a special provision for vegan soldiers in 2015, which included providing non-leather boots and wool-free berets.

A recent report by USDA Foreign Agricultural Service (27.6.2019) about retail foods in Israel indicates that the top trends of retail food in Israel are organic and vegan food. Sales of vegetarian and vegan products are on the rise, and sales of milk substitutes are showing rapid growth. Tel Aviv is ranked as one of the top 10 vegan-friendly cities in the world.

**Conclusion**

Need to complete

**Part II**

**Stress and Mental Wellbeing among Veterinary Students**

1. *Definition of stress and its effects on veterinary students*

The construct of stress has been defined in various ways, depending on the field in which it is studied. For the purposes of this study, stress refers to a complex of thoughts, emotions, behaviors, and physical symptoms that arises out of the relationship between a person and his or her environment (Collins and Foote, 2005). While the onset of stress is an adaptive short-term biological response, the body's failure to return to a state of homeostasis can lead to chronic stress and elevated hormone levels. Chronic stress can deplete the body and contribute to or exacerbate mental and physical illnesses (Sapolsky, 2004).

Physical responses to stress include lack of appetite, binge eating, and insomnia (El Ansari et al., 2014). Academic consequences arising from anxiety include difficulty concentrating, and procrastination (Zenner et al., 2005). Stress may cause students to negatively compare themselves to their peers and make them unwilling to participate in class discussions or to try to learn new skills, which impairs their learning. In general, stressed students report lower life satisfaction and greater concerns about their physical health and mental well-being (Root Kustritz, 2017). Recent results showing that burnout and subjectively assessed poor physical health may be expected in half of all veterinary students (Ilić Živojinović et al., 2020). The basic characteristics of burnout are emotional and physical exhaustion, depersonalization, and reduced personal job satisfaction (Maslach and Leiter, 2016). Burnout affects professional development and may reduce professional interest and degrade humanitarian attitudes such as empathy (Bullock et al., 2017). Monitoring of this syndrome is particularly important at the beginning of studies, when the first symptoms typically occur. Regarding other aspects of health habits, smoking is more prevalent among students with burnout compared to students without it (Cecil et al., 2014).

*2. Wellbeing among veterinary students*

Wellbeing encompasses a wide range of components, such as happiness, life satisfaction, hedonic balance, fulfillment, and stress. Affective and cognitive evaluation of one’s life lies at the core of wellbeing. Wellbeing also extends from the specific and concrete (momentary experiences) to the global and abstract (global judgments about one’s entire life (Chu Kim-Prieto et al., 2005).

**3.** *Wellbeing of veterinary students*

Recent years have seen an increasing focus on wellbeing in the veterinary profession, partly because reported proportional mortality ratios for suicide among veterinarians are higher than in other high-risk populations such as doctors and dentists (Mellanby 2005; Platt et al. 2010). This raises the question of at what point in the educational and career track issues of low wellbeing in the profession arises. It is valuable, therefore, to further our understanding of wellbeing in the veterinary student population.

Studies using validated psychological scales have shown that UK and US veterinary students experience lower levels of wellbeing and poorer mental health than the general population (Cardwell et al., 2013; Strand et al., 2005). These findings were echoed in a study by Hafen et al. (2008) at a US veterinary school, which found that approximately one third of the students were depressed; a figure that is significantly higher than among the general population (21.5%) and other medical students (23%) (Hafen et al., 2008). Veterinary students reported high levels of stress and exhaustion that impact academic and non-academic aspects of their lives (Kogan et al., 2005). Other studies have also demonstrated the negative impact that psychological difficulties have on student learning and development (Thomas et al., 2007).

**4.** *Veterinary studies related-stress factors*

Several academic and personal stressors have been identified as affecting veterinary students, such as heavy workload, rigorous or unclear academic requirements, frequent assessment, financial worries, and relationship difficulties (Kogan et al., 2005). Research pertaining to medical students has identified the medical school curriculum and environment as the students’ principal sources of stress. Stressors from social relationships and other outside causes are also frequent and significant sources of psychological distress (Murphy et al., 1984).

Coping with dilemmas and ethical concerns regarding animals has also been identified as a possible stressor (Gelberg and Gelberg, 2005). It has been proposed that the veterinary student population, in particular, experiences stress as a result of information overload, with an emphasis on the need for rote learning, and that students can be at risk of burn-out as they grapple with the range of demands on them (Rex, 1993).

