# Suicidal thoughts, animal euthanasia, and help-seeking among veterinarians in Norway

a nationwide and cross-sectional survey (The NORVET study)

Philosophiae Doctor (PhD) Thesis

Helene Seljenes Dalum

Department of Behavioural Medicine

Institute of Basic Medical Sciences

Faculty of Medicine

University of Oslo

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# ABSTRACT

**Background:** A systematic review from 2010 found elevated suicide rates among veterinarians in 14 of 15 studies. Since then, three recent studies have also found that veterinarians have a higher suicide rate compared to the general population. Also, a higher prevalence of suicidal thoughts has been found among veterinarians compared to the general population. There is scarce knowledge about variables associated with suicidal thoughts in veterinarians. Animal euthanasia is suggested to influence the suicide risk among veterinarians, but this is hardly studied. It has also been suggested that animal euthanasia may influence veterinarians' attitudes toward assisted dying in humans. Knowledge about help-seeking behaviour for mental health problems among veterinarians is also lacking. Most studies conducted on veterinarians and mental health have been conducted in other parts of the world, where working life differs from that in Scandinavia. As far as we know, there are no studies on suicidal thoughts or help-seeking among veterinarians in Scandinavia.

**Research questions:** The research questions in this thesis are:

1. What is the 12-month prevalence of suicidal feelings, thoughts, and attempts among veterinarians in Norway? (Paper I)
2. What is the 12-month prevalence of mental health problems in need of treatment? (Paper III)
3. Is work characteristics independently associated with serious suicidal thoughts? (Papers I and II)
4. What do veterinarians themselves report as variables contributing to serious suicidal thoughts and mental health problems? (Papers I and III)
5. What are veterinarians' overall attitudes toward assisted dying in humans? (Paper II)
6. Is work-characteristics, such as animal euthanasia, independently associated with veterinarians' attitudes toward euthanasia in humans? (Paper II)
7. How many of those with mental health problems or serious suicidal thoughts have sought help? (Paper III)
8. Is work characteristics independently associated with help-seeking behaviour? (Paper III)
9. What are veterinarians' attitudes toward mental illness, and are they independently associated with help-seeking behaviour? (Paper III)

**Material and Methods:** The NORVET study is a nationwide, cross-sectional survey. Of the 3464 eligible veterinarians in the sample, 2596 responses were received (75 % response rate). This thesis consists of three papers, all based on data from the survey. The first paper investigated the prevalence and

independent variables associated with serious suicidal thoughts. The second paper investigated veterinarians' overall attitudes toward assisted dying in humans, and whether field of work and the frequency of animal euthanasia were associated with positive attitudes toward euthanasia in humans, and whether animal euthanasia was associated with serious suicidal thoughts. The third paper investigated help-seeking behaviour for mental health problems and serious suicidal thoughts, as well as the independent variables associated with help-seeking behaviour.

**Results:** The 12-month prevalence of suicidal feelings, a wish to die, suicidal thoughts, serious suicidal thoughts, and having attempted suicide were 26.6 %, 19.4 %, 19.6 %, 5.4 % and 0.2 %, respectively. Thirty per cent of veterinarians reported mental health problems in need of treatment. Being single, negative life events, mental distress, positive attitudes toward euthanasia in humans, lack of colleague support, and frequent performance of animal euthanasia were independent variables associated with serious suicidal thoughts. The veterinarians themselves most commonly reported work problems as contributing to both serious suicidal thoughts and mental health problems. Overall, veterinarians' attitudes toward assisted dying in humans were comparable to those of the general population. Veterinarians working in companion animal practice had higher odds of positive attitudes toward euthanasia in humans compared to veterinarians working in mixed clinical practice. Fifty-four per cent of veterinarians with self-reported mental health problems in need of treatment had sought help. Fifty per cent of those with serious suicidal thoughts had sought help. Independent variables associated with more help-seeking behaviour were being female, the field of work (public administration, academia or research, and 'other' fields), and positive attitudes toward the treatment of mental illness. The only independent variable associated with less help-seeking behaviour was working in production animal practice.

**Conclusions:** Veterinarians in Norway reported a higher 12-month prevalence of suicidal thoughts compared to physicians and police. Both individual and work-related variables were associated with serious suicidal thoughts. The association between animal euthanasia and serious suicidal thoughts was a novel finding. Veterinarians themselves most often reported work problems as contributing to both mental health problems and serious suicidal thoughts. The finding that companion animal practitioners were more likely to have positive attitudes toward euthanasia in humans may suggest that animal euthanasia may affect veterinarians' attitudes toward death. The degree of help-seeking behaviour was low, with veterinarians working in production animal practices having lower odds of help-seeking behaviour.

# SAMMENDRAG

**Bakgrunn:** En systematisk oversiktsartikkel fra 2010 fant forhøyet selvmordsrate blant veterinærer i 14 av 15 studier. Siden da har tre nyere studier også funnet at veterinærer har en forhøyet selvmordsrate sammenlignet med den generelle befolkningen. Det er også funnet høyere prevalens av selvmordstanker blant veterinærer i forhold til den generelle befolkningen. Vi vet lite om hvilke faktorer som har sammenheng med selvmordstanker hos veterinærer. Eutanasi av dyr er foreslått å kunne påvirke selvmordsrisikoen blant veterinærer, men dette har knapt vært studert. Det har også blitt foreslått at eutanasi av dyr kan påvirke veterinærers holdninger til dødshjelp hos mennesker. Det mangler kunnskap også om hjelpsøking for psykiske problemer blant veterinærer. De fleste studiene om veterinærer og psykisk helse er utført i andre deler av verden, der arbeidslivet skiller seg fra skandinaviske forhold. Så vidt vi vet finnes det hittil ingen studier om selvmordstanker eller hjelpsøking blant veterinærer i Skandinavia.

**Forskningsspørsmål:** Forskningsspørsmålene i denne avhandlingen er:

1. Hva er 12-måneders prevalensen av en følelse av at livet ikke er verdt å leve, selvmordstanker og selvmordsforsøk blant veterinærer i Norge? (artikkel I)
2. Hva er 12-måneders prevalensen av behandlingstrengende psykiske problemer? (artikkel III)
3. Er det sammenheng mellom arbeidsfaktorer og alvorlige selvmordstanker? (artikkel I & II)
4. Hva mener veterinærene selv er bidragsytende faktorer til alvorlige selvmordstanker og psykiske problemer? (artikkel I og III)
5. Hva er veterinærenes holdninger til dødshjelp hos mennesker? (artikkel II)
6. Har arbeidsfaktorer, som eutanasi av dyr, sammenheng med veterinærers holdninger til eutanasi hos mennesker? (artikkel II)
7. Hvor mange av veterinærene med psykiske problemer eller alvorlige selvmordstanker har søkt hjelp? (artikkel III)
8. Er det en sammenheng mellom arbeidsfaktorer og hjelpsøking? (artikkel III)
9. Hva er veterinærers holdninger til psykiske lidelser, og er det en sammenheng mellom slike holdninger og hjelpsøking? (artikkel III)

**Materiale og metoder:** NORVET-studien er en landsomfattende tverrsnittsundersøkelse. Av utvalget på 3464 veterinærer fikk vi 2596 svar (75 %). Denne avhandlingen består av tre artikler, alle basert på data fra spørreundersøkelsen. Den første artikkelen undersøkte prevalensen og uavhengige variabler

som hadde sammenheng med alvorlige selvmordstanker. Den andre artikkelen undersøkte veterinærenes holdninger til dødshjelp hos mennesker, samt om det var en sammenheng mellom stillingstype eller eutanasi av dyr og positive holdninger til eutanasi hos mennesker, og om det var en sammenheng mellom eutanasi av dyr og alvorlige selvmordstanker. Den tredje artikkelen undersøkte hjelpsøking for psykiske problemer og alvorlige selvmordstanker, og uavhengige variabler som hadde sammenheng med hjelpsøking.

**Resultater:** 12-måneders prevalensen av å ha en følelse av at livet ikke var verdt å leve, et ønske om å være død, selvmordstanker, alvorlige selvmordstanker, og selvmordsforsøk var henholdsvis 26,6 %, 19,4 %, 19.6 %, 5,4 % og 0,2 %. Tretti prosent av veterinærene rapporterte psykiske problemer som de anså som behandlingstrengende. Å være enslig, negative livshendelser, psykiske plager, positive holdninger til eutanasi hos mennesker, mangel på kollegastøtte og hyppig utførelse av eutanasi av dyr var uavhengige variabler assosiert med alvorlige selvmordstanker. Veterinærene selv rapporterte oftest arbeidsrelaterte problemer som bidragsytende til både alvorlige selvmordstanker og psykiske problemer. Veterinærenes holdninger til dødshjelp hos mennesker var på linje med den generelle befolkningen. Veterinærer som jobbet i smådyrpraksis hadde høyere odds for positive holdninger til eutanasi hos mennesker sammenlignet med veterinærer som jobbet i blandet klinisk praksis. Femti-fire prosent av veterinærene med selvrapportert behandlingstrengende psykiske problemer hadde søkt hjelp. Femti prosent av de med alvorlige selvmordstanker hadde søkt hjelp. Uavhengige variabler som hadde sammenheng med mer hjelpsøking var å være kvinne, stillingstype (offentlig administrasjon, akademia/forskning og 'annet') og positive holdninger til behandling av psykiske lidelser. Den eneste uavhengige variabelen som hadde sammenheng med mindre hjelpsøking var å arbeide i produksjonsdyrpraksis.

**Konklusjon:** Veterinærer i Norge rapporterte en høyere 12-måneders prevalens av selvmordstanker sammenlignet med leger og politi. Både individuelle og arbeidsrelaterte variabler hadde sammenheng med alvorlige selvmordstanker. Sammenhengen mellom eutanasi av dyr og alvorlige selvmordstanker var et nytt funn. Veterinærene selv rapporterte oftest arbeidsrelaterte problemer som bidragsytende til både psykiske problemer og alvorlige selvmordstanker. At smådyrveterinærer hadde større sannsynlighet for å ha positive holdninger til eutanasi hos mennesker kan tyde på at eutanasi av dyr kan påvirke veterinærers holdninger til døden. Hjelpsøkingsgraden var lav, og veterinærer i produksjonsdyrpraksis hadde lavere sannsynlighet for å søke hjelp.

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I have been privileged to conduct this study. If the NORVET study could contribute to the normalisation of mental health or encourage just one person to talk about their thoughts or feelings with someone, this project has succeeded.

Helene Seljenes Dalum, Oslo, December 2022

# PREFACE

I started my veterinary education in 2005 to fulfil my childhood dream of being a companion animal veterinarian. When I graduated in 2010, I was determined to work in companion animal practice. It took me less than one year to realise that clinical practice was not what I expected. Although I had my diploma proving my qualifications, I did not feel prepared for working as a companion animal veterinarian. Professional isolation, low wages, huge responsibilities, and a fear of making mistakes had an impact on me. I made a transition from companion animal practice to public administration. Here, I felt that my knowledge and experience were valuable and appreciated. I could maintain a good work and personal life balance, and I did not have to worry about the on-call duty telephone. I did not have to discuss the financial aspects of diagnostics and treatment, which sometimes made me unable to deliver the most appropriate treatment for my animal patients. Even though moving away from clinical practice was the right choice for me, I have more than once heard from animal owners that: 'Oh, so you are not a *real* veterinarian anymore'? Most people also seem to perceive veterinarians as good-hearted animal lovers who are fortunate to spend their days working with animals and cuddling with kittens and puppies.

I have always wanted to contribute to educating the general population about what veterinarians *really* do, the complexity of their work, and the advancements and progress in veterinary medicine through the last several decades. Veterinarians have a broad medical and biological background and possess a competency field crucial to 'One Health' issues, which describe the intersection between environmental, animal and human health. Veterinarians have had several key roles both nationally and internationally during the coronavirus pandemic, emphasising this expert knowledge. Thus, veterinarians hold many important roles, reaching far beyond companion animal practice.

As of May 2020, there were approximately 4200 authorised veterinarians registered in Norway. There is only one university offering a veterinary degree (cand.med.vet) in Norway, namely the Veterinary Medicine curriculum at the Norwegian University of Life Sciences (NMBU), located approximately 30 km outside of Oslo. Annually, there are between 60 and 70 veterinarians who graduate from NMBU. Additionally, on average, 50 Norwegian veterinarians graduate from veterinary schools abroad annually.

The idea for the NORVET study emerged by coincidence. I met my co-supervisor, Reidar Tyssen, at a seminar on mental health held by the Norwegian Veterinary Association in 2016. In addition to my

interest in veterinary medicine, I have always been fascinated by psychology. Just a few months before attending the seminar, I wrote a debate article in The Norwegian Veterinary Journal about the need to talk about mental health in the veterinary profession (Dalum, 2016). I had panic anxiety when I was in veterinary school, and what I thought was a lack of talk about mental health problems made me want to break this silence. At the seminar, I told Reidar about my interest in psychology and mental health among veterinarians. Following that, I was invited to have a cup of coffee with Reidar and Erlend to discuss the possibility for a research project. The PhD-project NORVET was formed 3 years after our initial meeting in 2016. We launched a nationwide survey in the autumn of 2020. Three-quarters of veterinarians responded. I hope that the response rate reflects that my veterinary colleagues finds this project valuable.

The attention given to mental health has been increasing within the veterinary profession. When veterinarians in Norway started discussing aspects of mental health, most of the discussions were based on assumptions and research results from other parts of the world. My hope and intention with this research project were to provide baseline knowledge of some mental health outcomes and, by doing so, contribute to a more knowledge-based discussion regarding mental health and working life for veterinarians in Norway.

The interest and engagement in the project have been far beyond my imagination. Since 2020, about 50 newspaper articles, both in Norway and internationally, have mentioned the project. We have also participated in TV and radio interviews and several podcasts, in Norway, Sweden, Australia, and the United States. I have also given many talks on the mental health of veterinarians within the profession, in Norway and abroad. There has been a shift in how we address mental health problems in the profession since I graduated in 2010. We have transitioned from barely talking about mental health to including it in the curriculum, as a topic at seminars and conferences, and as part of continuing education. The integration of more of the so-called 'professional competencies' (such as clinical communication), professional role and ethics, resilience training, stress management, and basic psychoeducation into the curriculum and continued education are warmly welcomed. We also need to lower the threshold for help-seeking behaviour among veterinarians. I hope that mental health becomes just as natural to discuss in the workplace as ergonomics and the prevention of dog bites or horse kicking. Some reflections on this increasing attention to mental health within the veterinary profession and how it may have impacted our results are discussed in 'Section 4.1: Methodological issues'.

I have also received personal feedback from colleagues and students. One of them was from a veterinary student approaching graduation (reproduced with permission):

*'I am so grateful for the work that you do in reducing the stigma regarding mental health in our profession. I am short on my way out there in the "real world". It frightens me, but I am also very much looking forward to it. I have been struggling for a long time with anxiety and depression myself, but I couldn't imagine working in another field. The work you do has created a safe space–for mental health (and mental illness) and an opportunity to talk openly about how you feel. Thank you so much.'*
*[authors' translation]*

I am grateful to have contributed to a shift in how we address mental health within the veterinary profession. Nonetheless, it is important to note that many others, both individuals and organisations, have contributed. Please refer to the 'Acknowledgements' section.

## LIST OF PAPERS

### Paper I:

Dalum HS, Tyssen R, Hem E.

Prevalence and individual and work-related factors associated with suicidal thoughts and behaviours among veterinarians in Norway: a cross-sectional, nationwide survey-based study (the NORVET study)

BMJ Open 2022;12:e055827.

### Paper II:

Dalum HS, Tyssen R, Moum T, Thoresen M, Hem E.

Euthanasia of animals - Impact on veterinarians' suicidal thoughts and views on assisted dying in humans: A nationwide study (the NORVET study)

(submitted for review October 2022)

### Paper III:

Dalum HS, Tyssen R, Moum T, Thoresen M, Hem E.

Professional help-seeking behaviour for mental health problems among veterinarians in Norway: a nationwide, cross-sectional study (The NORVET study)

BMC Public Health 2022;22:1308.

# RATIONALE FOR THIS THESIS

The background for my interest in this research was that veterinarians represent an occupational group with a higher suicide rate compared to the general population and other occupational groups (Platt et al., 2010, Tomasi et al., 2019, Witte et al., 2019, Hem et al., 2005). Comparatively, veterinarians have been shown to have a low suicide attempt rate (Nett et al., 2015), as also seen in physicians (Hem et al., 2000). This may indicate that suicide attempts in veterinarians more often ends in completed suicide compared to non-medical professionals (Witte et al., 2019). Veterinarians have easy access to lethal means as part of their work and might have a different perspective on death as a result of their professional experience with animal euthanasia. This makes veterinarians an occupational group of high interest in research on suicidal thoughts. Despite this, there are few such studies among veterinarians.

