

Suicide in the Veterinary Field

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The Veterinary field is a popular field, however, when it comes to mental health, these health care professionals are overlooked. Looking into statistical, psychological, and scientific studies on veterinarians and how they cope with depression is important to look into when covering this topic. Occupational stressors are the main cause of depression for veterinarians and veterinary students. These stressors are further exacerbated by negative coping mechanisms. Suicide is seen much too often in this field and knowing the ways that it is carried about and why can lead to a better understanding of the occupation. The pressure to care for animals and communicate with pet owners is immense and there is clearly a connection between depression and the work related stress. This is explored in this paper with the hope to find clarity in why this issue exists and how it can be addressed in the future.

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Suicidal behavior can stem from a plethora of internal and external reasons ranging from past trauma, anxiety, and depression, to drug use and isolation. One group of people who are at a high risk of suicide are veterinary surgeons.

The work environment of veterinarians is commonly glorified by society and the mental toll that veterinarians take from working with difficult patients or pet owners is often overlooked. The workspaces of veterinarians can differ greatly depending on the situation. For example, there can be a veterinarian working at a local clinic with familiar patients or a veterinarian in an emergency hospital with a constant flow of different patients. One is not more stressful compared to the other because it depends on the individual. Minimizing one's mental health because of the situation of the other is not something that can be done. This is why research and case studies are used to study this phenomena.

The psychology and neurology behind suicide is one aspect to look into when researching the topic among veterinarians. There are many studies that show the mortality ratios between veterinary professionals and other occupational groups to depict that suicide in this field is a real issue that must be addressed. There is also a major sociological aspect that plays a role in the lives of veterinary students as they make their way up to becoming professionals. The difference in numbers between male suicides and female suicides in the field is also an important factor that must be discussed to understand the reasons behind this increased behavior.

Specific case studies also give insight into an individual who has suffered in this field. The mental health of veterinary surgeons can be analyzed through surveys on their well being and stress level. The job of a veterinarian has a very small room for error. This pressure put on surgeons on a day to day basis can be detrimental to one's mental health and can lead to suicidal behavior if there is no way for one to properly handle their stress. Psychological, sociological,

and neurological research can lead to breakthroughs into a way to benefit veterinary surgeons and improve their mental health.

The first thing that should be examined is the neuroscience behind suicide.

Understanding the neurology behind the act is one way to combat and prevent it from happening in the future. One question that might initially arise is what areas of the brain are stimulated when suicidal tendencies are present? One article from the Scientific American written by Carol Ezzell answers this question. The two regions in the brain that are affected anatomically and chemically are the orbital prefrontal cortex and the dorsal raphe nucleus of the brain stem. (Ezzell 47) In victims of suicide, the neurotransmitter serotonin is delivered in smaller amounts to the orbital prefrontal cortex. Serotonin is the neurotransmitter commonly known to affect mood and feelings of happiness. In veterinary medicine, the job can become stress inducing and overwhelming for an individual. This can lead to negative thoughts and depression which means that the neurotransmitter serotonin is most probably very low in the brain of that individual.

The knowledge about serotonin levels in the brain is the key to finding out what goes on when an individual commits suicide. The midbrain dorsal raphe holds the serotonin 1A receptors and those bind to a substance to regulate serotonin levels. (Stockmeier 4) The effect of selective serotonin reuptake inhibitor antidepressants on the Serotonin 1A receptors is important towards determining why suicide victims commit suicide and how to prevent this from happening in the future. These antidepressants are seen to desensitize the receptors on serotonin neurons, which happens when they are inhibited by an agonist. (Stockmeier 5) In figure 4, the table shows the data obtained by Craig A. Stockmeier. This shows those who passed away from suicide compared to a group of controls who passed away from other various reasons. Those who were diagnosed with depression were seen to have been on multiple medications to treat it, however,

they still committed suicide. Figure 5 shows a comparison of two dorsal raphe regions of two victims, one of which had depression and the other did not. The figure shows increased binding of serotonin 1A receptors in the dorsal raphe for the depressed victim. Those who work in the veterinary field who are susceptible to depression and stress would likely be taking antidepressants and if they are unable to impact the serotonin receptors effectively, it can be a reason for the abnormally high rates of suicide. More studies on how these antidepressants can be improved can be extremely beneficial towards lowering the rate of those in the veterinary field who commit suicide and even lower the rate of suicide for the general population.