*5***.** *Self-esteem among veterinary students*

Self-esteem (SE) is an important part of emotional wellbeing. It is related to how people experience stress (Sowislo and Orth, 2013). SE may serve to buffer anxiety (Pyszczynski et al., 2004). People with high SE are less likely to perceive experiences as stressful than people with low SE (Robinson et al., 1991). Gardner and Parkinson (2011) found that veterinary medical students with high SE reported less stress during veterinary school compared to those with low SE. In addition, students who reported having heavy workloads (subjectively assessed) experienced greater stress, whereas students with high SE experienced a higher level of wellbeing. Men and women did not differ on any of the study variables, and there were no differences between students in different years of study (Gardner and Parkinson, 2011).

There are many definitions of SE, but it is generally considered a global evaluation of the self that is relatively stable over time (Blascovich and Tomaka, 1991). SE differs from self-confidence or one's evaluation of specific attributes, such as academic abilities, in that SE is an appraisal of one's overall value as a person (MacDonald et al., 2003). While SE is considered a relatively stable trait, it can also change as a function of many factors, including the individual's experiences. When people have negative experiences related to things that they value as important, their overall SE can be affected.

The Veterinary Wellbeing Think Tank (an inter-professional consortium of veterinary mental health professionals, veterinarians, and veterinary educators) concluded that there is a complex interaction among personality traits, the rigors of veterinary medical training, and the learning environment that contributes to elevated rates of psychological distress among veterinary students (Strand et al., 2017). Moreover, the risk for poor mental health upon graduation may be attributed to work demands that go beyond the training received in veterinary medical educational settings, including providing client counselling about emotionally charged decisions and financial stress (Shirangi et al., 2013; Tran et al., 2014).

*6. Gender and stress among veterinarians and veterinary students*

Numerous studies have confirmed that females are more susceptible to stress and burnout compared to males (Gelberg and Gelberg, 2005; Mastenbroek et al., 2014). These findings are especially relevant considering the increased numbers of female students attending veterinary schools, as well as female graduates entering the labour market. A meta-analysis of gender differences in burnout confirmed that women are more likely to experience emotional exhaustion, while men scored higher on depersonalisation (Purvanova and Muros, 2010). The effect sizes of these differences, however, were small.

Studies among those working in the veterinary profession did not confirm these findings. In a study among Finnish veterinarians, no significant gender differences in levels of emotional exhaustion and cynicism were found (Reijula et al., 2003). A study in Belgium reported higher job engagement among female veterinarians and higher levels of emotional exhaustion among male veterinarians (Hansez et al., 2008).

*7. Role of organizational culture and the “hidden curriculum” in students’ stress*

Organizational culture and the “hidden curriculum” have a substantial role in shaping veterinary students’ perceived stress. It is possible to differentiate between three interconnected components of veterinary training: formal, informal, and hidden. The formal curriculum consists of the course of study, teaching and evaluation methods, syllabuses, and educational setting (lecture halls and laboratories). The informal curriculum occurs in clinical settings and is opportunistic, idiosyncratic, and often unplanned. The hidden curriculum embodies ideological and subliminal messages of the formal and informal curricula (Hafferty, 1998).

Medical training has long been charged with propagation of a “hidden curriculum” that encourages the enculturation of potentially unhealthy traits among graduates. Ideas unconsciously conveyed by the hidden curriculum in medicine include the ideas that: long hours and lack of time for oneself are necessary and reasonable; emotions have no place in work; asking for help is for the weak; negative reinforcement is a necessary component of medical training; and doctors never make mistakes. Medical training may inadvertently reinforce these messages and potentially hinder the development of healthy coping strategies known to assist individuals in stressful careers (Strand et al., 2017).

Studies examining the hidden curriculum of veterinary programs have identified a culture that normalizes disease and death, such as by euthanasia, and that emphasizes competitiveness and hierarchy. Sometimes, a school’s hidden curriculum involves faculty teaching by humiliation (Liz Mossop et al., 2013). Often, the hidden curriculum conflicts with what is learned during formal studies, creating a dilemma for students when the behaviours they see and believe they should emulate are at odds with their understanding of best practices. For example, students may be taught to communicate clearly and empathetically with clients but may see different behaviour from clinicians in the teaching hospital.

A recent study conducted among students and faculty in a college of veterinary medicine in the UK regarding aspects of professional conduct identified a dramatic decline in the importance placed on altruism when comparing responses of freshman to those of final-year students (Roder et al., 2012). The authors of the study identified the hidden curriculum as responsible for contributing to this surprising drop in students' desires to put the interests of others before their own, and called for further exploration into this aspect of veterinary medical education.