The most well-known role of the veterinarian is as a healthcare provider for companion animals. In contrast to physicians, veterinarians must be proficient in anatomy, physiology, pharmacology, pathology, and medicinal treatment across multiple species (Reisbig et al., 2012). In Norway, the cost of human health care is generally funded by tax revenues. In animal health care, the expenses for treatment are the sole responsibility of the animal owner. This discrepancy between the human health care system and animal health services often leads to high expectations from animal owners concerning diagnostics and treatment options and, at the same time, a low willingness to pay for animal health care. Therefore, veterinarians have to balance animal welfare, economy, and ethics in each case, often rendering the veterinarian under pressure at this intersection. A qualitative study highlights the importance of financial concerns. When asked what aspect of their profession they would change; the majority of veterinarians wanted to remove money from the decision-making process (Whitnall and Simmonds, 2021). Financial issues have previously been identified as a risk factor for suicide (Gerdtham and Johannesson, 2003), and financial worries were related to suicidal thoughts in a study among veterinarians in France (Andela, 2021).

In addition to their well-known role as clinicians who provide healthcare for animals, veterinarians also play several important roles in society. Veterinarians work in food safety, the military, human and veterinary medicine research and development, and public health. A study of information about veterinarians on social media found that the most popular terms were about caring for companion

animals (Widmar et al., 2020) and that people did not know much about the roles of veterinarians outside of companion animal care.

Even though longitudinal data is warranted to conclude causality for suicidal thoughts among veterinarians, a baseline study of veterinarians in Norway is also needed. The present thesis is based on a nationwide, cross-sectional survey among veterinarians in Norway. Considering the wide range of responsibilities veterinarians have in society, it is important to increase the knowledge of health and well-being of veterinarians – not only for veterinarians themselves, but to society as a whole.

Among the different variables associated with completed suicide, suicidal thoughts are a well-known risk factor. So, it is important to investigate the prevalence and independent variables associated with suicidal thoughts among populations where suicide rates are high. In this study, we have investigated suicidal thoughts, mental health treatment needs, and help-seeking behaviour for such problems. Also, we investigated a possible association between work characteristics, such as animal euthanasia, and attitudes toward euthanasia in humans, and between animal euthanasia and serious suicidal thoughts. Definitions and terms used in this thesis are described in the next section.

# DEFINITIONS AND TERMS

**Mental distress and mental health problems**

The World Health Organization (WHO) has described mental health as follows (WHO, 2022b):

*'Mental health is a state of mental well-being that enables people to cope with the stresses of life, realise their abilities, learn and work well, and contribute to their community. It is an integral component of health and well-being that underpins our individual and collective abilities to make decisions, build relationships, and shape the world we live in. Mental health is a basic human right. It is also essential for personal, community, and socio-economic development.'*

The definition is broad and does not only include the absence of disease; it also describes mental well-being as a state of mind that enables human beings to contribute to their surroundings. Poor mental health is also a broad and general term that can mean a wide range of things, from unspecific mental health problems to mental disorders. Mental disorders are classified in many ways, including in terms of diagnoses, for instance in the WHO's International Classification of Disease (WHO, 2022a) and the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013). In this thesis, we measured self-reported 'mental distress' and 'mental health problems in need of treatment'. None of the measures in our survey are diagnostic tools, and therefore, we do not measure mental disorders as such but self-reported mental health problems.

A five-item version of the Symptom Check List-25 (SCL-5) was used to measure mental distress (Tambs and Moum, 1993, Derogatis, 1983). Symptom Check List-5 measures anxiety symptoms and depressive symptoms, but is not a diagnostic screening tool for anxiety or depression disorders.

Mental health problems in need of treatment and help-seeking behaviour for such problems were investigated through a single-item measure in which, veterinarians were asked whether they had mental health problems during the last 12 months and, if yes, if they had sought or received help.

Further discussion on the choice and use of the instruments 'mental distress' and 'mental health problems in need of treatment' can be found in sections '2.3.2.2: Individual variables' and '2.3.1.3: Mental health problems in need of treatment and help-seeking', respectively.

**Suicidology**

In the research field of suicidology, there is no consensus on definitions and terminology. This has hindered research in suicidology for many decades (Silverman and De Leo, 2016). For example, a recent systematic review investigated the classifications used for 'suicidal behaviours' (Goodfellow et al., 2020). The authors found 19 descriptive classification systems or single behavioural terms in published papers, manuals, and other online material between 1968 and 2016. For example, some of the published material classifies suicidal ideation as an operational classification of suicidal behaviour (Devries, 1968), suicidation as a form of suicidopathy (Cohen, 1969), suicidal ideas as suicidal behaviour (Beck et al., 1973), p.7-12, and suicide-related ideation and suicide-related communication (like a threat or plan) as suicide-related thoughts and behaviours (Silverman et al., 2007). The authors concluded that the preciseness of the classification of suicidal behaviour is generally improving, but on the international level, the development of classifications precedes the establishment of a consensus on definition and terminology to describe suicidal behaviour (Goodfellow et al., 2020). The authors concluded that the review 'highlighted a contradictory and confusing situation on a global level, owing to the lack of consensus on definitions and terms'. Thus, there are still no agreed-upon definitions and terminology for suicidal behaviour, which is also used to describe thoughts, without an actual act or behaviour necessarily being present. The relationship between suicidal thoughts, serious suicidal thoughts, suicide attempts, and completed suicide is further discussed in 'Section 1.1: The relationship between mental health, suicidal thoughts and suicide'.

In this thesis[1], the following terms were used:

| Terms | Question* |
|---|---|
| Suicidal feelings | 1. Have you ever felt that life was not worth living? |
| Wish to die | 2. Have you ever wished you were dead? – for instance, that you could go to sleep and not wake up? |
| Suicidal thoughts | 3. Have you ever thought of taking your life, even if you would not really do it? |
| Serious suicidal thoughts | 4. Have you ever reached the point where you seriously considered taking your life, or perhaps made plans how you would go about doing it? |
| Suicide attempt | 5. Have you ever made an attempt to take your life? |

*According to Paykel et al. (1974).

In our study, we investigated the 12-month prevalence of the five questions on Paykel's instrument. Further discussion on the choice and use of Paykel's instrument as an outcome variable in our study can be found in 'Section 2.3.1.1: Suicidal thoughts and attempts'.

**Animal euthanasia and assisted dying in humans**

There are different definitions and classifications of animal euthanasia (British Veterinary Association, 2016); absolutely justified euthanasia (e.g. trauma, catastrophic head or spinal injury); contextually justified euthanasia (e.g. unpredictable aggression toward children); and non-justified or convenience euthanasia (e.g. an owner who does not want to consider re-homing a healthy animal). It has been

[1] In Paper I, the term 'suicidal thoughts and behaviour' was used in several sections. Paykel's instrument was used to measure suicidal feelings, a wish to die, suicidal thoughts, serious suicidal thoughts, and suicide attempts. In the last section of the paper, 'suicidal behaviour' was used as a collective term for several of Paykel's questions. In retrospect, we should have distinguished the terms in the paper in accordance with Paykel's instrument and not used 'suicidal behaviour' as a collective term.

suggested that non-justified animal euthanasia (i.e., 'convenience euthanasia') may be associated with higher moral stress than justified euthanasia (Rollin, 2011), emphasising the importance of defining animal euthanasia in research. It is also important to emphasise that animals have a legal status as 'property' of the animal owner. This means that in the end, it is the animal owner who decides the animal's fate, not the veterinarian. In this thesis, we measured the caseload of animal euthanasia. Further discussion of this measure is found in 'Section 2.3.2.3: Work variables'.

In this thesis, assisted dying in humans is used as a collective term for 'physician-assisted suicide' and 'euthanasia', in line with previous work (Gaasø et al., 2019). 'Physician-assisted suicide' is a suicide carried out with the help of a physician, who provides drugs that the person can take himself or herself. 'Euthanasia' is the intentional killing of a person by a physician who injects lethal drugs in response to a voluntary request from the person. The definition of the terms was included in the questionnaire. Veterinarians were asked to state their agreement with four statements regarding assisted dying in humans. This measure is further described and discussed in 'Section 2.3.1.2: Attitudes toward assisted dying in humans'.

**Help-seeking behaviour for mental health problems and suicidal thoughts**

Generally, research on help-seeking has focused on three different aspects, namely *attitudes* toward help-seeking, help-seeking *intentions,* and help-seeking *behaviour* (Gulliver et al., 2012). In this thesis, self-reported help-seeking *behaviour* is investigated among veterinarians reporting mental health problems and among those with serious suicidal thoughts. Most people report help-seeking intentions for mental health problems if faced with them themselves (Lally et al., 2013), and findings from behavioural theory suggest that intentions strongly correlate with health-related behaviour (McEachan et al., 2011). But a considerably lower proportion of people who have mental disorders actually seek help (Wang et al., 2007a). Therefore, we chose to investigate help-seeking *behaviour* among veterinarians. We investigated help-seeking behaviour from formal services, such as primary health care or secondary mental health services, but did not include informal help-seeking, such as from a partner, family, or friends.

More information on the instrument of help-seeking behaviour can be found in 'Section 2.3.1.3; Mental health problems in need of treatment and help-seeking'.

# 1 INTRODUCTION

The introduction gives a brief overview of the relationship between mental health, suicidal thoughts, and suicide. Then, the current knowledge on mental health problems and suicidal thoughts among veterinarians is presented. Further, a discussion on how animal euthanasia may play a role in suicidality among veterinarians is given. Then, an overview of what we know about help-seeking behaviour among veterinarians and the importance of help-seeking is provided. At the end of the introduction, a simplified theoretical model of a possible relationship between the variables in our study is given, and then the research questions are listed.

## 1.1 The relationship between mental health, suicidal thoughts, and suicide

A meta-analysis found that most mental disorders lead to increased suicide risk (Harris and Barraclough, 1997). Also, mental disorders are strongly associated with suicide (Cavanagh et al., 2003, Hawton and van Heeringen, 2009). Depressive disorders are linked to a 'painful emotional state' in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013), and 'unbearable psychological pain' is one of the most reported features of serious depression, and its presence may lead to suicide (Shneidman, 1993). A recent meta-analysis found that depressive symptoms increased the odds of subsequent suicidal thoughts (Ribeiro et al., 2018), and major depressive episodes have been reported to be associated with an increased speed in the transition from suicidal thoughts to serious suicidal thoughts or attempts (Sunderland et al., 2021). Also, it is well known that having anxiety is a risk factor for suicide (Hawton et al., 2013).

Suicide is a multifaceted phenomenon, and the causes of suicide are complex (Hawton and van Heeringen, 2009). Theoretically, there is a transition from suicidal feelings to suicidal thoughts to suicidal attempts, which can ultimately lead to suicide (the suicidal process). Serious suicidal thoughts or suicide attempts rarely occur without any preceding suicidal thoughts. However, not everyone who has suicidal thoughts progresses with suicidal plans or attempts (Klonsky et al., 2016). Previous studies have found strong independent effects of mental disorders on the transition from suicidal thoughts to serious suicidal thoughts (Batterham et al., 2018, Nock et al., 2010).

It is important to account for known personal variables that can affect suicidal thoughts when investigating possible independent work-related variables associated with suicidal thoughts. In addition to gender and age, it is important to include marital status (Hem et al., 2000, Tyssen et al., 2001b); negative life events (Howarth et al., 2020); mental distress (Tyssen et al., 2001b, Turecki and

Brent, 2016); personality traits (Tyssen et al., 2004a, O'Connor and Nock, 2014); and use of alcohol (Turecki and Brent, 2016).

Certain personality traits may increase the suicide risk (O'Connor and Nock, 2014, Brezo et al., 2006). Also, some aspects of personality may increase vulnerability or make a person more resilient to the psychosocial work environment (Stansfeld, 2002). It has been proposed that mental health problems and high suicide rates could, at least partly, be attributed to maladaptive personality traits among those attracted to veterinary medicine (Halliwell and Hoskin, 2005, Bartram and Baldwin, 2008). When studying personality traits, the 'Big Five' personality traits, namely conscientiousness, agreeableness, neuroticism, extraversion, and openness to experience (Costa and McCrae, 2009), are frequently used. In the NORVET study, we did not aim to extensively investigate personality among veterinarians. However, we chose to investigate a deviant personality trait with predictive validity concerning suicidal thoughts in several occupations (Berg et al., 2003, Sterud et al., 2008b, Tyssen et al., 2004a) and a lack of help-seeking among physicians (Tyssen et al., 2004a, Tyssen, 2017). Further information on this measure is discussed in 'Section 2.3.2.2: Individual variables'.

Our study is an epidemiological one, which will provide knowledge about work and some mental health outcomes among veterinarians on a population level (Veierød et al., 2012), p.23. A brief overview of mental health problems among veterinarians will be discussed in the next section.

### 1.1.1 Mental health problems and treatment needs among veterinarians

In most developed countries, mental disorders are the leading cause of absence and long-term work incapacity (Whiteford et al., 2013). Also among veterinary staff, there are significant economic costs due to burnout (Neill et al., 2022). In general, there have been quite a lot of studies investigating the influence of work on mental health. A meta-review across different occupations found three overarching risk factors associated with mental health problems, namely, imbalanced job design, occupational uncertainty, and a lack of value and respect within the workplace (Harvey et al., 2017). All of these variables may apply to veterinarians. High time pressure, frequent interruptions, job insecurities, and conflicts predicted lower mental health in a prospective study from Germany, even when controlling for personal resources such as self-esteem (Limmer and Schütz, 2021).

There has been an increase in published research on veterinarians and their mental health, especially in the last decade. Three main areas of the scientific literature on suicide, burnout, and depression

were found in the literature between 1985 and 2019 as follows: (1) difficulties encountered during the curriculum, resulting in increased stress and anxiety; (2) exposure to death and animal euthanasia as an occupational risk factor; and (3) need for support (Brscic et al., 2021). This text mining and topic modelling analysis showed that the current research field ranges from the veterinary curriculum to colleague support after graduation, with animal euthanasia being suggested as a veterinary-specific occupational risk factor. A recent meta-analysis found that psychosocial job stressors were associated with an elevated risk of suicidal thoughts across multiple occupations (Milner et al., 2018). The knowledge of the prevalence of mental health problems and the possible role of work stressors in the mental health of veterinarians are discussed in the following sections.

A higher prevalence of anxiety symptoms and depressive symptoms among veterinarians compared to the general population has been found in several studies (Perret et al., 2020, Best et al., 2020, Schwerdtfeger et al., 2020, Hatch et al., 2011, Nett et al., 2015). In a recent scoping review on work-related stress among veterinarians, all the 21 studies included indicated a high prevalence of psychological stressors in veterinary medicine (Pohl et al., 2022). Working hours and ethical dilemmas were emphasised as major sources of stress. Female veterinarians perceived the psychological workload as higher than that of their male colleagues (Pohl et al., 2022). Another study found 15 practice-related stressors, with the most common being financial insecurity, client issues, co-worker or interpersonal issues, and work-life balance (Vande Griek et al., 2018). Additionally, a qualitative study of occupational stress among veterinarians found self-doubt, conflicting responsibilities, and insufficient support as overarching themes in their analyses (Whitnall and Simmonds, 2021), illustrating that both personal variables and the nature of veterinary work may influence their occupational health. As far as we know, there are only two studies investigating job stress among veterinarians in Scandinavia, both studies from Finland. In the first study, 73 % of veterinarians reported being somewhat or very stressed, with work being perceived as the primary cause of stress by 65 % of the respondents (Reijula et al., 2003). Being on-call and administrative duties and job insecurities were most commonly reported. The second study found that half of the veterinarians working in animal welfare control reported work-related stress or fatigue (Väärikkälä et al., 2020).

Several studies have shown that being female and of a younger age increases the risk of serious psychological distress among veterinarians (Nett et al., 2015, Platt et al., 2012b, Dow et al., 2019, Perret et al., 2020, Hatch et al., 2011). Possible work-related variables related to job stress among veterinarians are the number of hours worked (Bartram et al., 2009b, Gardner and Hini, 2006); making

professional mistakes (Bartram et al., 2009b); and a lack of recognition and meeting client expectations (Smith et al., 2009, Gardner and Hini, 2006). Also, years after graduation and working in a companion-, mixed-, or equine practice were associated with depression in one study (Hatch et al., 2011). Animal euthanasia is one factor that is claimed to be veterinary specific. Dealing with bereaved animal owners in connection with animal euthanasia has been suggested to impact the mental health of veterinarians (Dow et al., 2019). Requests for the euthanasia of healthy animals may be especially challenging. 'Moral injury', conceptualised as psychological distress following an experience that violated moral beliefs or expectations, was shown to be associated with adverse mental health outcomes among veterinarians in a recent study (Williamson et al., 2022). Even though there have been some studies on the prevalence and contributors to mental health outcomes in veterinarians, only a few have investigated independent variables associated with mental health outcomes. Therefore, the NORVET study will contribute knowledge by using a nationwide, representative sample.