One study to be explored is one done by the American Veterinary Medical Association. This study was done to discover and compare the proportionate mortality ratios among male and female veterinarians from 1979 to 2015. The percentage of deaths that were caused by suicide was compared to the suicide numbers of the general population and the causes and risk factors were analyzed statistically. A total of 11,620 veterinarian deaths were studied in this research. Out of the total, 398 deaths were found to have been the result of suicide. (Tomasi 104) This information was made available through life insurance databases that contained underlying causes of death. In Figure 1, which was taken from the study, the specific details of the victims were listed. The table shows that those who worked in a clinical setting made up seventy nine percent of the reported suicides in the time period of the study. This shows sufficient evidence that the workspace has a significant impact on the mental health of veterinary surgeons. In this same study, the proportionate mortality ratio (PMR), which was examined and determined to be higher for veterinarians, as compared to the general population. This increased risk can be attributed to exposure to a work environment that causes pressure, stress, and depression. The authors suggest that some aspects of a veterinarian's job that can lead to this are euthanasia

procedures, overworking, difficulty managing a private practice, and many other factors that can negatively affect mental health.

Another significant piece of data from this study was that the age ranges compared with suicide were numbers that did not differ by much, with the 45-64 age range containing the most victims. (Tomasi 106) This is very close to the exact age range that people experience their mid-life crisis. The PMR could be increased for veterinary professionals because of this crisis event that occurs on top of their work environment that could be detrimental to mental health when combined. People going through a midlife crisis are known to be prone to depression which can put people at risk of suicide. Occupational stressors in a clinical veterinarian's life at this age range is most likely a factor that can send one on a downward spiral in mental health. The expectations and stress that veterinarians face at any age can impact mental health and lead to suicidal tendencies.

Another section of the study mentioned the methods of suicide that were recorded in the life insurance databases. This information gives more insight into how the event occurred and how it was made available to the veterinarians. The two most prominent methods of action was the use of firearms (45%) and the use of pharmaceuticals (39%). (Tomasi 108) Another finding was that females were more likely than males to use pharmaceuticals as a method of suicide. The thirty nine percent of individuals that passed away from pharmaceutical poisoning is two times as large a percentage when compared to the PMR of the general United States population. Practicing veterinarians have access to pharmaceuticals that can poison them and lead to death. Suicidal individuals tend to lean towards methods that are accessible to them so it makes sense that pharmaceutical poisoning is common among veterinarians. Other research has shown that other healthcare professionals who have been victims of suicide also had a high percentage of

deaths due to pharmaceutical poisoning. One way to prevent this would be to have more administrative protection on the pharmaceuticals that are in a veterinary practice. This would not help the mental health of the veterinarians, however it would make the methods of suicide less available.

Veterinarians are not the only ones who are vulnerable to higher rates of death by suicide. The other professions and positions included are veterinary technicians, assistants, practice managers, and students. All these professions in the veterinary field deal with similar problems that can lead to suicide if they are not dealt with properly. The amount of pressure and stress that can be found in the veterinary profession is something that is not looked at by society as much, but it is a serious issue that must be addressed. There are even more statistics that prove the fact that veterinary workers have a much higher chance of committing suicide compared to the general population.