The fourth-year students are not paid for their shifts at the hospital on shifts. There was a large protest regarding this, which was covered in the press and was discussed in the Knesset (Israeli Parliament):

להוסיף- הסטודנטים בשנה רביעית מגיעים לתורנויות בבית החולים, ולא מקבלים שכר. היתה מחאה גדולה, שאף הגיעה לעיתונות, ונידונה בכנסת:

https://www.makorrishon.co.il/nrg/online/1/ART2/788/560.html

https://www.themarker.com/career/1.2974530

8. **Conclusion**

**To be completed…**

**Part III**

**Ethical Dilemmas Faced by Students of Veterinary Medicine**

*Definition of ethical dilemmas and moral stress*

Veterinarians frequently encounter morally charged situations that are potentially difficult to manage. Conflicts of interest for veterinarians include *ethical dilemmas* and *moral conflicts* (Tannenbaum, 1993). For example, situations involving euthanasia, end-of-life care, economics, and inadequate provision of care create practical and ethical dilemmas. An ethical dilemma, in a strict sense, is a conflict between responsibilities or obligations of equivalent moral weight. In a wider sense, ethical dilemmas occur when there are competing responsibilities with no obvious way to prioritize one responsibility over others (Morgan and McDonald, 2007).

A moral conflict occurs when a professional is aware of the path they see as morally correct, but is unable to follow it satisfactorily due to internal or external constraints (Crane et al., 2013). Throughout the literature, authors use various terms interchangeably, such as: ethical issue (Tannenbaum, 1993), ethical conflict (Moses et al., 2018), ethical dilemma (Montoya et al., 2019), ethical challenge (Morgan, 2009), moral issue ( Wilkinson, 1987), moral stressor (Crane et al., 2015), moral problem (Corley, 2002) and moral conflict ( Crane et al., 2013). For the sake of simplicity, this review will use the term ‘ethical dilemma’ to describe a situation that conflicts with the professional’s personal morals; ‘moral stress’ as the stress elicited by experiencing an ethical dilemma, and ‘moral distress’ as the psychological disequilibrium experienced from being constrained from following the perceived correct moral path.

In accordance with the findings by Morley et al. (2019), moral distress occurs when there is 1) the experience of a moral event, 2) the experience of psychological distress and 3) a direct causal relation between 1 and 2. These requisites are necessary and sufficient conditions for moral distress to occur (Morley et al., 2019). The development of moral distress from an ethical dilemma is influenced by internal and external factors, including personality and other occupational stressors (Crane et al., 2015). These factors impact the perception of a situation as an ethical dilemma, and impact each step of the deliberation process the professional undergoes, from exposure to a moral conflict to a final resolution of the situation.

Although there is disagreement regarding the ethical underpinnings of moral distress among healthcare providers and the scope of the definition, the literature supports a broad agreement that moral distress has a measurable impact on patient safety, compassion fatigue, mental health, and professional quality of life (Austin et al., 2017; Christodoulou-Fella et al., 2017;). Several authors have suggested that a similar link exists in veterinary medicine (Kahler, 2015; Roff, 2009).

**Prevalence**

Recent medical advances available at veterinary specialty hospitals have given rise to ethical dilemmas in the care of small and large animal species. Such dilemmas are a major source of moral distress among veterinarians and staff members (Adin et al., 2019). This is a seldom-studied but apparently widespread phenomenon among veterinary students in their clinical year. Instruments using practice-specific dilemmas have been created in other professions such as dentistry, science, and engineering (Bebeau et al., 1985; Clarkeburn, 2002) to measure ethical sensitivity, which is the ability to recognize ethical issues within a problem. However, this is neither a tool to measure ethical sensitivity among veterinary surgeons, nor data on this attribute. There is, therefore, an urgent need for more quantitative research.

In a survey of frequency and perceived stressfulness of ethical dilemmas encountered by 58 practicing veterinary surgeons in the UK, including recent graduates, most respondents (57%) reported that they faced one or two ethical dilemmas per week. Two respondents reported facing more than 10 ethical dilemmas per week, and three respondents stated they faced none. The median stress ratings for each dilemma were 8 (euthanasia of a healthy animal), 7 (financial limitations), and 9 (client wishing to continue treatment). This indicates that clients wishing to continue treatment despite poor animal welfare/quality of life was rated as the most stressful situation, but the other two scenarios were also rated as highly stressful. No effect of years in practice was found in relation to the stress ratings, nor was there any relation to type of practice (Batchelor and McKeegan, 2012).

In a survey of recent graduates from five UK veterinary schools found that less than half of those surveyed reported that they could always rely on support from others in the practice, and 78% said they had made mistakes during treatments that had negative emotional repercussions (Mellanby and Herrtage, 2004). Moral distress does not appear to dissipate in experienced veterinarians. In a survey of 889 veterinarians in North America, most respondents reported feeling conflict over what care is appropriate to provide. Over 70% of respondents said they faced obstacles that prevented them from providing appropriate care caused them or their staff moderate to severe distress. Seventy‐nine percent of participants report being asked to provide care that they consider futile. More than 70% of participants reported no training in conflict resolution or self‐care. The findings implicate moral distress in generating feelings of burnout and compassion fatigue, raising concern that moral distress may contribute to the development of mental health problems among veterinarians (Moses et al., 2018).