Mental health problems among physicians are negatively associated with patient care and positively associated with medical errors (Wallace et al., 2009). Therefore, it is important to investigate work characteristics, and independent variables associated with mental health outcomes in veterinarians. Most of the studies conducted so far on mental health problems in veterinarians have had low or unspecified response rates (Best et al., 2020, Perret et al., 2020, Schwerdtfeger et al., 2020, Hatch et al., 2011); samples with an overrepresentation of females and younger veterinarians (Schwerdtfeger et al., 2020, Perret et al., 2020, Nett et al., 2015); or investigated veterinarians in clinical practice only (Bartram et al., 2009a). Also, most studies have been conducted in the United States, United Kingdom, or Australia, where working life in many respects differs from that in Scandinavia. The NORVET study is the first nationwide study with a representative sample, including veterinarians in all fields of work and providing baseline knowledge on work and mental health among veterinarians in a Scandinavian context.

In the following section, a brief overview of suicide rates among veterinarians is provided, as well as the current knowledge on suicidal thoughts and possible associated variables.

### 1.1.2 Suicide and suicidal thoughts among veterinarians

There are four possible explanations for increased suicide rates in certain occupations often cited in the literature. These are mental disorders, job stress, the self-selection of vulnerable individuals and

occupational access to means (Boxer et al., 1995). Occupational access to means has been emphasised in physicians (Ekeberg and Hem, 2016), p.57, and this is probably also of relevance for veterinarians (Nett et al., 2020). We will not discuss all four themes in this thesis. However, a brief overview of the knowledge of suicide rates among veterinarians is given, as this was one of the main reasons for the NORVET study being initiated.

Based on suicide rates from 1960–2000, veterinarians have twice the suicide rate as the general population in Norway (Hem et al., 2005). A systematic review on the prevalence of suicide rates among veterinarians was published in 2010, finding that in all but one of 15 studies, veterinarians had elevated suicide rates (Platt et al., 2010). Since then, two register-based studies from the United States reported an increased standardised mortality rate and proportional mortality rate among veterinarians compared to the general population for both genders (Witte et al., 2019, Tomasi et al., 2019). Furthermore, a recent study from Sweden found that females in life science and healthcare professions had the highest suicide rates, with female veterinarians topping the list (Santander et al., 2022), followed by nurses. An increased incidence was not found among male veterinarians. On the other hand, a study from Denmark found no elevated suicide rate among veterinarians (Hawton et al., 2011).

The veterinary profession is diverse, with veterinarians working with all animal species and a wide range of both public and animal health and welfare issues. These different fields of work all have different types of challenges. In most cases, euthanising a healthy kitten would be more emotionally demanding than euthanising reared fish. As veterinary medicine has developed into more specialised branches, few studies have investigated suicide rates in the different fields of veterinary medicine. One register-based study found that decedents in clinical positions were more likely to die from self-poisoning compared to those not working in clinical practice. They also stated that 75 % of the decedents worked exclusively or predominantly in companion animal practice (Tomasi et al., 2019).

Self-poisoning is a common method of suicide among veterinarians (Platt et al., 2010, Witte et al., 2019, Mellanby, 2005, Miller and Beaumont, 1995, Kelly and Bunting, 1998, Jones-Fairnie et al., 2008). Barbiturates, the drug used for animal euthanasia, are the most commonly used drug for self-poisoning (Witte et al., 2019, Kelly et al., 1995). Moreover, a register-based study found that, when excluding decedents with pentobarbital poisoning, the standardized mortality rate for suicide was not significantly different between veterinarians and the general population (Witte et al., 2019).

From 1960 until today, the veterinary profession has developed from being male-dominated to being a female-dominated profession, with only 15 % of veterinary graduates in 2022 being male (Personal communication, Ann Kristin Egeli, Norwegian University of Life Sciences, November 18, 2022). As of November 2022, 69.8 % of authorised veterinarians in Norway are female (Personal communication, Bente Reve, The Norwegian Food Safety Authority, November 15, 2022), and this proportion is expected to rise further. The gender shift in the veterinary profession is evident in other countries as well (Reijula et al., 2003, Kersebohm et al., 2017, Allen, 2016). In the general population, females report mental health problems more often than males (Lin et al., 2021, Penninx et al., 2021, Altemus et al., 2014). This emphasises the need for further research on veterinarians and their mental health, with increasing rates of young females entering veterinary medicine.

Suicidal thoughts are a well-known risk factor for suicide. Therefore, we chose suicidal thoughts as one of the outcome variables in the NORVET study. Suicidal thoughts are more common among veterinarians than in the general population, according to studies from Germany, Canada, the United States, and the United Kingdom (Bartram et al., 2009a, Nett et al., 2015, Perret et al., 2020, Schwerdtfeger et al., 2020). Except for the study from United Kingdom, which had a response rate of 56 % and a representative sample, the other studies had a sample size representing below 10 % of the total veterinary population, and there was an overrepresentation of females and younger respondents. To the best of our knowledge, there are no studies on the prevalence of suicidal thoughts among veterinarians in Scandinavia. The NORVET study will be the first nationwide study to provide knowledge of the prevalence of suicidal thoughts based on a representative sample of veterinarians.

There is little understanding of the independent individual and work-related variables associated with suicidal thoughts among veterinarians. Among the studies conducted so far, methodological heterogeneity makes inter-population comparison difficult. Further, mental health and suicidal thoughts have barely been studied using a longitudinal design. One longitudinal study investigated suicidal thoughts and attempts among veterinarians who intended to leave the profession. When skill transferability to other working fields was perceived as limited, there was an increase in suicidal thoughts and attempts over 12 months (Crane et al., 2017). Notably, the response rate in this study was approximately 35 %, and it focused on occupational mobility. However, the results may suggest that if veterinarians feel 'trapped' in their work, this could increase the level of suicidal thoughts.
A systematic review, including 52 studies, on non-fatal suicide attempts (suicidal behaviour) and psychosocial problems among veterinarians was published in 2012 (Platt et al., 2012b). Five studies

investigated suicidal behaviour, and only two of those studies had relatively high quality (Gardner and Hini, 2006). One of the high-quality studies[2] found that the lifetime prevalence of a suicide attempt was 2 % and lifetime prevalence of serious suicidal thoughts was 16 %. Females and companion animal veterinarians were more likely to report suicidal thoughts (Gardner and Hini, 2006). The response rate was 48.6 %, and there was an overrepresentation of females in the sample. The authors of the review highlighted the paucity of research that investigated variables that may contribute to suicide risk among veterinarians and noted that many of the studies were of poor quality (Platt et al., 2012b). A scoping review on strain and stress among veterinarians from 2022, including 21 studies, found five studies reporting on aspects of suicidality (Pohl et al., 2022). Negative work and personal life balance (Andela, 2021, Platt et al., 2012a); high responsibility and workload (Andela, 2021, Platt et al., 2012a, Bartram et al., 2009a); workplace relationships (Platt et al., 2012a); the demanding nature of work (Wallace, 2017); and attachment loss and trauma (Waters et al., 2019) were reported as contributing variables to suicidal thoughts. Possible differences in suicidal thoughts among veterinarians working in different fields are scarcely studied. A study from the United Kingdom found that veterinarians in companion animal practice were more likely to have suicidal thoughts compared to those working in mixed clinical practice and university-based clinical positions (Bartram et al., 2009a). Different working fields in the veterinary profession may have different impacts on the mental health of veterinarians. Therefore, we included veterinarians from all main fields of work in the NORVET study.

Despite some of the conducted studies having quite large samples, the samples were probably biased (Schwerdtfeger et al., 2020, Perret et al., 2020, Nett et al., 2015); they have no comparison group (Andela, 2021); or they investigate a distinct group of veterinarians (e.g. from one clinical practice, only companion animal practitioners, veterinarians in the Military Force or veterinarians classifying themselves as LGBTQ+) (Rivera et al., 2021, Witte et al., 2020). To our knowledge, no nationwide studies have been carried out. Few studies have investigated independent variables associated with suicidal thoughts (Bartram et al., 2009a). To the best of our knowledge, the NORVET study is therefore the first comprehensive, nationwide survey, encompassing veterinarians in both clinical and non-

[2] The second high-quality study was not possible to retrieve using ordinary channels, such as via literature searches in scientific databases or with assistance from the University of Oslo Library. Thus, I contacted the author of the study. She informed me that she had been supervising this master's thesis study and referred me to the Jean Jaurès University Library. The librarian at this university told me that this master's thesis was referred to incorrectly in some papers; the correct author is Rouline Corinne. However, the master's thesis only has one existing copy in French, printed at the university, and was therefore not available for loan. The librarian informed me that the only way to read it would be to come to the university library.

clinical positions. This enables us to conduct multivariable analyses, where we adjust for several variables simultaneously, and also to investigate possible differences between different fields of work.

In summary, many of the general risk factors for mental health problems and suicidal thoughts are relevant for veterinarians. However, there are veterinary specific work variables that distinguish veterinarians from other medical professions. Animal euthanasia has been suggested as a veterinary-specific risk factor for suicide in the veterinary profession. This is further discussed in the next section.

## 1.2 Animal euthanasia and the possible role in suicidal thoughts among veterinarians

### 1.2.1 Animal euthanasia: a veterinary-specific occupational task

Animal euthanasia is an occupational task that is unique to veterinarians. It has been hypothesised that the performance of animal euthanasia may influence the suicide risk in veterinarians (Bartram and Baldwin, 2010, Mellanby, 2005, Bartram and Baldwin, 2008), as well as veterinarians' views on assisted dying in humans (Bartram and Baldwin, 2010). The need for research on animal euthanasia concerning suicidal thoughts and attitudes toward suicide has been emphasised (Platt et al., 2012b, Connolly et al., 2022b). So far, such knowledge is scarce.

Veterinarians perform animal euthanasia as an integrated part of their daily work. Animal euthanasia has been referred to as the 'caring-killing paradox' (Arluke, 1994), i.e., the conflicting situation of euthanising animals when you are trained to provide care. Veterinarians themselves have described animal euthanasia as both the best and worst part of their work (Morris, 2012b), further illustrating the duality of this occupational task. It has been reported as a source of job stress and ethical dilemmas in several studies (Kipperman et al., 2018, Meehan and Bradley, 2007, Batchelor and McKeegan, 2012), including in systematic reviews among animal health personnel (Scotney et al., 2015) and veterinarians (Platt et al., 2012b). However, another study reported no relationship between animal euthanasia and psychological distress or compassion fatigue (Dow et al., 2019). However, this study had a response rate of 15 %, and participation bias cannot be ruled out. Animal euthanasia was found to be more of a concern in companion animal practice than in other clinical fields (Gardner and Hini, 2006), demonstrating how the nature of work may impact differently across the different fields of veterinary work. In addition to the impact that performing animal euthanasia has on veterinarians, veterinarians are also responsible for managing grief and guilt in the animal owners during euthanasia consultations (Morris, 2012b). The perception of animal euthanasia as a source of job stress and ethical

dilemmas among veterinarians may be partly influenced by the perceived lack of sufficient training in euthanasia decision-making and consultations, as reported in several studies (Kipperman et al., 2018, Dow et al., 2019, Matte et al., 2019).

Knowledge of animal euthanasia may lead veterinarians to view death as a way to alleviate their suffering if they experience suicidal thoughts (Bartram and Baldwin, 2010). However, there are few studies investigating a possible association between animal euthanasia and suicidal thoughts among veterinarians. One study found that frequent performance of animal euthanasia attenuated the impact of depression on suicide risk, suggesting that animal euthanasia could be a protective factor against suicide (Tran et al., 2014). In the same study, the frequency of animal euthanasia was significantly associated with depressed mood, but the amount of variation in depression that it explained was very small (1 %). When euthanising an animal, veterinarians observe the impact that the death of the animal has on the owner or family. The grief expressed in such situations may remind veterinarians about the potential loss that their family and friends would experience if they took their own life (Tran et al., 2014). In most cases, euthanising a family companion animal is more emotionally demanding than euthanising a production animal. However, no association between the field of work and suicide risk was found in the aforementioned study. Another study also found that the frequency of animal euthanasia was unrelated to suicidal thoughts (Wallace, 2017). However, there is no discussion on the representativeness of the samples in the two studies mentioned above; hence, selection or response bias cannot be ruled out.

In the few studies conducted so far, different definitions of animal euthanasia have been used, but there are quite small sample sizes and methodological heterogeneity. This hinders any conclusions about animal euthanasia and its possible association with suicidal thoughts among veterinarians. Also, the two aforementioned studies include veterinarians working in clinical practice only. To the best of our knowledge, the NORVET study is the first nationwide study investigating animal euthanasia and its possible association with suicidal thoughts among veterinarians in different fields of work.

In addition to a possible influence on the suicide risk among veterinarians, occupational experience with animal euthanasia has been suggested to alter veterinarians' attitudes toward death, viewing it as a way to alleviate suffering, possibly also in humans (Santander et al., 2022). Palliative care and animal hospices are emerging in veterinary medicine (Selter et al., 2022). As a result, animal euthanasia may influence veterinarians' attitudes toward assisted dying in humans. This is further discussed in the next section.

### 1.2.2 Animal euthanasia and the possible association with attitudes toward assisted dying in humans

In humans, knowledge about assisted dying and euthanasia has been hypothesised to lead to a restrictive attitude toward such practices (Lerner et al., 2011, Førde et al., 1997). Several studies report more restrictive attitudes toward assisted dying among physicians compared to the general population (Ryynänen et al., 2002, McCormack et al., 2012, Gaasø et al., 2019).

One study found that veterinarians have more liberal attitudes toward assisted dying than physicians, thus questioning the hypothesis that knowledge of assisted dying is unambiguously associated with restrictive attitudes (Lerner et al., 2011). The study did not investigate variables associated with attitudes toward assisted dying. To our knowledge, only one study has investigated a possible association between animal euthanasia and acceptance of euthanasia in humans (Ogden et al., 2012). However, there was no such association. The study included veterinary students and recent graduates and had a response rate of 32 %. Fearlessness about death was associated with animal euthanasia among veterinary students in one study (Witte et al., 2013). Fearlessness about death and attitudes toward assisted dying are probably not describing the same underlying construct, but they may contribute to some further reflections on how veterinarians view death. Less distress in connection to animal euthanasia was associated with a greater fearlessness of death among veterinarians (Glaesmer et al., 2021). However, veterinarians did not have higher levels of fearlessness about death than the general population. In summary, little is known about attitudes toward assisted dying in humans and possible variables associated with such attitudes among veterinarians. Such research may contribute to a better understanding of the complexity of suicidality among veterinarians.

In the NORVET study, we did not aim to investigate or test any theoretical models of pathways to suicide among veterinarians. However, some relevant theoretical models for understanding the possible influence of animal euthanasia on suicidality among veterinarians are discussed. There are several theoretical models suggesting pathways to understanding suicide, such as the integrated motivational-volitional model of suicide (O'Connor and Kirtley, 2018), the stress-diathesis model (Mann, 2003), the cognitive dissonance theory (Harmon-Jones and Harmon-Jones, 2007), and the psychache theory (Shneidman, 1993). The application of such theoretical models to understand suicide among veterinarians has not been extensively studied, but some studies exist. The interpersonal theory of suicide suggests that the simultaneous presence of three constructs is central to engaging in suicidal acts: thwarted belongingness, perceived burdensomeness, and the capability to engage in suicidal acts (Van Orden et al., 2010). Thwarted belongingness describes an unmet need for belonging,

while perceived burdensomeness comprises beliefs about the self as being so flawed as to be a liability to others (Van Orden et al., 2010). The acquired capability of suicide describes an increased physical pain tolerance and a reduced fear of death. This is thought to happen through habituation, as a response to repeated exposure to physically painful or fear-inducing experiences (Van Orden et al., 2010). The interpersonal theory of suicide has been suggested as a model to understand suicidality in veterinarians (Fink-Miller and Nestler, 2018), with the acquired capability of suicide being the construct of special relevance for veterinarians. One study investigated the acquired capability of suicide among physicians and veterinary students (Bauer et al., 2019). Exposure to animal euthanasia was defined as a veterinary-specific 'painful and provocative event'. They found an increase in the fearlessness of death (i.e., an increase in the acquired capability of suicide) among veterinary students from repeated exposure to animal euthanasia during their first year in school. However, exposure to animal euthanasia over time did not lead to a further increase. This may suggest that the acquired capability of suicide does not progress linearly but is a more stable trait (Bauer et al., 2019).

Independently of the cause of mental health problems or suicidal thoughts, help-seeking behaviour is important. There is a knowledge gap regarding veterinarians and help-seeking behaviour for mental health problems and suicidal thoughts. Help-seeking is further discussed in the next section.

## 1.3 Help-seeking behaviour for mental health problems and suicidal thoughts

### 1.3.1 Variables that influence help-seeking

Delayed or avoided help-seeking for mental health problems is associated with a long-term burden of disease (Wang et al., 2007b). Also, seeking help lowers social and personal costs, prevents future relapses, and improves social quality and quality of life (Campion et al., 2012).