A different study on the numbers and methods of death by suicide done by veterinarians from 2003-2014 was also done by Tracy K. Witte, PhD. Similar to the previous study, self poisoning by drug use was a common method of suicide that was found in veterinary doctors, technicians, and assistants. The most common form found was pentobarbital suicide. (Witte 11) This is the euthanasia that veterinary doctors use for the animals. This is a drug that is readily available to those who work at a practice, so it does not come as a surprise that it is the most common method of suicide recorded. Because more methods of suicide are available to veterinarians, on top of the stress and depression that can result from working, the percent mortality rate for veterinarians is much higher when compared to the general population. The idea of veterinarians using the drug for euthanasia for self poisoning is very saddening because the use of that drug on animals could be a reason for the depression that led to the result of

suicide. The data table from the study shown in figure 3 below shows the specific numbers involved with the veterinary workers who committed suicide from 2003-2014. All but one statistic came out to be higher than the expected value. The pentobarbital suicide had to be placed in a different statistic because of how common a method it is. As mentioned earlier, more administrative control over the substances in the veterinary practice can greatly reduce the risk of suicide by self poisoning.

One way to study how suicide continues to occur in the veterinary field is to study the coping mechanisms that are used by veterinarians to deal with stress from practicing. One study done by Lisa Emmett covers how women in the field deal with stress and work related issues. The study looks into females because they cover most of the demographic of veterinarians today and are most prone to mental illnesses related to stress. As the profession of veterinarian requires the doctor to interact with both the human and animal side, it can lead to additional stressors and veterinarians can end up coping with this built up stress in harmful ways. Negative coping mechanisms are detrimental to mental health and can even lead to suicidal tendencies. The fact that female veterinarians practice these coping mechanisms gives evidence about how the increased rates of suicide exists in this field.

Veterinary medicine is a profession that induces a large amount of stress on the doctor, so it is no surprise that when mixed with poor coping mechanisms, psychotropic substances and suicidal tendencies are high compared to the general population. The negative coping mechanisms that were found to be practiced in the study were escapism, social encapsulation, rumination, resignation, self-pity, and self-incrimination.(Emmett 4) Some may argue that escapism can be a positive coping mechanism as it can distract one from depressing thoughts and realities. However, escapism can be harmful when reality is ignored completely and once a

person returns, they would be worse off than before they began to cope with escapism.

Self-incrimination is an interesting coping mechanism that was mentioned because one might wonder how a veterinarian can end up coping in that way. One possibility is if an animal is harmed or passes away while being treated by a veterinarian. If this occurs, the veterinarian can easily fall into this coping mechanism and fully blame themselves for what occurred. Constantly seeing animals in worsened states and having to deal with the owners as well can overwhelm veterinarians if they do not deal with this stress correctly. This can quickly spiral into depression. The statistics clearly support the claims made in this study as one statistic states “Regarding suicidal tendencies Nett and colleagues [16] found that female veterinarians practicing in the US show increased suicidal ideation (19.1%) compared to female adults (7.1%).” (Emmett 2) Because females fill the majority of the demographic of veterinarians, this study only covers the female population. The difference in percentages of those with suicidal tendencies is staggering and it is clear that there are other factors that play a role in the increased rate for veterinarians.

Furthermore, going into the statistics behind the stressors, Figure 2 below shows the coping mechanism frequently used methods as compared to the norm population. To get this data, online surveys were given to female veterinarians and the answers were recorded. The percentages of stressors that were most commonly mentioned were also reported. The most common stressor was the communication with the animal owners, followed by 24/7 availability, and euthanasia. (Emmett 3) Many people would assume that euthanasia would be the number one stressor, however most people do not think about the fact that the job of the veterinarian deals with both people and animals. The responsibility that can come with treating an animal that belongs to someone else who is dependent on the veterinarian's expertise can induce plenty of stress. The stress leads to negative coping mechanisms which can then lead to suicidal

tendencies. It is already known that the rates of suicide for veterinary doctors is higher than that of the general population. The study on stressors and coping mechanisms gives insight into why this statistic is still true today. If veterinarians are taught how to positively cope with stressors in veterinary school, this issue can be reduced greatly. Negative coping is common because the resources to combat these practices are not readily available.