*Demographic factors associated with ethical dilemmas moral stress among veterinary students*

Several modifying factors have been associated with the prevalence of occurrence and levels of moral distress among veterinary students. To date, little has been written about the causes of these serious problems. However, a survey of veterinary students disputed the suspicion that veterinarians may be at higher risk than the general population for mental health problems because of adverse childhood experiences (Kahler, 2015; Rollin, 2011; Strand et al., 2017).

Women students tend to more readily recall ethical dilemmas, in greater number and with greater detail, and they described more of the context surrounding each dilemma than did the men. These findings could reflect a difference in communication style, or could suggest that the women spent more time reflecting on ethical dilemmas than the men had. Nearly 90% of the situations described by women involved an animal as the central focus of the ethical concern. In contrast, only about half of the real-life dilemmas described by men involved an animal as the primary focus of concern; the remainder involved concern with a person or principle (Sawyer, 1999). While not conclusive, this hints at a difference that could be explored in future research.

The impact of the hidden curriculum on subconscious learning goes well beyond professionalism. It shapes the response to moral stress. Some studies have shown that the hidden curriculum causes a decrease in empathy and animal welfare commitment among veterinary students (Hojat et al., 2004). Research has also shown the hidden curriculum can cause an increase in acceptance of unethical behaviors (Branch et al., 2001) as well as tolerance of harassment, bullying, and discrimination (Witte et al., 2006).

**Ethical Dilemmas in the Fourth-year Clinical Training at KSVM**

Veterinary students identified numerous real-life ethical dilemmas that they faced during their fourth-year clinical training. An analysis of the ethical dilemmas experienced by veterinary students showed that the majority involved a particular, concrete other, either animal or human, while the remainder involved what could be described as the violation of a principle. The majority of dilemmas experienced by veterinary students (72%) involved animals as the primary focus of ethical concern. Animals, for veterinary students, are included the moral domain (Sawyer, 1999).

In the absence of specific education on animal welfare, studies in both Britain and Australia have found that many veterinary students perceive their education as a rite of passage from ‘tender-minded’ pet owner to ‘toughminded’ clinician (Blackshaw and Blackshaw, 1993). Students appear to reduce their beliefs about the sentience of animals (animals’ capability to have feelings of pain, fear, etc.) and their empathic reactions to animals in distress (Paul and Podberscek, 2000). Although this process of apparently hardening attitudes towards animals may help some students to cope with the emotional and ethical challenges of veterinary work, it may also threaten the welfare of animals in their care.

Causing, prolonging, or failing to alleviate animal suffering is of central concern in most ethical dilemmas described by veterinary students. Suffering is equated with cruelty. Death of an animal is not necessarily equated with cruelty, although an exception to this seems to be euthanizing healthy animals for the owner’s convenience. Students balk at euthanizing healthy animals unless there are mitigating circumstances, particularly behavior problems that pose a threat to people. Also, many students would opt to perform a procedure they regard as inhumane, such as the declawing of cats, if the alternative is for the cat to be euthanized (Herzog et al., 1989).

Some ethical dilemmas are specific to veterinary university hospitals. How work is done, practiced, and justified are defined by the institutional structure within which the work takes place. The teaching hospital associated with KSVM is primarily a referral practice. That is, the majority of cases seen in the hospital have been referred by outside veterinarians because the cases call for greater expertise and specialization or for more extensive facilities and equipment than primary-care practitioners possess. This has wide-ranging implications, and impacts all facets of clinical operation, from the types of cases and clients, to the ways in which medical treatment is delivered. One of the significant implications of this situation is the ways in which it affects how students are educated to become veterinarians. Circumstances relating to KSVM as a referral institution are often central to the ethical concerns expressed by veterinary students in this study.

One impact of the hospital being a referral practice is that the types of cases seen are usually difficult: atypical or rare diseases, misdiagnosed or wrongly treated conditions, cases presenting vague symptoms that resist diagnosis, and cases in need of complex procedures, such as plating and pinning for multiple fractures. Often, KSVM is the last resort and only hope. The clients who arrive at the hospital have high expectations in terms of results. The collective expertise and diagnostic equipment available at KSVM are second to none in Israel. Some ethical dilemmas can revolve around the costs of extensive diagnostic procedures (owners are generally in a position to agree to high expenses) or may concern subjecting the patient to prolonged examinations and unpleasant experiences in the course of the diagnostic process. Although these dilemmas are indirectly experienced by the student, if the student considers the chosen medical treatment as unnecessary or unwarranted, it could present them with an ethical dilemma.

**Conclusion**

Need to complete

**Thesis overview**

To be completed