There are several variables influencing seeking help, like age (Doll et al., 2021, Mackenzie et al., 2019), gender (Berg et al., 2006, Sterud et al., 2008a, Calear et al., 2014, Oliffe et al., 2019), and marital status (Michel et al., 2018). Regarding gender differences in seeking help for mental health problems, several studies have found that males seek help more rarely than females (Cleary, 2017, Harris et al., 2015, Holzinger et al., 2012, Wang et al., 2007a) and that males often delay seeking help (Galdas et al., 2005). There are several other variables influencing help-seeking, such as a low perceived need for help, a desire to handle the problem on one's own, and attitudinal barriers (Andrade et al., 2014). Failure to recognise symptoms of mental illness (Hom et al., 2015), low accessibility of mental health services (Ferris-Day et al., 2021), internalised stigma (stigma toward oneself), and public stigma (negative view of others) (Clement et al., 2015, Schnyder et al., 2017) may also be relevant.

Occupational studies among police and ambulance personnel in Norway have reported females seeking help more than males (Berg et al., 2006, Sterud et al., 2008a). Conversely, no gender difference in seeking help for mental health problems was found among physicians (Tyssen et al., 2004b). Functional impairment is a strong mediator of seeking help, indicating that people seek help when mental health problems become more severe (Doll et al., 2021, Michel et al., 2018, Tyssen et al., 2004b). Personality problems may also be associated with seeking help. Reality weakness (Torgersen and Alnæs, 1989), a deviant personality trait, has been shown to predict a lack of seeking help among physicians (Tyssen et al., 2004b), possibly because persons with this deviant trait tend to deny their problems. In the general population, the level of help-seeking among suicidal individuals is usually low (Hom et al., 2015, Cleary, 2017, Calear et al., 2014).

Some studies are showing that health personnel, and in particular physicians (Fridner et al., 2012, Holmes et al., 2017, Jones et al., 2018, Grover et al., 2019), have a low degree of help-seeking. It has been suggested that this may be influenced by 'role reversing', i.e., they are used to helping others, but not receiving help (Tyssen et al., 2004b, Harvey et al., 2021). 'Role reversing' is probably relevant for veterinarians as well. One study among physicians in Norway found that 50 % and 41 % had sought

help for mental health problems during the first and fourth postgraduate years, respectively (Tyssen et al., 2004b). It has been suggested that there could be specific barriers to help-seeking by health personnel (Harvey et al., 2021). This includes among other things, aversion to disclosure, confidentiality concerns, career consequences, and a desire for self-management (Clement et al., 2015, Ferris-Day et al., 2021, Harvey et al., 2021, Dyrbye et al., 2017). The professional culture of medicine may influence their attitudes toward help-seeking, as illustrated by qualitative interviews among physicians, which describe a view of physicians as invincible and findings of high levels of self-stigma (Henderson et al., 2012). On a positive note, a recent longitudinal study among medical students in Norway found an increase in help-seeking over the past 20 years (Ruud et al., 2020). This may indicate that medical students today experience fewer barriers to help-seeking.

To date, there is limited research on help-seeking behaviour and associated variables among veterinarians. Suicide attempts among veterinarians and other medical professionals may lead to completed suicide more often than among non-medical professionals. This emphasises the importance of seeking help for mental health problems in these occupational groups. One study found that 59 % of veterinarians in the United States with serious psychological distress did not receive mental health treatment (Nett et al., 2015), while another study from Canada found that 86 % of respondents with a history of mental illness had sought help (Perret et al., 2020). A recent study from the United States found that 52 % of veterinarians with serious psychological distress did not seek help, despite a perceived need for mental health treatment (Volk et al., 2022). The abovementioned studies use different measures and definitions of psychological distress and mental illness. There are also methodological shortcomings, such as not having a comparison group (Volk et al., 2022) and having an overrepresentation of females in the sample (Perret et al., 2020, Nett et al., 2015). The level of help-seeking behaviour in these studies ranges from 41 to 86 %. The study from the United States in 2015, reporting a level of help-seeking behaviour at 41 %, was the largest study, with over 11,000 respondents. Seen together, there seems to be a treatment gap for mental health problems among veterinarians.

Not much is known about attitudes toward mental health disorders or stigma among veterinarians and how this may influence their help-seeking behaviour. A preliminary cross-sectional study among veterinarians found that the most commonly reported barriers to seeking help were difficulty getting time off work, difficulty scheduling an appointment, and financial concerns, and they found moderate levels of stigma (Connolly et al., 2022a). The NORVET study is, to the best of our knowledge, the first

nationwide study investigating help-seeking behaviour and associated variables in a representative sample of veterinarians. Attitudinal barriers may be of special relevance for health personnel. This is further discussed in the next section.

### 1.3.2 Attitudes toward mental illness

Stigma has been described as an attitude that conveys devalued stereotypes, and Erving Goffman defined stigma as an 'attribute that is deeply discrediting' (Goffman, 1963), p.3, such as having a mental illness. Stigma could also refer to negative attitudes, beliefs, and behaviours concerning characteristics that are devalued in different social contexts (National Academies of Sciences Engineering and Medicine, 2016, Pachankis et al., 2018). The heterogeneity in conceptual frameworks for stigma has led to a plethora of assessment tools for evaluating these different dimensions (Wei et al., 2018). In this thesis, we investigated *attitudes toward mental illness*, which is a dimension within the conceptual framework of stigma (Wei et al., 2018). The instrument used in our study is described in detail in 'Section 2.3.2.2: Individual variables'.

A systematic review found that the majority of qualitative and quantitative studies on mental health-related stigma and help-seeking reported a small negative association between stigma and help-seeking, yet it was statistically significant in most studies (Clement et al., 2015). Stigma was the fourth-highest-ranked barrier to help-seeking, and disclosure was the most commonly reported barrier (Clement et al., 2015). Another review found an association between negative attitudes toward help-seeking and stigmatising attitudes toward people with mental illness and less active help-seeking (Schnyder et al., 2017). In a recent study, attitudinal variables were shown to be more strongly associated with help-seeking than structural variables (Tomczyk et al., 2020), illustrating the importance of attitudinal barriers to help-seeking. The authors suggested that the promotion of positive treatment experiences, peer education, and social role models was important to increase help-seeking (Tomczyk et al., 2020). Self-stigma is not only important for help-seeking attitudes and behaviours but also for commitment to treatment once it has been initiated (Carrara and Ventura, 2018). Age has also been found to be associated with stigma, with older people having more positive attitudes toward seeking help for mental health problems than younger individuals (Mackenzie et al., 2019). Regarding help-seeking for suicidal thoughts, stigma was reported by only 7 % of individuals in a global survey by the World Health Organization (Bruffaerts et al., 2011). Much of the research on help-seeking for suicidality is carried out in adolescents and young adults, and the generalisability to adult

populations such as veterinarians may be limited (Hom et al., 2015). Therefore, the NORVET study will provide new knowledge on help-seeking behaviour among suicidal individuals in an adult population sample.

The stigma or attitudes toward mental illness among veterinarians have not been extensively researched. Nonetheless, it has been suggested that mental health stigma may reduce help-seeking behaviour among veterinarians (Bartram and Baldwin, 2010). One study from the United States showed that veterinarians were less likely to have positive attitudes toward mental illness than the general population (Nett et al., 2015). Due to the organisational variables in the veterinary profession, such as ambulatory practice, veterinarians probably experience more professional isolation compared to other medical professionals. Such a lack of a daily working environment may influence their attitudes toward mental health problems. Veterinarians working alone were shown to have more negative attitudes toward the treatment of mental health disorders compared to those not working alone (Kassem et al., 2019). The professional culture of veterinary medicine may also influence attitudes toward mental health. A mixed-methods study among veterinary students reported stigma, culture, and identity norms within the profession as barriers to help-seeking (Hancock and Karaffa, 2021). These barriers are further reflected in an interview study, where half of the veterinarians with a history of suicidal attempts did not seek help because they felt guilty or ashamed (Platt et al., 2012a). This suggests that even though there have been efforts over the past decades in the general population to reduce stigma concerning mental health disorders (Rao et al., 2019), dimensions of stigma still function as a barrier to help-seeking among both graduated and future veterinarians. The NORVET study will be the first to investigate attitudes toward mental illness among veterinarians in Norway. Our results may provide further knowledge on the possible association such attitudes have with help-seeking behaviour in this occupational group.

## 1.4 Theoretical model of work-related stressors and mental health

Several models are aiming to explain a possible relationship between work and psychological well-being, such as Karasek's control-demand model (Karasek, 1979) and Siegrist's effort-reward imbalance model (Siegrist, 1996). Karasek's control-demand model is comprised of two dimensions, namely 'decision latitude' and 'psychological demands' (Karasek, 1979). In short, the model predicts that mental strain results from the combination of low decision latitude combined with heavy job demands. The effort-reward imbalance model suggests that high-cost and low-gain conditions are considered particularly stressful and associated with adverse health effects (Siegrist, 1996, Zhuo et al., 2020), but this model is not restricted to mental health effects. The theoretical basis of Karasek's model was included in studies on veterinarians as early as 1986 (Hesketh and Shouksmith, 1986), and more recent studies have extended the original control-demand model to include emotional demands (Wallace, 2017). According to the most recent study, stressful working conditions may be important in understanding occupational variations in suicidal tendencies. Bartram and Baldwin suggested a more comprehensive model for understanding suicide among veterinarians (Bartram and Baldwin, 2010). This model included both individual and general work-related variables (such as long working hours and emotional exhaustion) but also veterinary-specific work variables such as attitudes toward euthanasia and access to lethal means. Both individual and work-related variables are of importance when investigating mental health outcomes. Due to the cross-sectional design of the NORVET study, we are not able to draw any conclusions about causality from our findings. Hence, our model was used as a theoretical framework in the planning phase of the NORVET study and to develop our research questions (Figure 1).

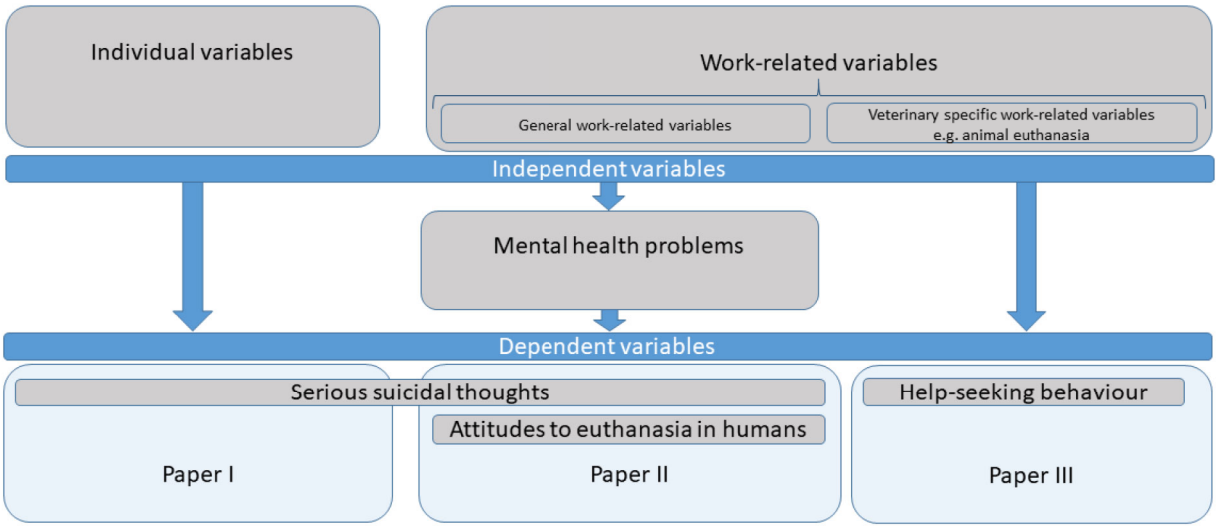


**Figure 1 – A simplified model of a possible theoretical relationship between the main variables in the NORVET study**

*There are three outcome variables in the NORVET study: serious suicidal thoughts (Papers I and II), attitudes toward euthanasia in humans (Paper II), and help-seeking behaviour (Paper III). There may be either direct associations between individual and work-related variables and the outcomes or indirect associations via mental health problems. Additionally, there may be interaction effects between gender and some of the work-related associations (not shown).*
***Individual variables** include gender, age, marital status, negative life events, personality (reality weakness), attitudes toward mental illness, and the use of alcohol to cope with tension.*
*There are both general and veterinary-specific work-related variables. These are:*
***General work-related variables**: working hours, colleague support, job-stress variables.*
***Veterinary-specific work-related variables**: field of work, attitudes toward euthanasia in humans (used as both an independent and dependent variable in Paper II, in two different regression models), and frequency of animal euthanasia.*
***Mental health problems**: mental distress (anxiety symptoms and depressive symptoms) and mental health problems in need of treatment.*

All variables are discussed in detail in the 'Methods' section.

## 1.5 Research questions

The specific goals of this thesis were to investigate the following among veterinarians in Norway:

1. What is the 12-month prevalence of suicidal feelings, thoughts, and attempts among veterinarians in Norway? (Paper I)
2. What is the 12-month prevalence of mental health problems in need of treatment? (Paper III)
3. Is work characteristics independently associated with serious suicidal thoughts? (Papers I and II)
4. What do veterinarians themselves report as variables contributing to serious suicidal thoughts and mental health problems? (Papers I and III)
5. What are veterinarians' overall attitudes toward assisted dying in humans? (Paper II)
6. Is work-characteristics, such as animal euthanasia, independently associated with veterinarians' attitudes toward euthanasia in humans? (Paper II)
7. How many of those with mental health problems or serious suicidal thoughts have sought help? (Paper III)
8. Is work characteristics independently associated with help-seeking behaviour? (Paper III)
9. What are veterinarians' attitudes toward mental illness, and are they independently associated with help-seeking behaviour? (Paper III)

# 2 MATERIALS AND METHODS

In this section, the study sample, representativeness of the sample, and design of our study have been described. The variables used in this study, their strengths and weaknesses, reliability, and validity, have also been discussed. Lastly, statistical and ethical considerations are discussed.

## 2.1 Study sample

The original sample included all veterinarians in Norway holding a valid authorisation as of May 2020 (n = 4256), according to information retrieved from the Norwegian Food Safety Authority. We chose to use address lists from the Norwegian Food Safety Authority, as this is the national authority granting the veterinary authorization. However, the list of addresses was not complete. The register is based on self-reporting and must be updated by veterinarians themselves. Due to the incompleteness of the address list, the Norwegian Veterinary Association did a manual check of the addresses on the list, updating it according to their member database. We excluded veterinarians with no residential address in Norway (n = 527) since these were out of the scope of our study. Several hundred letters were returned after the first dispatch due to incorrect addresses. We, therefore, did a manual search for addresses in these cases and found the correct address in most cases. We were also contacted by 62 respondents who were currently working abroad: these were also excluded. The widows of seven deceased veterinarians notified us that their spouses had passed away. Finally, we excluded veterinarians for whom we could not retrieve the current address after manual searching (n = 196). This resulted in an eligible sample of 3464 veterinarians.

Out of the 3464 veterinarians, we received responses from 2596, resulting in a response rate of 75 %. A major strength of our study was the high response rate, making multivariable analyses feasible. The most frequently reported age category was 41–45 years. There was a higher proportion of younger females, and 65 % of males were older than 50 years (Figure 2). In total, 69.6 % were females and 30.4 % were males. The representativeness of the sample is further discussed below.