Another type of stress that veterinarians deal with is secondary traumatic stress, or compassion fatigue. This type of stress directly impacts many veterinarians and can lead to depression. (Hanrahan 1) The different levels of trauma that veterinary students and doctors have to deal with when dealing with patients and their owners. For students this is added on to the stress of graduate school. All this stress can eventually lead to burnout and the negative coping mechanisms mentioned above. When dealing with burnout, most people take a break to reset themselves, however, veterinarians do not have this option because they need to constantly treat patients. One worrying statistic from a study done in New Zealand showed that two percent of veterinarians have attempted to commit suicide and thirty percent have considered doing so. For veterinary students it was reported that between 32 and 68 percent of students had symptoms of clinical depression. (Hanrahan 2-3) These findings will not improve in the future if awareness is not brought to the subject.

The immense pressure that a veterinarian deals with mostly comes from the fact that they are responsible for attaining the human-animal bond that is formed between a pet and its owner. Failure to do so can lead a veterinarian towards a downwards spiral of depression. Looking at how depression affects the brain is one way to approach the issue. Doing this can lead to the development of new antidepressants that can be more effective in treating depression and can

overall lower the rates of suicide in veterinarians. Looking at statistical data from the past on depression and suicide can also help with the treatment of future veterinarians.

Table 1—Characteristics of 398 veterinarians who died by suicide during the years 1979 through 2015.

Variable	Males (n = 326)	Females (n = 72)	Total (n = 398)
Age at death (y)			
25–44	74 (23)	45 (63)	119 (30)
45–64	148 (45)	≥ 5 (—)	≥ 148 (—)
≥ 65	104 (32)	< 5 (—)	≥ 104 (—)
Position type*			
Clinical	261 (80)	52 (72)	313 (79)
Nonclinical	56 (17)	11 (15)	67 (17)
Species specialization†			
Companion animal	174 (53)	52 (72)	226 (57)
Food animal	≥ 5 (—)	< 5 (—)	44 (11)
Mixed animal	≥ 5 (—)	< 5 (—)	19 (5)
Equine	≥ 5 (—)	< 5 (—)	9 (2)
Other	< 5 (—)	< 5 (—)	< 5 (—)
None—not listed	86 (26)	12 (17)	98 (25)

Data are shown as number (%). Data for cell sizes < 5 and data reported as minimum rather than exact values were suppressed to comply with the NDI data reporting requirements.

*Occupational positions for 18 decedents (9 male and 9 female veterinarians) were classified as unknown.

†Species specialization was classified according to AVMA market research statistics definitions²⁸; not all individuals with species specialization were in clinical practice.

— = Percentages not calculated for compliance with NDI data reporting rules.

Figure 1. Data obtained by Tomasi, Suzanne DVM on veterinarians who committed suicide from 1979 to 2015.

Coping Strategies	t	df	p-Value
escapism	2.173	73	0.033
social encapsulation	1.943	75	0.056
ruminantion	6.733	74	0.001
resignation	2.541	75	0.013
self-pity	3.140	74	0.002
self-incrimination	2.374	75	0.020

Figure 2. Data obtained by Emmet, Lisa. Shows the statistics with the negative coping mechanisms used by veterinarians who are women.

Table 2—Standardized mortality ratios for suicide among 128 of the 189 decedents in Table 1 who were classified as employed at the time of death.