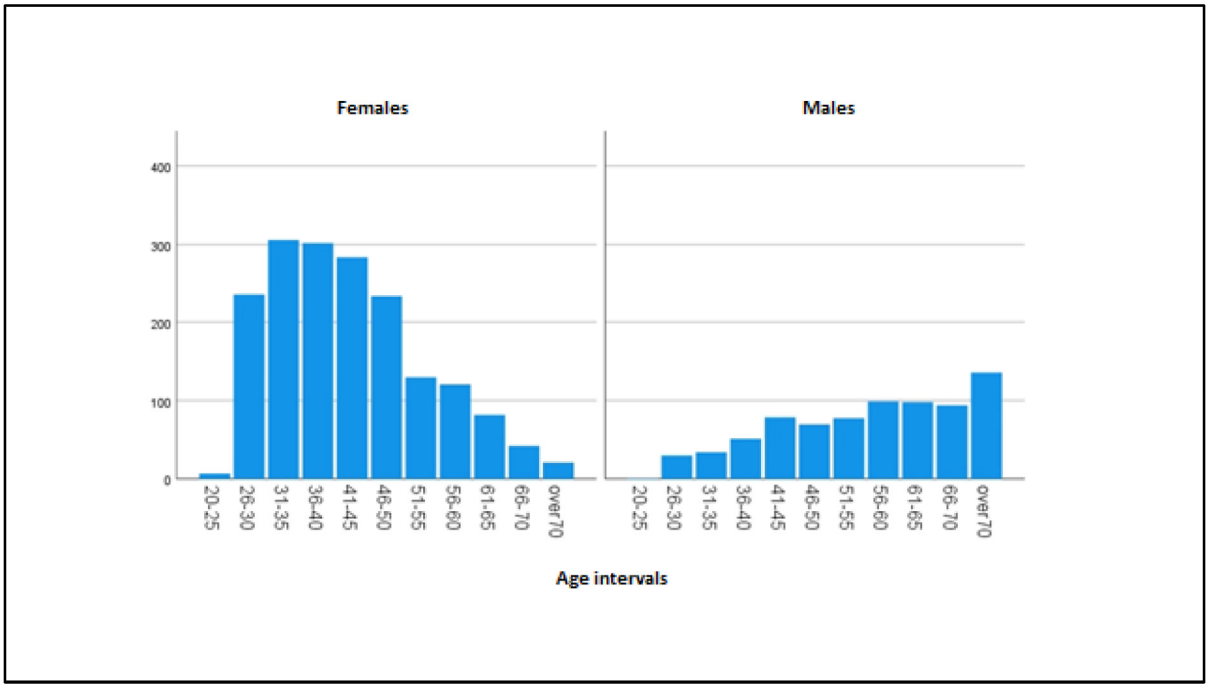


**Figure 2 – Distribution of age for females and males**

**Representativeness of the samples for veterinarians in Norway**

The distribution of gender in the total population of veterinarians at the time of sampling was 69 % female and 31 % male (Personal communication, Bente Reve, The Norwegian Food Safety Authority, July 12, 2021). The Norwegian Food Safety Authority could not provide us with any details about the distribution of age among veterinarians with authorisation. Therefore, the address list we received also included retired veterinarians, who still held an authorisation. Veterinary authorisations are valid until the age of 75 (Landbruks- og matdepartementet [Ministry of Agriculture and Food], 2021).

When the Norwegian Food Safety Authority grants authorisation to veterinarians, they send information to the Norwegian Directorate of Health about the individuals that have been granted authorisation, and for what time period the authorisation is valid. The Norwegian Directorate of Health (Helsedirektoratet) has an overview of all registered health personnel (Helsepersonellregisteret), including veterinarians (n = 4169). The Norwegian Directorate of Health assigns each person a unique Health Personnel Register Number ('HPR-number'), which is used on prescriptions for animals, for example. Ideally, the list of veterinarians with authorisation from the Norwegian Food Safety Authority should mirror the list from the Health Personnel Register. But while the HPR list is automatically updated based on the National Register (Folkeregisteret), the NFSA list has to be updated manually by

veterinarians themselves. Of the 4169 veterinarians registered, 627 have a residential address outside of Norway (15 %), which is approximately the same proportion as we excluded from our sample due to a residential address outside of Norway (12 %). The Directorate informed us that they were not able to exclude those with a residential address abroad in the file that they provided. Therefore, the estimates of the distribution of gender and age below also include those with a residential address outside of Norway.

A total of 3986 veterinarians in the Health Personnel Register were registered with their gender and age. The distribution of gender was 69.5 % female and 30.5 % male, which is practically the same as what we have in the NORVET study sample. Comparing the distribution of age between veterinarians in the HPR and the NORVET study sample, there is a slight overrepresentation of males in the age category over 70 years in the NORVET study sample (Table 1). Those who reported being a pensioner in the NORVET study were excluded from the logistic regression analyses since work-related variables were included in all regression models. However, the pensioners were included in the 12-month prevalence of Paykel's questionnaire, mental health problems and help-seeking behaviour, and attitudes toward assisted dying in humans. However, we estimated the prevalence of Paykel's questionnaire and mental health problems in need of treatment excluding the pensioners and found only minor differences (e.g., Paykel Q3: 19.6 % in the total sample vs. 20.7 % excluding pensioners; mental health problems in need of treatment: 29.9 % in the total sample vs. 31.7 % excluding pensioners - calculations not shown). This suggests that retaining the pensioners in the prevalence estimates did not have a significant impact on the overall prevalence results. Other than the slight overrepresentation of males over the age of 70, there are only minor differences between veterinarians registered in the Health Personnel Register and the veterinarians in the NORVET study sample.

**Table 1 – Comparison of age distribution among veterinarians in the NORVET sample and veterinarians in the Health personnel register.**

| | Age in 5-year intervals, n (%) | | | | | | | | | | | Total n |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 20-25 | 26-30 | 31-35 | 36-40 | 41-45 | 46-50 | 51-55 | 56-60 | 61-65 | 66-70 | >70 | |
| **Females** | | | | | | | | | | | | |
| NORVET | 7 (0.4) | 235 (13.3) | 306 (17.3) | 302 (17.1) | 284 (16.1) | 233 (13.2) | 130 (7.4) | 121 (6.9) | 82 (4.7) | 43 (2.4) | 22 (1.2) | 1765 |
| Register | 9 (0.3) | 331 (11.9) | 453 (16.4) | 444 (16.0) | 474 (17.1) | 395 (14.3) | 226 (8.2) | 205 (7.4) | 130 (4.7) | 83 (3.0) | 19 (0.7) | 2769 |
| **Males** | | | | | | | | | | | | |
| NORVET | 1 (0.1) | 31 (4.0) | 35 (4.5) | 52 (6.7) | 79 (10.2) | 70 (9.1) | 78 (10.1) | 99 (12.8) | 98 (12.7) | 94 (12.2) | 136 (17.6) | 773 |
| Register | 1 (0.1) | 40 (3.3) | 71 (5.8) | 79 (6.5) | 143 (11.8) | 134 (11.0) | 144 (11.8) | 156 (12.8) | 178 (14.6) | 183 (15.0) | 88 (7.2) | 1217 |

Also, the Norwegian Veterinary Association has an overview of the distribution of both gender and age among its members, as well as membership in speciality groups (such as the Norwegian Small Animal Veterinary Association). The Norwegian Veterinary Association is the only union solely for veterinarians, and it is estimated that they have an organisational degree of about 85 % of all authorised veterinarians in Norway (Personal communication, Ellef Blakstad, the Norwegian Veterinary Association, December 17, 2022). Among its members (n = 3007), 70.7 % were female and 29.3 % were male. We received an overview of the distribution of ages among the members of the Norwegian Veterinary Association in 10-year intervals. This distribution of age compared to veterinarians in the NORVET study sample is shown in Table 2.

**Table 2 – Age distribution among veterinarians in the NORVET sample and the Norwegian Veterinary Association**

| | Age in 10-year intervals, n (%) | | | | | | Total n |
|---|---|---|---|---|---|---|---|
| | 20-30 | 31-40 | 41-50 | 51-60 | 61-70 | >70 | |
| **Females** | | | | | | | |
| NORVET | 242 (13.7) | 608 (34.5) | 517 (29.3) | 251 (14.2) | 125 (7.1) | 22 (1.2) | 1765 |
| NVA | 244 (11.5) | 722 (34.0) | 586 (27.6) | 352 (16.6) | 180 (8.5) | 41 (1.9) | 2125 |
| **Males** | | | | | | | |
| NORVET | 32 (4.1) | 87 (11.3) | 149 (19.3) | 177 (22.9) | 192 (24.8) | 136 (17.6) | 773 |
| NVA | 37 (4.2) | 89 (10.1) | 155 (17.6) | 140 (15.9) | 217 (24.6) | 244 (27.7) | 882 |

Overall, the distribution of age among females in the NORVET study sample compared to the members of the Norwegian Veterinary Association was very similar. However, the distribution of age among males had some differences. We have a higher percentage of males in the age category of 51–60 years in the NORVET study sample compared to members of the association. Since the organisational degree is not 100 %, some of the non-members in the association may be reflected in the age group 51–60 years in the NORVET study sample. Additionally, we have fewer males in the NORVET study sample in the age group older than 70 years compared to members of the association. This may be because one can remain a member even when the authorisation expires after 75 years. Membership in the Norwegian Veterinary Association is voluntary, and the organisational degree is not 100 %. Therefore, the distribution of gender and age from the Health Personnel Register is probably the most relevant comparison.

Additionally, the Norwegian Veterinary Association has associations for different specialities. Membership in these speciality associations is also voluntary, and it is possible to have membership in several associations simultaneously. However, the proportion of members in these speciality associations may provide a rough estimate of the distribution of the main fields of work. A total of 1636 members of the Association are members of a speciality association. Forty per cent are members of the Small Animal Veterinary Association, 30 % are members of the Production Animal Veterinary Association, 12 % are members of the Equine Veterinary Association, and 10 % are members of both the Aquaculture Veterinary Association and the Association for Veterinarians working with Public Health Medicine. Even though there are large uncertainties about whether the distribution of veterinarians in different speciality associations could be generalised to the working field of all veterinarians in Norway, companion animal medicine is the largest field of work for veterinarians in the NORVET study sample (32 %), and the Small Animal Veterinary Association is the largest speciality group in the Norwegian Veterinary Association. When mixed clinical practitioners and production animal practitioners in the NORVET study sample are combined, this represents 26 % of our sample, which is the same as the number of people who are members of the Production Animal Veterinary Association (29 %). Both veterinarians working solely with production animals and veterinarians in mixed clinical practice usually belong to this speciality association. Overall, the distribution between the different speciality associations coincides with the distribution of our sample of different fields of work.

Lastly, the Norwegian Veterinary Association also have associations based on the connection to working life (employee, self-employed/business owner). Of the 3007 members in the Norwegian Veterinary Association, 797 members (26.5%) belongs to this subgroup. This is comparable to veterinarians reporting self-employment/business owner in our study, which was 573 veterinarians (23 %).

In summary, there was a high response rate in our study, and the distribution of gender and age in our sample only had minor differences from the target population. Additionally, rough estimates of the distribution between different fields of work in the NORVET study sample coincide with the major speciality associations in the Norwegian Veterinary Association, indicating that our sample is fairly representative concerning the distribution of fields of work as well. Finally, the prevalence of self-employment among members of the Norwegian Veterinary Association is comparable to the

prevalence of self-employment in our study. Overall, this indicates that the sample in our study is representative of the veterinary profession in Norway as a whole.

## 2.2 Study design

The NORVET study is a nationwide, cross-sectional survey-based study. A 12-page questionnaire, an information sheet, and a prepaid envelope were distributed by mail in November 2020. The questionnaire was comprehensive, with more items than those reported in this thesis. In case someone felt the need to talk to someone following the survey, we included contact information for a psychiatrist in the research group and also for the colleague support network of the Norwegian Veterinary Association in the information sheet. Two reminders were sent: one in January and one in February 2021. There was also a reminder in The Norwegian Veterinary Journal and on the webpage of the Norwegian Veterinary Association in December 2020. Information about the survey was also disseminated through social media, both by the author and by the Norwegian Veterinary Association. Five gift cards of NOK 5,000 from a sports shop were placed in a drawing for respondents as an incentive to increase the response rate. An external company (ViaScan) handled both the data collection and the awarding of prices. Respondents returned their questionnaires in a sealed envelope, and the identity of the respondents was not revealed to the researchers at any time.

The questionnaire was composed of four sections: (A) background information; (B) work characteristics and demands; (C) health; and (D) personal characteristics, comprising a total of 142 items about demographic and occupational details, life events, job stress, psychosocial working environment, colleague support, use of alcohol to cope, mental health, treatment needs for mental health problems, help-seeking behaviour, attitudes toward mental illness, the deviant personality trait reality weakness, and attitudes toward assisted dying in humans. All variables are discussed in detail below.

The cross-sectional design was an obvious limitation of this study, which restricts any conclusions about causality from our findings (Kirkwood and Sterne, 2003b). Another limitation was that the study was conducted during the coronavirus pandemic, which may have influenced the results. The survey was planned before the pandemic, and any potential effects (e.g., redundancies and economic effects in the practices) were not accounted for.

**Patient and public involvement**

The Norwegian Veterinary Association appointed a reference group for this project consisting of seven veterinarians from each of the professional subgroups: the Companion Animal, Equine, the Production Animal and Aquaculture Veterinary Association, the Association of Veterinarians in Public Health Medicine, the Veterinary Students' Association, and the Pensioners' Association. These veterinarians contributed with valuable input both to the design of the questionnaire, as well as hypotheses and objectives of this study. They were also part of a pilot group that received the questionnaire before launching the survey nationwide. More information about the pilot group is found in 'Section 2.3.3: Psychometric considerations (reliability and validity)'.

## 2.3 Variables

**Table 3 - Dependent variables in papers I, II and III**

| | Paper I | Paper II | Paper III |
|---|---|---|---|
| Serious suicidal thoughts (Paykel Q4) | X | X | |
| Attitudes toward euthanasia in humans | | X | |
| Help-seeking for mental health problems | | | X |

**Table 4 - Independent variables included in papers I, II and III**

| | Paper I | Paper II | Paper III |
|---|---|---|---|
| Gender | X | X | X |
| Age | X | X | X |
| Marital status | X | X | X |
| Life events | X | | |
| SCL-5 (mental distress) | X | | X |
| Reality weakness personality trait | X | | X |
| Use of alcohol to cope with tension | X | | |
| Main field of work | X | X | X |
| Coopers job stress questionnaire | X | | X |
| Number of working hours | | X | |
| Colleague support | | X | |
| Attitudes toward euthanasia in humans | | X | |
| Attitudes toward mental illness | | | X |
| Frequency of animal euthanasia/week | | X | |

### 2.3.1 Description of dependent variables

#### 2.3.1.1 Suicidal thoughts and attempts

We applied Paykel's questionnaire about suicidal thoughts and attempts, a five-item instrument developed to study suicidal feelings in the general population (Paykel et al., 1974). The items represent increasing severity, from unspecific suicidal feelings, and a wish to die, to suicidal thoughts, serious suicidal thoughts (plans), and suicide attempts. The original study by Paykel was based on interviews. However, a written version of the instrument has been used in questionnaires, among others, in different occupational groups in Norway (Hem et al., 2000, Tyssen et al., 2001b, Berg et al., 2003, Sterud et al., 2008b, Rosta and Aasland, 2013). The original five items have the following wording:

Paykel Q1: 'Have you ever felt that life was not worth living?'

Paykel Q2: 'Have you ever wished you were dead? – for instance, that you could go to sleep and not wake up?'

Paykel Q3: 'Have you ever thought of taking your life, even if you would not really do it?'

Paykel Q4: 'Have you ever reached the point where you seriously considered taking your life, or perhaps made plans how you would go about doing it?'

Paykel Q5: 'Have you ever made an attempt to take your life?'

In the NORVET study, we investigated the 12-month prevalence of all Paykel items. Paykel Q4 has previously been slightly altered in the Norwegian translation, to: '… and even made plans…', reinforcing the seriousness of this statement (Tyssen et al., 2001b). The responses to each question were 'never', 'hardly ever', 'sometimes' and 'often'. Responses were dichotomised into 'never' (0) and 'any frequency' (1) according to Paykel's original work (Paykel et al., 1974). Following Paykel Q4 and Q5, an additional question was asked: 'To what extent do you think the following factors contributed to your consideration of taking your life?', with the following responses: (1) personal problems; (2) family problems; (3) social problems; (4) work problems; and (5) other problems. Each of the factors had five response categories, from 'not at all' to 'very much' (1 to 5). This additional question is not widely used but has been used in physicians (Hem et al., 2000). No further description or definition of what the factors consisted of was given. As a results, the validity of this measure may be somewhat low. And hence, findings using this measure should be interpreted with caution.

As discussed above, the questions in Paykel's instrument represent a stepwise increase in severity from Paykel Q1 to Paykel Q5. In the original study by Paykel et al., a stepwise drop in the prevalence of 'any

frequency' was seen throughout the five questions (Paykel et al., 1974), both for 12-month and lifetime prevalence. This was also the case among veterinarians in our study. We performed a cross-tabulation and calculated Cohen's kappa to investigate the inter-relationship between the five questions in our sample and the possibility of creating an index score based on all items. Cohen's kappa between Paykel Q1–Q2, Q2–Q3 and Q3–Q4 were 0.71, 0.67 and 0.37, respectively. The decrease of Cohen's kappa through Paykel Q1–Q5, and the drop below 0.40, suggest that a total index score based on the first four items was not feasible. The majority of respondents who reported affirmatively to one of the more severe questions (serious suicidal thoughts or suicidal thoughts) also reported those that were less severe. In detail, among those who reported serious suicidal thoughts (Paykel Q4), 98 % reported suicidal thoughts (Paykel Q3). Among those with suicidal thoughts (Paykel Q3), 73 % reported suicidal wishes (Paykel Q2). Among those with suicidal wishes (Paykel Q2), 92 % reported suicidal feelings (Paykel Q1).

Suicidal thoughts and attempts can be measured by a variety of measures (Oquendo et al., 2008), such as the Beck Scale for Suicide Ideation (Beck et al., 1988), the Columbia Suicide Severity Rating Scale (Posner et al., 2011), the Suicide Behaviours Questionnaire-Revised (Osman et al., 2001), item nine of Patient Health Questionnaire (Kroenke et al., 2001), and four items on suicidality in the Severe Depression Subscale of the General Health Questionnaire-28 (Goldney et al., 1989). The main reason for using Paykel's instrument in our study was the possibility of comparing our results with studies among other relevant occupational groups in Norway, such as physicians and police (Hem et al., 2000, Berg et al., 2003). We assessed whether another measure of suicidal thoughts and attempts should be included in our survey in addition to Paykel's instrument. Few of the available measures for suicidal thoughts and attempts are available with a Norwegian translation, and validation of a measure including a Norwegian translation was outside the scope of the NORVET study.

Paykel Q4 was used as the dependent variable in Papers I and II. Since we used only one item as the dependent variable, this may have reduced the reliability. However, Paykel Q4 has been used as the dependent variable in several studies (Hem et al., 2000, Berg et al., 2003, Tyssen et al., 2004a).

#### 2.3.1.2 Attitudes toward assisted dying in humans

Attitudes toward assisted dying in humans were investigated using four questions: (1) physician-assisted suicide should be permitted for persons suffering from a fatal disease with a short remaining

life expectancy; (2) euthanasia should be permitted for persons suffering from a fatal disease with a short remaining life expectancy; (3) assisted dying should be permitted also for persons suffering from an incurable chronic disease, but who are not dying; and (4) there are cases in which it may be right or morally defensible for the doctor to provide assisted dying, even though it is illegal. Veterinarians were asked to state their agreement with the four statements. The responses were 'strongly agree', 'partially agree', 'neither agree, nor disagree', 'partially disagree', and 'strongly disagree'. The responses were dichotomised so that 'agreed' included both 'strongly agree' and 'partially agree', and 'disagree' encompassed the remaining response alternatives, in line with a previous study (Gaasø et al., 2019).

We considered statement (2) as the one statement veterinarians would be most familiar with through their working experience with animal euthanasia. Thus, we chose this statement as the dependent variable in Paper II.

A challenge with this instrument is that, although we included definitions of the different terms in the questionnaire, the statements and response alternatives leave room for interpretation. For example, 'short remaining life expectancy' was not defined, nor were 'suffering' or 'fatal disease'. Also, the response categories were not strictly defined. When using this instrument, we dichotomised the responses as in previous studies, assuming that the respondents were either in favour of or opposed to assisted dying. This may have reduced the reliability of this measure.

#### 2.3.1.3 Mental health problems in need of treatment and Help-seeking

The instrument was first used in physicians (Tyssen et al., 2000). Since then, it has been used several times among physicians and medical students (Tyssen et al., 2004b, Tyssen et al., 2001a, Midtgaard et al., 2008, Ruud et al., 2020). Veterinarians were asked the following: 'If you have experienced mental health problems in the preceding year, have you sought/received help for this?' The response categories indicated a higher level of care for categories 1–5, as follows: (1) have not had any mental health problems of significance; (2) have not sought help despite being in need of this; (3) yes, have consulted a general practitioner; (4) yes, have consulted a psychologist/psychiatrist; (5) yes, have been admitted to psychiatric hospital. In the event of multiple responses to this question, the highest level of care was retained for the analyses.

To assess the prevalence of mental health problems in need of treatment, we dichotomised the variable into those in need of or having sought help (responses 2–5) and those with no mental health problems of significance (response 1). To assess the prevalence of help-seeking behaviour among those who considered themselves in need of treatment (i.e., those who responded 2–5), we computed a dichotomy with those who had sought help (responses 3–5) and those who had not sought help (response 2). This dichotomisation of the variable was in line with the previous study among physicians (Tyssen et al., 2004b). The dependent variable in two logistic regression analyses in Paper III was this binary variable of help-seeking behaviour ('not sought help' = 0, 'sought help' = 1) was used as t. One model included veterinarians that considered themselves in need of treatment for mental health problems, and the other model included veterinarians reporting serious suicidal thoughts.

For those who reported mental health problems in need of treatment (responses 2–5), an additional question was asked: 'To what extent do you think the following factors contributed to your difficulties?', with the following responses: (1) personal problems; (2) family problems; (3) social problems; (4) work problems and (5) other problems. Each of the factors had five response categories, from 'not at all' to 'very much' (1 to 5). As in the additional question following Paykel Q4 and Q5, no further description or definition of what the factors comprised was given. As a result, the validity of this measure may be somewhat low. And hence, findings using this measure should be interpreted with caution.

There are, however, several important limitations to this measure. First, the use of a single item as a dependent variable may have reduced its reliability, although there were several response categories with respect to help-seeking behaviour from formal sources. It is also a measure that is based on the judgement of the respondents themselves, which clearly reduces the validity. Veterinarians may lack competency in assessing their mental health and may be unaware that they have symptoms of mental illness. This could lead to under-reporting. Further, due to social desirability, veterinarians may have under-reported mental health problems. On the other hand, veterinarians may have over-reported mental health problems. This is further discussed in 'Section 4.1.2: Errors in estimates' under the heading 'Information bias'. Also, since the measure did not define mental health problems, we do not know what kind of mental health problems comprise the dependent variable. But the fact that this measure has been used in physicians shows that, despite its limitations, it seems to have performed well previously (Midtgaard et al., 2008, Ruud et al., 2020, Tyssen et al., 2004b, Tyssen et al., 2000, Tyssen et al., 2001a).

### 2.3.2 Description of independent variables

#### 2.3.2.1 Sociodemographic variables (gender, age and marital status)

Gender was reported as female, male, or 'other' gender identities. Females constituted 69.6 % of the respondents and 30.4 % were male. 0.1 % reported 'other gender identity'. In analyses including gender, the respondents with 'other gender identity' were excluded, since they were few in number.

The Norwegian Centre for Research Data encouraged the use of age intervals so that the collected data could be as unidentifiable as possible. Therefore, age was reported in five-year intervals as follows: 20–25, 26–30, up to 66–70, and more than 70 years old. These age categories were entered as continuous variables in the regression models, since age can be considered ordinal data (categories that have a natural order) and because entering age as categorical variables would generate an excessive number of effect estimates for our models.

Marital status was measured with one question with six response alternatives: unmarried, separated, widow or widower, divorced, married, or cohabiting. These variables measure structural social support, such as having a partner, as well as the negative effect of being divorced or separated. This variable was dichotomised into married or cohabiting and single, divorced, separated or widowed, as used in previous studies (Tyssen et al., 2009, Hem et al., 2000).

#### 2.3.2.2 Individual variables

Life events in association with the onset of illness were studied by Holmes and Rahe in 1967 (Holmes and Rahe, 1967). Later, there have been several studies showing that stressful life events are a predictor of mental health problems and suicidal thoughts (Paykel et al., 1974, Paykel, 1978, Tyssen et al., 2001b, Howarth et al., 2020). Life events during the past year were measured by 17 items:

1) Serious disease or accident
2) Divorce, separation or broken relationship
3) Married or started living with a cohabitant
4) Had children
5) Death of a family member or close friend
6) Other difficulties in the immediate family
7) Serious financial problems
8) Partner unemployed or granted leave

9) Serious problems with the residence or dwelling
10) You or someone in your immediate family was involved in a serious law violation
11) Problem with a partner
12) Moved away from your parents
13) Leave of absence
14) Sick leave for 21 days or more
15) You have been inspected by regulatory authorities
16) Serious disease in the immediate family (partner, child or parents)
17) Other serious events (self-specified)

All items were coded 'no = 0' or 'yes = 1'. In the regression analysis, we used the total score of all life events significantly associated with serious suicidal thoughts. This measure has been used in studies across multiple occupations (Tyssen et al., 2000, Mahmood et al., 2019, Tyssen et al., 2004a, Midtgaard et al., 2008).

Mental distress (anxiety symptoms and depressive symptoms) over the last 14 days was measured by the Symptom Check List-5, a five-item version of the Symptom Check List-25 (Derogatis, 1983). This five-item version is based on a factor analysis by Tambs and Moum (1993) and contains questions about how much one is bothered by the following: (1) feeling fearful; (2) nervousness or shakiness inside; (3) feeling hopeless about the future; (4) feeling blue and (5) worrying too much about things. In our sample, Cronbach's alpha was 0.90, indicating a high level of reliability for the data measured by this instrument. In our study, the response was measured for each item on a scale from 1–5 from 'not at all' to 'very much'. There were four response categories for this measure in the original SCL questionnaire (Derogatis, 1983) and the 5-item version (Tambs and Moum, 1993). When the Norwegian Physician Survey (Legekårsundersøkelsen) was made in 1993 and 1994, the number of response categories changed from four to five (Personal communication, Reidar Tyssen, September 02, 2021). This change has made it difficult to compare the use of this measure across populations. Nevertheless, five response categories have been used across multiple occupations (Tyssen et al., 2001b, Tyssen et al., 1998, Ruud et al., 2020, Rø et al., 2008, Tyssen et al., 2009). So, we considered this measure to be a fairly valid measure of general mental distress. Also, SLC-5 has been used in several studies of the general population (Strand et al., 2003, Tambs and Moum, 1993), however, these studies used only four response categories.

Mental distress has previously been shown to be associated with suicidal thoughts (Tyssen et al., 2001b, Turecki and Brent, 2016). So, we used the mean score of the five SCL-5 items to account for mental distress in regression analyses. Since there were very few respondents (less than 1 %) with two or more missing responses on the five SCL-5 items, we did not imputate these values. Instead, we classified these responses as 'missing'.

An important reason for choosing mental distress as our independent variable was because of its previous use among physicians. This variable is not a diagnostic tool, and it does not measure anxiety or depression disorders. First, there are too few items in the mental distress measure to draw any conclusions on the probability of anxiety or depression. Second, to make a diagnosis of anxiety and depression disorders, it is necessary to do a clinical interview. However, the correlation between mental health problems in need of treatment (described above) and mental distress was 0.59. On the assumption that mental distress taps anxiety symptoms and depressive symptoms, a substantial proportion of mental health problems are likely to fall into these categories.

We did not aim for a broad investigation of personality in the NORVET study. Instead, we chose a deviant personality trait in Torgersen's Basic Character Inventory, namely the nine-item reality weakness dimension (Torgersen, 1980). Reality weakness has shown predictive validity for both suicidal thoughts and lack of help-seeking among physicians (Tyssen, 2017). Each item had a dichotomous response ('agree' or 'do not agree'), and the total score ranged from 0 (low) to high (9). Reality weakness on Torgersen's Basic Character Inventory is an original, deviant trait related to perceptions and ideations on the borderline between reality and weakness. This dimension also measures chronic illusions, paranoid traits, and traits related to severe personality disorders (Torgersen and Alnæs, 1989, Tyssen, 2017). 'I feel lonely most of the time' and 'Sometimes I feel I am not myself' are two examples. To our knowledge, reality weakness has not been investigated among veterinarians before. In our sample, Cronbach's alpha was 0.75, which is acceptable but lower than, for example, our job-stress variables (discussed below). Cronbach's alpha for this measure in other samples has been 0.65 in physicians (Grotmol, 2012) and 0.62 in medical students (Tyssen et al., 2000). The seemingly lower alpha for this measure compared to, for example, job stress could also be due to the dichotomous response categories. This may reduce the reliability of the data measured by this instrument.

Alcohol to cope with tension was measured by a single item originally used in national surveys in the United States (Timmer et al., 1985), as well as in mental health surveys of students and physicians in

Norway (Kjøbli et al., 2004, Sterud et al., 2007, Tyssen et al., 1998, Mahmood et al., 2017). Problematic use of alcohol is known to be associated with increased suicide risk (Turecki and Brent, 2016). The item was: 'when you feel worried, tense, or nervous, do you ever drink alcoholic beverages to help you handle things?' The responses were 'never', 'seldom', 'now and then', and 'often'. Responses were dichotomised into 0 'never' and 1 'any frequency', as used in previous studies (Tyssen et al., 1998, Sterud et al., 2007, Mahmood et al., 2017). The reason for dichotomising the response was to make a clear distinction between drinking to cope with tension or not, as accounted for in detail elsewhere (Tyssen et al., 1998). Since this is a single-item measure, an assessment of internal consistency is not possible.

Attitudes toward mental illness were investigated using a two-item measure. This measure was originally used in public health surveys in the United States (Kobau and Zack, 2013) and has also been used among US veterinarians (Nett et al., 2015). Veterinarians were asked for their level of agreement with the following statements: (1) treatment can help people with mental illness lead normal lives and (2) people are generally caring and sympathetic to persons with mental illnesses. The response categories were 'strongly agree', 'somewhat agree', 'not sure/undecided', 'somewhat disagree', and 'strongly disagree'. The response scales for the two items were reversed, meaning that increasing values on the scale indicated a more positive attitude. Although this measure has been called 'attitudes toward mental illness', this two-item measure actually measures (1) attitudes toward the *treatment* of mental illness and (2) *beliefs* about other people's attitudes toward people with mental illness. We investigated if there had been any instruments used in Norway for investigating attitudes toward mental health and mental illness that could be suitable for our study. A few studies on such attitudes have been conducted in the general population (Fønnebø and Søgaard, 1992, Falkum, 1992). Although some of the separate questions could be relevant, the results from the first study were preliminary and part of an evaluation of a funding campaign (Fønnebø and Søgaard, 1992), and the second study investigated attitudes toward psychiatric patients (Falkum, 1992). As the measure of attitudes toward mental illness was the only measure that had been used in veterinarians, we chose this as our measure of attitudes toward mental illness. They were entered as continuous variables in the regression models, with increasing values on the scale indicating more positive attitudes.

#### 2.3.2.3 Work variables

The main field of work was reported as 'companion animal practice', 'production animal practice', 'mixed clinical practice', 'equine practice', 'aquaculture', 'public administration', 'academia or research', 'pensioners', and 'others'.

The number of working hours per week was included as a workload measure to assess the role of total working hours as a potential workload or stressor.

Job stress was measured by a modified version of Cooper's Job Stress Questionnaire (Cooper et al., 1989), originally including 38 items. This measure was later modified into a 32-item scale used in physicians (Tyssen et al., 2000). For the NORVET study, the measure was slightly modified, mainly in terms of linguistic adjustments but also by the inclusion of items specific to the veterinary profession (such as 'cross pressure between economy, animal welfare and ethics'). Each item was measured on a five-point scale (1= 'no stress' to 5= 'a lot of stress'). A factor analysis (principal component with varimax rotation, including scree plot evaluation) was conducted. The content of the three variables was constructed by retaining items loading more than 0.5–0.6 on one single factor and deleting items with loading differences of less than 0.2 between variables, as done in previous studies (Røvik et al., 2007). Finally, we discussed the content of the items to determine which items should be retained in each of the three variables: *emotional demands* (Cronbach's alpha = 0.87), *work and personal life balance* (Cronbach's alpha = 0.86) and *fear of complaints and criticism* (Cronbach's alpha = 0.88). The items constituting the three job-stress variables are found in Paper I.

A high Cronbach's alpha (0.86–0.88) for all three job-stress variables indicates a high internal consistency (i.e. reliability) of the data from this measure in this population. The job-stress measure has been used in other occupational groups as well, such as physicians (Sutherland and Cooper, 1992, Tyssen et al., 2000, Røvik et al., 2007). Some of the job-stress variables found among veterinarians in our sample coincide with job-stress variables among physicians (Røvik et al., 2007), namely work-home interface stress, emotional pressure, and fear of complaints and criticism. This may indicate that veterinarians and physicians face many of the same overall job stressors, although the species treated differs between the two occupational groups.

The frequency of animal euthanasia was measured using a single question: 'If you work in clinical practice, how many euthanasia procedures do you perform on average in a normal week?' Responses were categorised as follows: 0–4, 5–9, 10–14, and 15 or more. Due to low numbers in the latter three

categories, the variable was dichotomised into 0–4 and 5 or more per week. A large proportion (70–90 %) of veterinarians working in aquaculture, public administration, academia or research, and other fields did not respond to this question. Most veterinarians in these fields do not routinely perform animal euthanasia. Therefore, this lack of response was recoded to the category '0–4', as this seemed to be the most likely reason for the high proportion of missing responses. There are some important limitations to this measure. First, '0' should have been a separate category instead of being grouped with 0–4 per week. Further, we did not define animal euthanasia. It may be that non-justified and absolutely justified animal euthanasia would have yielded different results. This may have reduced the validity of this measure. In Paper II, veterinarians' frequency of euthanasing animals was used as an independent variable.

Colleague support was measured using two questions, as used in previous studies among physicians (Røvik et al., 2007, Hertzberg et al., 2016):

1) 'To what degree do you enjoy working with your colleagues?'
2) 'To what degree are you taken care of by your colleagues?'