Category	No. of deaths		SMR (95% CI)
	Observed	Expected	
Veterinarians			
Male			
All deaths by suicide	34	21.5	1.6 (1.1–2.1)
Pentobarbital poisoning excluded	24	21.5	1.1 (0.7–1.6)
Female			
All deaths by suicide	16	6.6	2.4 (1.2–3.6)
Pentobarbital poisoning excluded	10	6.6	1.5 (0.6–2.5)
Veterinary technicians or technologists			
Male			
All deaths by suicide*	15	3.0	5.0 (2.5–7.6)
Female			
All deaths by suicide	37	15.9	2.3 (1.6–3.1)
Pentobarbital poisoning excluded	32	15.9	2.0 (1.3–2.7)
Veterinary assistants or laboratory animal caretakers			
Male			
All deaths by suicide*	9	10.8	0.8 (0.3–1.4)
Female			
All deaths by suicide	17	12.1	1.4 (0.7–2.1)
Pentobarbital poisoning excluded	—	—	—

Data are reported for 25- to 69-year-old veterinarians, 20- to 69-year-old veterinary technicians or technologists, and 20- to 69-year-old veterinary assistants or laboratory animal caretakers; age limits were selected on the basis of an assumed retirement age of 70 for all decedents and additional time for postgraduate study prior to employment for veterinarians. This analysis excluded deaths of undetermined intent; the SMR for a given group indicates a significant difference in the rate of death by suicide, compared with that for the general population, when the 95% CI does not include 1.

*No deaths involving pentobarbital poisoning were recorded for these groups.

See Table 1 for remainder of key.

Figure 3. Suicide mortality rates of veterinary workers. Data recorded by Tracy K. Witte

PhD.

Table 1. Characteristics of subjects							
Sample	Age/ gender	Cause of death	PMI (hr)	Toxicology	Smoker	Medication	AXIS I diagnosis
Control	27/m	Electrocution by lightning	22	Nothing detected	Yes		No diagnosis, alcohol abuse >7 years ago
Control	40/m	Cardiovascular disease	22	Lidocaine	Yes		No diagnosis, alcohol abuse >2 years ago
Control	44/m	Cardiovascular disease, aortic aneurism	6	Ephedrine, phenylprochlorpheniramine	No		No diagnosis
Control	45/f	Cardiovascular disease	9	Nothing detected	Yes		No diagnosis
Control	47/m	Cardiovascular disease	17	Nothing detected	Yes	famotodine	No diagnosis
Control	50/m	Cardiovascular disease	26	Nothing detected	Yes		No diagnosis
Control	57/m	Cardiovascular disease	10	Nothing detected	Hx	naproxen	No diagnosis
Control	58/m	Cardiovascular disease	22	Nothing detected	Yes	digoxin	No diagnosis
Control	69/m	Cardiovascular disease	18	Nothing detected	No		No diagnosis
Control	82/m	Cardiovascular disease, aneurism	16	Nothing detected	No	levothyroxine	No diagnosis
Suicide	25/f	Hanging	17	Nothing detected		Nortriptyline, Perphenazine, clonidine	Major depression
Suicide	30/m	Sigsw-chest	18	Ethanol 0.07% blood	Yes		Major depression, alcohol abuse 2 years ago
Suicide	42/m	Sigsw-chest	>20	Nothing detected			Major depression
Suicide	43/m	Hanging	21	Nothing detected	No		Major depression
Suicide	45/m	Multiple knifing	8	Nothing detected		Nifedipine, allopurinol, corzide	Major depression, dysthymia
Suicide	48/m	Sigsw-chest, slashed wrists	21	Flurazepam	No	Flurazepam, Lorazepam	Major depression, alcohol abuse 24 years ago
Accident*	54/m	Carbon monoxide	23	Carbon monoxide, phenobarbital, phenytoin	Hx	Sertraline	Major depression
Suicide	62/m	Hanging	5	Nothing detected	Yes	traz, nortriptyline, sertraline	Major depression, alcohol abuse 4 years ago
Suicide	70/m	Sigsw-head	23	Phentoin-acute		doxepin, prednisone, captopril	Major depression, alcohol dependence 15 years ago
Suicide	83/f	Slashed wrists	21	Nothing detected		temazepam	Major depression

F, Female; Hx, history; m, male; phenylpro, phenylpropanolamine; PMI, postmortem interval; sigsw, self-inflicted gunshot wound; traz, trazodone. Medications listed in upper case were prescribed in the last month of life. *Subject had attempted suicide on several occasions, and it is possible the death was a suicide.