The responses were given using a scale from 'not at all' to 'to a very high degree' (1 to 7), as in previous studies (Røvik et al., 2007, Hertzberg et al., 2016). Cronbach's alpha in our sample was 0.84. The mean score of the two items was used in the regression model. Cronbach's alpha in physicians was also 0.84 (Røvik et al., 2007, Hertzberg et al., 2016). Cronbach's alpha of 0.84 is good, and the high alpha in both the veterinary and physician samples indicates high reliability of the data yielded by this instrument.

### 2.3.3 Psychometric considerations (reliability and validity)

The two core dimensions of psychometric evaluation are to evaluate the psychological instruments for their reliability and validity (Blacker and Endicott, 2008), p.7. In short, validity describes the accuracy of the measures used (does it measure the construct intended?), and reliability describes the consistency of the variation of data produced by the measures (Blacker and Endicott, 2008), p.8. Concerning psychometric validity, no comparison of measures in our study was made to the 'gold standard', as this was not the scope of this study. Nevertheless, the instruments used in this study were chosen based on the assumption that they were fairly valid measures of the underlying constructs that we intended to measure. Overall, most of the measures used in our study have been validated in other studies. With regard to reliability, there are three kinds of reliability estimates: inter-rater reliability, test-retest

reliability and internal consistency between items on a scale (Blacker and Endicott, 2008), pp. 8-10. In our study, internal consistency can be estimated from our data. Where such information is available, this is discussed for specific measures.

Overall, the measures used in our survey are all well-established instruments, but they are generally not developed for use in veterinarians. Therefore, we conducted a face validity procedure in a pilot group consisting of 28 veterinarians before the survey was distributed to all licenced veterinarians. Some small adjustments were made after the pilot, mainly in terms of linguistics but also with the addition of some items specific to the veterinary profession (e.g., job-stress variables). Also, the majority of the work-related measures used refer to employees, but veterinarians are often self-employed. Additionally, when considering the broad field of veterinary medicine, with veterinarians working with companion animals, in aquaculture and with governmental bodies, it is clear that some of the instruments (e.g., job stress) would not be suitable for all respondents. This was reflected in the missing data for some items, which is discussed in the next section.

## 2.4 Statistical considerations

All of our measurements of mental health outcomes had ordinal categorical responses. We chose to dichotomise all of our dependent variables. Considerations for dichotomising the dependent variables were two-fold. First, responses for the outcome variables, especially serious suicidal thoughts, were skewed. Secondly, we aimed to compare our results with results from other occupational groups where the outcome variables had also been dichotomised. The chosen cut-off for the dichotomisation has been accounted for in the papers.

Since all of our dependent variables were binary, we chose logistic regression analyses to assess a possible association between the independent and dependent variables. Table analyses and the $\chi^2$ test were used to test for gender differences. Bivariate and multivariable logistic regression models were used to estimate odds ratios (ORs) for associations between independent and dependent variables. Initially, all independent variables were analysed bivariately with the dependent variable. The significance level was set to 5% ($p < 0.05$) for all analyses. We tested the goodness-of-fit for all regression models by Pearson's goodness-of-fit test, and all models were found satisfactory. Gender differences in the effects of the independent variables in the logistic regression models were investigated through two-way interaction terms between gender and the independent variables.

Interaction terms were entered one at a time. Details on interactions are found in the papers. Statistical analyses were carried out using IBM SPSS Statistics for Windows, version 27 (IBM Corp., Armonk, NY, USA) (Paper I), as well as Stata versions 16 (Papers I and III) and version 17 (Paper II).

**Missing data**

There is no established cut-off for how much missing data is acceptable while still having valid statistical inferences (Dong and Peng, 2013). Schafer (1999) suggested that a missing rate of less than 5 % was insignificant. Overall, the amount of missing data across our dependent and independent variables was low (less than 4 %). For descriptive analyses (such as prevalence and distribution), the total numbers (n) for each item have also been reported. For the logistic regression models, analyses to assess possible bias due to missing data in the independent variables were conducted for each of the models. No imputation of data was made.

There were two variables with somewhat higher numbers of missing data, namely the job-stress variables (missing data ranged from 7–10 %, used in Papers I and III) and the frequency of animal euthanasia (missing data was 36 %, used in Paper II). This may be explained by the fact that the job-stress variables and the question regarding animal euthanasia were mainly relevant for veterinarians working in clinical practice, but in our sample, there are also many veterinarians working in non-clinical positions. Concerning the job-stress variables, we assessed whether the respondents with one or more missing items were significantly different from those with non-missing responses. There was a slight predominance of veterinarians working in public administration who had one or more missing items on the dependent variables, supporting our hypothesis that the missing responses were due to perceived non-relevance for the respondents. Still, it was not expected that the slight predominance of missing responses from veterinarians working in public administration would have introduced any substantial bias in the model.

With regard to the instrument measuring the frequency of animal euthanasia, we recoded missing data into the response categories ‘0–4’, resulting in missing data for 2.92 % of respondents on this item.

## 2.5 Ethical considerations

The questionnaire and methodology for this study were approved by the Regional Committee for Medical and Health Research Ethics, Region South-East C (132704), and the Norwegian Centre for Research Data (674793). Hence, the study was done in accordance with the 1964 Declaration of Helsinki and its later amendments (World Medical Association, 2013).

The Regional Committee for Medical and Health Research Ethics also approved an informed consent waiver since the collected data was unidentifiable. A brief justification for an informed consent waiver and an assessment of the need for a safety plan for individuals in a suicidal crisis is described in the next section.

**Safety plan for identifying individuals at risk**

Initially, the ethical committee suggested that we establish a safety plan to identify and contact individuals classified as at-risk. We deemed such a plan unnecessary. Among the approximately 3,500 veterinarians invited to this study, one should statistically expect one completed suicide per year based on previous studies (Hem et al., 2005). It is unlikely that the individual veterinarian would spend more than one week filling out the questionnaire. We do not know what the suicide rate is for female veterinarians, but it is almost certainly lower than the rate for male veterinarians. Then the expected number of suicides would be a maximum of 44 suicides per 100,000 veterinarians x 3,500 veterinarians per 52 weeks = 0.03 for the time period during which a veterinarian is responding to the questionnaire. The probability of encountering respondents who are in a suicidal crisis was therefore considered negligible. Furthermore, there is no reason to believe that participating in the study leads to increased suicide risk in and of itself. We, therefore, believed that establishing a plan to identify and contact individuals at acute suicidal risk was out of proportion. However, it is likely that including informed consent could negatively affect the response rate.

Further, there is an international agreement that questionnaires for measuring suicide risk have low sensitivity and specificity for use at the individual level, even if they may be valuable at the group level in population surveys. If we imagine a questionnaire for suicidality with a sensitivity of 90 and specificity of 60, with 2 % responding to the highest risk option, we can estimate that 3500 veterinarians x 0.02 = 70 people in the NORVET study are at risk. Therefore, among these 84 veterinarians, there will be a 40 % probability that we contact someone who is not at risk, while there

is a 10 % probability that we will not catch those who are. If we carried out a safety plan, contacting individuals at risk, we would have to contact 84 veterinarians who we must assume do not want this as they would already have received an invitation to contact an experienced psychiatrist. Again, we would not assume that 84 veterinarians would take their lives in a year, but perhaps one veterinarian, and only a fraction of this on the actual days they participated in the survey. Therefore, among the 84 veterinarians that might be evaluated as being at risk, hardly anyone would be in an acute suicidal crisis at the time of the survey. We believe that it is most likely that veterinarians who are contacted based on response to a questionnaire will react negatively since they have already been offered to contact a psychiatrist. Therefore, we believe it is sufficient to make an offer so that those who may need it can contact a highly qualified psychiatrist. In summary, suicide is statistically a very low-frequency phenomenon, and our measures in a population survey must be in a reasonable proportion to this.

**Informed consent waiver**

In the NORVET survey, we considered that we were to process anonymous information, so there was no need to obtain informed consent from the participants based on § 20 of the Health Research Act (Helseforskningsloven, 2008). However, the feedback from the Norwegian Centre for Research Data was that it was not possible to guarantee full anonymity because there was a range of information that, put together, could make it possible to indirectly identify individual participants (e.g., a combination of age in the year of birth, gender, marital status, number of children, as well as detailed information about working conditions). However, this would probably be the case for very few participants. We, therefore, changed the age from year of birth to age categories (20–25, 26–30, 31–35, and so on), which reduced the possibility of indirect identification of the participants. The data material was then considered adequately de-identified but not anonymised.

The processing of personal data in our study was therefore on the legal basis of 'public interest or authority'[3] and 'archival purposes in the public interest, or for purposes related to scientific or historical research, or for statistical purposes'[4]. Using this legal basis, obtaining informed consent involves a disproportionate collection of personal data. We also believed that the study could generate important new knowledge about work and mental health among veterinarians. So, we thought that all things considered, the advantages of participating in the study outweighed the disadvantages.

In summary, the decision to not establish a safety plan and the waiver for informed consent was justified on the following basis:

- The requirements for a safety plan in the case of individuals in suicidal crisis, including measures to identify individual people at risk, are out of proportion. On the other hand, it may negatively impact the response rate.

- The requirement of a safety plan to identify and contact individuals will lead to many people being contacted who do not want to be contacted and without them being in a suicidal crisis. The probability of meeting someone who is in such an acute crisis is very low.

- The use of questionnaires has little predictive value for suicide at the individual level.

- We included contact information for a psychiatrist, at the committee's request in previous similar applications. There are no significant differences in the NORVET study compared to previous studies carried out by the research group. In our best judgement, this was also sufficient for our study.

The ethical committee re-evaluated based on our response and concluded that there was no need for a safety plan. Also, because this survey would collect only de-identifiable data, an informed consent waiver was given. Including contact information for a psychiatrist was deemed an adequate measure to ensure the possibility of a follow-up.

[3] (Allmenn interesse eller offentlig myndighet - art. 6 no. 1 letter e in Personvernforordningen)

[4] (Arkivformål i allmenhetens interesse, eller for formål knyttet til vitenskapelig eller historisk forskning eller for statistiske formål - art. 9 no. 2 letter j in Personvernforordningen)

# 3 SUMMARY OF RESULTS

**Paper I:**

Dalum HS, Tyssen R, Hem E.

**Prevalence and individual and work-related factors associated with suicidal thoughts and behaviours among veterinarians in Norway: a cross-sectional, nationwide survey-based study (the NORVET study)**

BMJ Open 2022;12:e055827.

Aim: This paper aimed to investigate the 12-month prevalence of suicidal feelings, thoughts, and attempts among veterinarians in Norway, as well as contributing and independent variables associated with serious suicidal thoughts.

Methods: The main outcome measure was Paykel's questionnaire. Data were collected using a cross-sectional, nationwide survey distributed to veterinarians with a residential address in Norway, registered at the Norwegian Food Safety Authority (n=3464), and the response rate was 75 %.

Results: 27 % (95 % CI 24.9-28.3) reported having felt that life was not worth living, 19 % (95 % CI 17.9-21.0) reported a wish to die, 19 % (95 % CI 18.1-21.2) reported suicidal thoughts, 5 % (95% CI 4.6-6.4) reported serious suicidal thoughts, and 0.2 % (95 % CI 0.09-0.51) had attempted suicide. When compared to male veterinarians, female veterinarians reported a significantly higher prevalence on all items. For serious suicidal thoughts, females had nearly twice the prevalence than their male colleagues (6.2 % vs. 3.6 %). The veterinarians themselves related their serious suicidal thoughts to work and personal problems, and to a lesser degree, family, social, and other problems. Nearly twice as many females as males (53 % vs. 28 %) reported work problems as contributing to their serious suicidal thoughts. Being single, having negative life events, and having mental distress were all independent variables associated with serious suicidal thoughts. The field of work and job stress were not independently associated with serious suicidal thoughts. Serious financial problems were the life event most strongly associated with serious suicidal thoughts, with the highest odds.

Conclusions: Veterinarians in Norway had a higher prevalence of suicidal thoughts, including serious suicidal thoughts, than physicians and police (11.1 % and 2.6 %, 7.5 % and 1.7 %, respectively). In multivariable analyses, the individual variables were more important than the work-related ones, while work problems were the most frequently reported contributing factor to serious suicidal thoughts by veterinarians themselves. The relationship between individual and work-related variables should be further investigated to gain a deeper understanding of suicidality in veterinarians.

**Paper II:**

Dalum HS, Tyssen R, Moum T, Thoresen M, Hem E.
**Euthanasia of animals - impact on suicidal thoughts and views on assisted dying in humans: a nationwide study of veterinarians (the NORVET study)**
Submitted October 2022


Aim: The aim of this paper was threefold: we investigated (1) attitudes toward assisted dying in humans, (2) whether the field of work and the frequency of animal euthanasia were associated with positive attitudes toward human euthanasia; and (3) whether frequent animal euthanasia was associated with serious suicidal thoughts.

Methods: There were two outcome variables in this paper, namely attitudes toward euthanasia in humans, and serious suicidal thoughts. Data were collected using a cross-sectional, nationwide survey distributed to veterinarians with a residential address in Norway, registered at the Norwegian Food Safety Authority (n=3464), and the response rate was 75 %.

Results: Fifty-five percent of the veterinarians agreed that euthanasia should be permitted in humans with a fatal disease and a short life expectancy. Veterinarians working in companion animal practice had 1.66 times the odds of having positive attitudes toward euthanasia in humans compared to veterinarians working in mixed clinical practice. The frequency of animal euthanasia was not associated with positive attitudes toward euthanasia in humans. Performing animal euthanasia more than five times per week was independently associated with a higher likelihood of serious suicidal thoughts compared to veterinarians with four or fewer euthanasia procedures per week.

Conclusions: Veterinarians' attitudes toward assisted dying in humans did not differ from those of the general population. Veterinarians' frequency of euthanasing animals was not independently associated with positive attitudes toward euthanasia in humans. However, veterinarians working in companion animal practice were more likely to have positive attitudes toward euthanasia in humans. Moreover, euthanising animals five times or more per week was independently associated with serious suicidal thoughts. We need more research to infer causality from these findings.

**Paper III:**

Dalum HS, Tyssen R, Moum T, Thoresen M, Hem E.
**Professional help-seeking behaviour for mental health problems among veterinarians in Norway: a nationwide, cross-sectional study (The NORVET study)**
BMC Public Health 2022;22:1308.

Aim: This paper aimed to investigate the prevalence of professional help-seeking behaviour for mental health problems among those reporting mental health problems and among those with serious suicidal thoughts. We also investigated self-reported contributing factors to mental health problems and independent variables associated with help-seeking behaviour.

Methods: The main outcome measure was mental health problems in need of treatment and help-seeking. Data were collected using a cross-sectional, nationwide survey distributed to veterinarians with a residential address in Norway, registered at the Norwegian Food Safety Authority (n=3464), and the response rate was 75 %.

Results: The prevalence of self-reported mental health problems in need of treatment was 30 % (746 out of 2494), significantly higher among females than males (36 %, 625 out of 1726 vs. 15 %, 111 out of 730; p <0.001). Of those with mental health problems, 54 % sought professional help (401 out of 746; 95% CI, 50–57), with females doing so significantly more frequently than males (56 %, 350 out of 625 vs. 41 %, 45 out of 111; p <0.003). Among veterinarians with serious suicidal thoughts, 50 % had sought help (69 out of 139; 95% CI, 41–58). Veterinarians most frequently related mental health problems to work problems (47 %), with females doing so significantly more often than males (49 % vs. 34 %; p = 0.004). Variables independently associated with a higher likelihood of help-seeking behaviour were being female, working in public administration, academia or research, or 'other' fields, and having positive attitudes toward mental illness. Working in production animal practice was associated with a lower likelihood of seeking help.

Conclusions: Thirty per cent of veterinarians in Norway reported mental health problems in need of treatment, but only half of them sought professional help. Furthermore, only half of those with serious suicidal thoughts had sought help. The low degree of help-seeking behaviour points to a treatment gap for mental health problems in this profession. Gender, attitudes toward the treatment of mental illness, and field of work were independently associated with help-seeking behaviour, with working in production animal practice being associated with less help-seeking. Interventions to increase help-seeking behaviour for mental health problems among veterinarians are warranted.

# 4 DISCUSSION

The main aim of the NORVET study was to investigate the prevalence of suicidal thoughts as well as the individual and work-related variables independently associated with serious suicidal thoughts. It has been hypothesised that experience and knowledge about animal euthanasia may influence attitudes toward euthanasia in humans, which is why we included measures of such attitudes in our survey. Also, the degree of help-seeking behaviour for mental health problems and serious suicidal thoughts was investigated, as were the independent variables associated with help-seeking behaviour. Our main findings were:

- Veterinarians have a relatively high prevalence of suicidal thoughts, while the prevalence of suicide attempts was low.
- Both individual and work-related variables were associated with serious suicidal thoughts. A novel finding in our study is the association between animal euthanasia and serious suicidal thoughts.
- Veterinarians have attitudes toward euthanasia in humans comparable to those of the general population. Companion animal veterinarians have a higher likelihood of positive attitudes toward euthanasia in humans compared to veterinarians working in mixed clinical practice.
- Only half of those with mental health problems and only half of those with serious suicidal thoughts had sought help. The field of work was independently associated with help-seeking behaviour, with working in production animal practices being associated with less help-seeking behaviour.