Figure 4. Subjects who passed away whose cases were studied and recorded by Craig A. Stockmeier.

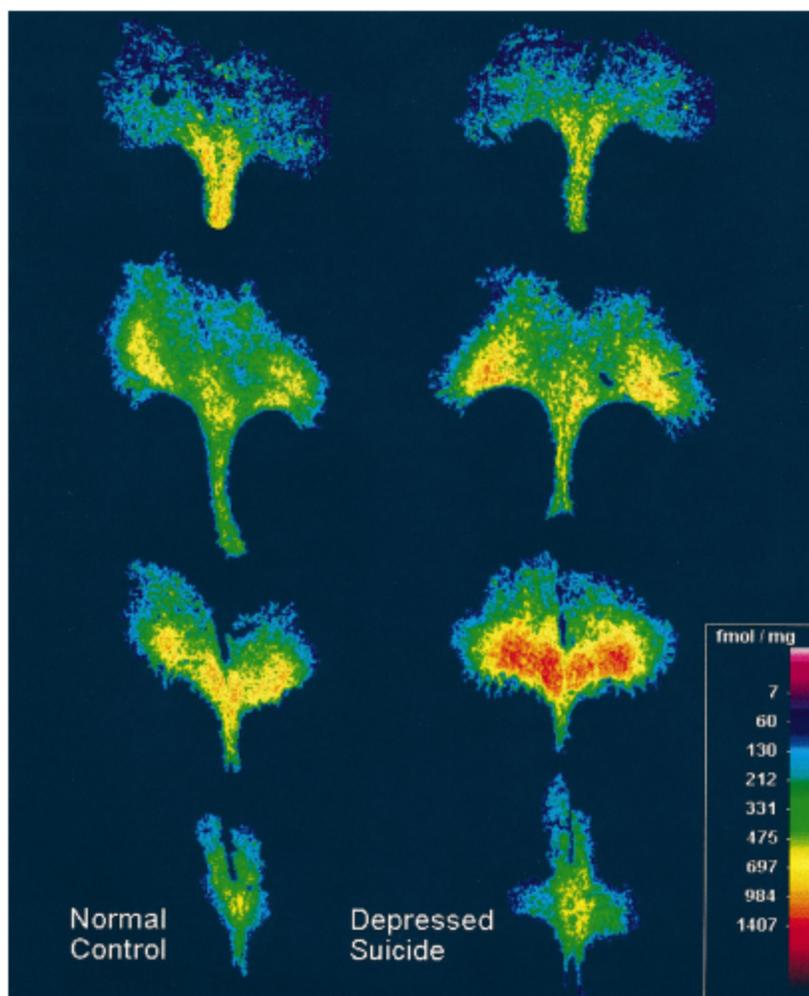


Figure 3. [^3H]-hydroxy-2-(di-n-propyl)aminotetralin binding to serotonin-1A receptors in the midbrain dorsal raphe (DR) from a representative control subject that was psychiatrically normal (*left*) and an age-matched suicide victim with major depression (*right*). The control subject was the 27-yr-old male, and the suicide victim was the 30-yr-old male (see Table 1). The digitized autoradiograms of the DR are shown at four rostral-to-caudal levels of the midbrain, with the upper images located more rostrally. Note the enhanced radioligand binding to serotonin-1A receptors in the depressed suicide victim, as evidenced by greater numbers of orange and red pixels in the images in the *right* column. The distance across the widest portion of the DR is ~ 5 mm.

Figure 5. The autoradiograms of a deceased suicide victims dorsal raphe activity with the Serotonin-1A receptor compared to a normal control. Data obtained from Craig A. Stockmeier.

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