In this section, the methodological issues that are of importance when interpreting our results are discussed first, followed by a discussion of our findings in comparison with those of other relevant studies. Finally, a conclusion and future perspectives are given.

## 4.1 Methodological issues

### 4.1.1 The use of questionnaires

This study aimed to conduct the first nationwide study of work and mental health among veterinarians. Therefore, it seemed feasible to use a survey to collect such a large amount of data. All data were collected through a postal survey. The use of a postal survey is also quite an economically feasible way of collecting large amounts of data. The sole use of self-report measures is a weakness of our study.

The mode of administration (e.g., interviews vs. self-report questionnaires) may influence the responses given (Moum, 1998), and it is often assumed that data from surveys are less reliable compared to data from interviews. Although acquiescence (responding affirmatively) and systematic errors such as response biases (e.g., social desirability) could influence survey results, this may be less pronounced in surveys compared to interviews. For example, surveys are not influenced by the presence of an interviewer, which could lead to, for instance, 'yeah-saying' and the influence of the gender or age of the interviewer (Moum, 1998, Bowling, 2014). Additionally, social desirability has been suggested to be more pronounced in interviews compared to surveys (Okamoto et al., 2002). The de-identified nature of the NORVET survey may reduce the potential for results to be influenced by acquiescence and social desirability. Further studies could aim to utilise more objective data, such as register data, to improve the validity of the results. Also, the order in which the questions are presented in the questionnaire may influence the responses given (Bowling, 2014), p.294. This has been shown in a study from Norway investigating attitudes toward assisted dying (Magelssen et al., 2016). In the NORVET study, we generally used the same order of the different measures as in previous studies among physicians.

### 4.1.2 Errors in estimates

Random errors and systematic errors are two of the main types of errors affecting epidemiological studies (Rothman, 2012a).

**Random error – sampling variability**

Random error is data variability that cannot be explained easily. In a study with an infinite size, random errors caused by sampling variability would be reduced to zero. Confidence intervals (CI) is a way of

expressing the statistical variation that underlies an estimate, that is, the variability or amount of random error in the estimate (Rothman, 2012b).

When presenting estimates of the prevalence of responses to Paykel's five items and mental health problems in need of treatment and help-seeking behaviour, we used 95% CI to estimate the precision of our results (CIs for Paykel's instrument are not shown in the papers, but are found in the "Results" section of this thesis). We also included 95% CIs to estimate the precision of the odds ratios presented in the regression analyses in all three papers. The use of CIs has an underlying assumption that there is no bias and that the underlying statistical model is correct. If these assumptions are fulfilled, the CI would include the correct value of the measure 95% of the time. However, the abovementioned underlying assumptions are rarely even met in carefully designed and conducted randomised trials. Rothman stated that CIs are only a rough estimate of the statistical data variability (Rothman, 2012b). We had a high number of respondents in our study. Overall, the CIs in our estimates are narrow. However, some of the CIs in Paper III were wider, especially for veterinarians working in academia or research, or 'other' fields. This is probably due to a smaller subsample in the regression models investigating help-seeking behaviour for mental health problems, subsequently leading to smaller subgroups within the main fields of work. This indicates a somewhat lower degree of precision in our estimates with regard to help-seeking behaviour for mental health problems.

**Systematic error**

Unlike random errors, systematic errors are not reduced by increasing the size of the study. The relative role of systematic errors increases with increasing study size compared to random errors (Rothman, 2012a). A study can be assessed both in terms of internal and external validity. The internal validity of a study is the validity of the results compared to the target population in question (in this case, the validity of the results of the NORVET study pertaining to veterinarians in Norway). The three most common systematic errors that affect internal validity are selection, information, and confounding biases (Rothman, 2012a), which are all discussed below.

*Selection bias*

Generally, selection bias occurs when the association between the exposure and the outcome is different among those who participate compared to those that do not participate (Kleinbaum et al., 1981). Selection bias could be a result of the selection process of study objects or of variables that influence participation in a study (Rothman, 2012a).

Participation bias is the phenomenon in which respondents decide whether or not to participate based on variables such as social or health conditions. These conditions (e.g., poor perceived mental health) could correlate with associated variables for the outcome of the study, and possible bias due to selective participation or non-participation cannot be ruled out. If non-response in the NORVET study was due to the mental health of the respondents being either in the worst or best part of a theoretical scale, this would have introduced a selection bias in our sample. If that is the case, that would lead to an under- or overestimation of suicidal thoughts or mental health problems. This may lead to a reduction in the validity of the findings. However, most studies have found that non-participation did not introduce substantial bias (Galea and Tracy, 2007). Despite the general notion that non-responders are those who are more seriously ill, there is no consensus on this matter (Bowling, 2014), p.286. Also, the potential of non-response bias in our study would probably be more pronounced if the response rate was lower (Dillman, 1991).

The address list of veterinarians retrieved from the Norwegian Food Safety Authority, used for distributing the survey, contained only names and addresses, and the respondents to the survey were de-identified to researchers at all times. Hence, we did not have information about responders in the different waves of distribution or non-responders overall. Therefore, no comparison of responders compared to non-responders could be carried out, nor could respondents be compared in the different waves of distribution. High response rates are generally accepted as an indicator of a lower probability of non-response error (Dillman, 1991). With a response rate of 75 %, this may have reduced the risk of non-response bias. Except for the slight overrepresentation of males over 70 in our sample, the distribution of gender and age in our sample is very similar to that of the target population. The possibility of non-response bias cannot be excluded completely, but the high response rate and similar distribution of gender and age suggest that our sample is indeed representative of the target population of veterinarians in Norway, thereby providing acceptable internal validity to our results.

*Information bias*

Information bias is due to measurement errors in the data collected from study participants. Information bias could be random or systematic. Such measurement errors can also be called classification errors, which are further divided into differential misclassification (misclassification based on the value of other study variables) and non-differential misclassification (misclassification unrelated to other study variables) (Rothman, 2012a).

We cannot exclude the possibility of systematic over-reporting of some of the outcome measures in our study, such as mental health problems. This may have led to a systematic bias. Of importance, a meta-analysis found that occupational studies, regardless of the occupational group being assessed, tend to yield higher estimates of common mental disorders than general population surveys (Goodwin et al., 2013). The authors suggest that such symptoms may be over-reported when respondents know that they belong to a 'high-risk' occupational group and that such results may indicate job dissatisfaction rather than actual poor mental health. There is also evidence among professionals that stress and mental disorders may impact job perceptions (Firth-Cozens and Hardy, 1992). Systematic over-reporting could also be a result of extensive exposure to information about a certain topic, and it has been shown that respondents tend to over-report in such cases (Aalen et al., 2018), p.242. Since 2018, the general media and the veterinary profession have paid increased attention to mental health problems among veterinarians. It may be that the increasing attention regarding mental health in the veterinary profession has influenced the results of our study, leading to a 'framing effect', and an overestimation of mental health problems in our results. This increasing attention regarding mental health is nevertheless not a phenomenon unambiguously associated with the veterinary profession or with a national phenomenon in Norway. Through the last decade, increasing attention regarding mental health problems has also been seen in the general public in Norway, and it has also been an area of interest in the veterinary profession worldwide. However, it is important to keep this type of bias in mind when interpreting the results of our study. In the original study by Paykel et al., they measured the prevalence in the past week, the past year, and lifetime prevalence (Paykel et al., 1974). In the NORVET study, we used the 12-month prevalence of suicidal thoughts and attempts, as this would probably increase the reliability of the data compared to the lifetime prevalence (Goldney et al., 1991). Mental health problems in need of treatment was also measured as 12-months prevalence.

Non-differential misclassification is not dependent on any other variable in the analyses. In bivariate models, with misclassified binary independent or dependent variables, the bias will always be toward

the null (Rothman, 2012a). If continuous variables have random errors (low reliability) and are used as independent variables, this is also the case. All of our dependent variables were binary. If there were non-differential misclassification of our dependent variables of serious suicidal thoughts, attitudes toward euthanasia in humans or help-seeking for mental health problems, this may have biased the estimates toward the null (assuming there were no misclassification or measurement errors in the explanatory variables). Both selection bias and information bias are examples of systematic errors that cannot be controlled for in statistical analyses.

*Confounding*

Confounding is a type of systematic error. A variable is a confounding variable when: (1) there is an association between this variable and the outcome (for example as the cause, but it cannot be an effect of the outcome); and (2) there is an association between this variable and the exposure (but the variable should not be an effect of the exposure or be a step in the causal pathway from exposure to the outcome) (Kirkwood and Sterne, 2003a), p. 177-179. Age is a common confounding variable. In our study, we have controlled for the common confounding variables, such as age and gender. In general, confounding can be adjusted for in the statistical analyses as long as we measure all the confounding variables in the study. However, in practice, there will almost always be some unmeasured confounding that is not accounted for.

Since the NORVET study is a cross-sectional study, we could not assess causality in the associations found. Also, in our theoretical model, we hypothesised that 'mental health' could be an intermediate variable between independent or work-related variables and our dependent variables (please refer to 'Section 1.4: Theoretical model of work-related stressors and mental health'), i.e., that mental health is on a theoretical causal pathway between our independent and dependent variables. In Paper I, we did a post-hoc analysis to investigate the effect of mental distress or reality weakness on job stress, with serious suicidal thoughts as the dependent variable. When the two variables of mental distress and reality weakness were excluded in processing the individual and work-related variables, all three job-stress variables remained significant. However, the direction of causality in these findings cannot be unequivocally assessed. If job stress is an effect of mental distress and reality weakness, our results indicate that the effect of job stress was probably confounded by mental distress and reality weakness. But if job stress is defined as the underlying causal factor, our results indicate that mental distress and

reality weakness mediate the effect of job stress. Longitudinal studies are needed to elaborate further on these findings.

**External validity**

We assume that the internal validity of our results is adequate (i.e., that our results are valid for veterinarians in Norway). The external validity (generalisability; i.e., veterinarians outside Norway) of our findings is more uncertain. The veterinary population and the curriculum in Norway are comparable to those of the other Scandinavian countries and some Northern European countries in regard to admittance to veterinary education, duration of the study, and working life overall (such as regulation of working hours, overtime, and absence from work). However, the veterinary curriculum in, say, the United States is designed differently (e.g., interviews at admission), and working life in the United States differs quite a lot from that in Norway and Northern Europe when it comes to, for instance, working hours and the regulation of absence from work. Therefore, our findings should be replicated in studies from other countries.

## 4.2 General discussion of our results

### The 12-month prevalence of suicidal feelings, thoughts and attempts among veterinarians in Norway

During the last year, 27 % of veterinarians in Norway had felt that life was not worth living, 19 % reported a wish to die, 19 % had suicidal thoughts, 5 % had serious suicidal thoughts, and 0.2 % had attempted suicide. For all items, female veterinarians reported a significantly higher prevalence than male veterinarians.

There is no data on the prevalence of suicidal thoughts in the general population of Norway. However, it has been suggested that the general population is not always the best reference group when investigating levels of suicidal thoughts in an occupational group (Harvey et al., 2021). This is partly because medical professionals, such as veterinarians, belong to a different socio-economic group than the general population. Therefore, it may be more feasible to compare the prevalence of such thoughts with similar occupational groups, such as physicians (Harvey et al., 2021), to avoid inflated estimates. Also, there is often a problem with comparing prevalence estimates of, say, suicidal thoughts between different groups or between studies. This is due to methodological differences (i.e., in measurements used), the mode of administration of the instruments, and whether the survey is anonymous or not. However, Paykel's instrument has been used to measure suicidal feelings and thoughts among other occupational groups. In our study, veterinarians reported a higher prevalence of suicidal feelings and thoughts compared to physicians (16.6 % and 11.1 %, respectively) (Hem et al., 2000) and police (8.9 % and 7.5 %, respectively) (Berg et al., 2003). This was also the case for serious suicidal thoughts, where physicians and police reported a prevalence of 2.6 % and 1.7 %, respectively. The prevalence of suicide attempts was low among veterinarians and comparable to that among physicians (0.3 %) and police (0.1 %). Also, suicide is a biopsychosocial phenomenon; however, this thesis does not include biological or clinical approaches to suicidal thoughts. We have investigated neither completed suicide nor suicide risk in veterinarians.

The prevalence of suicidal thoughts among veterinarians in Norway is comparable to that of veterinarians in other countries (Perret et al., 2020, Bartram et al., 2009a, Schwerdtfeger et al., 2020). Except in the study by Bartram et al. females and younger veterinarians were over-represented in the samples, possibly leading to selection or response bias. It should also be noted that the instruments used and the time periods measured differ between the aforementioned studies. This limits the

possibility of comparing results across these veterinary populations. The NORVET study is therefore the first nationwide survey with a representative sample, investigating the prevalence of suicidal thoughts among veterinarians.

**The 12-month prevalence of mental health problems in need of treatment**

Self-reported mental health problems in need of treatment were reported by 30 % of veterinarians. Female veterinarians reported a significantly higher prevalence compared to male veterinarians (36 % vs. 15 %).

The corresponding numbers for mental health problems among first- and fourth-year postgraduate physicians in Norway are 11 % and 17 %, respectively (Tyssen et al., 2004b). However, the distribution of age in our sample covers the whole veterinary profession, whereas there was a younger age group in the physician study (24–36 years). Therefore, the prevalence in the two samples is not directly comparable. However, we performed an estimation of the prevalence of mental health problems in need of treatment in the similar age categories in the NORVET study sample (26–35 years), finding a prevalence of 42.0 % (95% CI, 38.1–46.0). The gender difference in this age group was similar to that of the whole sample, being twice as high among females compared to males (44.5 % vs. 21.9 %, $p = 0.001$). Among female medical students, an increase in self-reported mental distress has been found from 1993 to 2015 (Ruud et al., 2020). We do not have any previous estimates of the prevalence of mental health problems or mental distress among veterinarians. However, an increase in self-reported mental health problems among female students and adolescent girls has been reported over the last decades (Bakken, 2018, Knapstad et al., 2018). Further, the abovementioned study on physicians was published in 2004 and was based on data collected in 1993. The way in which mental health is discussed in the general population has probably also changed since then. In the general debate in Norway, psychiatrists have argued that the change in our daily language affects population surveys measuring mental health outcomes, as feeling 'stressed' is described as having anxiety, and feeling 'down' due to normal struggles may be referred to as having depression (Holte, 2022). So, the aim of further research should be to validate our findings with data from more objective sources, such as health registers.

Various instruments are used in measuring anxiety and depressive symptoms, such as the Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983), the Generalized Anxiety Disorder Scale 7 (Spitzer et al., 2006) and the Center for Epidemiologic Studies Depression Scale (Andresen et al., 1994,

Radloff, 1977). The Hospital Anxiety and Depression Scale measure has been used in both general population surveys in Norway, as in the Trøndelag Health Study (HUNT: Helseundersøkelsen i Trøndelag) (Holmen et al., 1990, Krokstad et al., 2013), and in occupational studies, such as in farmers (Torske et al., 2016b, Torske et al., 2016a). As noted above, comparisons with the general population should, however, be interpreted with caution when investigating specific occupational groups. So, we chose a measure that had already been used with physicians because this seemed like a relevant occupational group to compare veterinarians to.

The finding of higher levels of suicidal thoughts and mental health problems among females compared to males is in line with a uniform agreement across studies showing that in general, females report higher levels of mental health problems compared to males (Lin et al., 2021, Penninx et al., 2021, Altemus et al., 2014). Therefore, our findings should probably not be interpreted as occupational findings specific to the veterinary profession. A 'framing effect' may apply to our results as well, as attention to the project was quite extensive before the study was launched. To conclude, the prevalence measures of both suicidal thoughts and mental health problems should be interpreted with caution due to possible over-reporting. However, our comparison with a similar occupational group (physicians) instead of the general population may nevertheless strengthen our findings. Also, most of the prevalence measures had relatively narrow 95 % CIs, indicating high precision.

To the best of our knowledge, the NORVET study is the first nationwide study assessing the prevalence of mental health problems, including suicidal thoughts and attempts, in a nationwide, representative sample of veterinarians. The combination of a relatively high prevalence of mental health problems, suicidal thoughts, and a low prevalence of suicide attempts among veterinarians in Norway is in accordance with other studies among veterinarians (Witte et al., 2019, Nett et al., 2015, Volk et al., 2022, Schwerdtfeger et al., 2020, Perret et al., 2020). Our findings may indicate that a suicide attempt among veterinarians more often ends in suicide, as is also suggested in physicians (Hem et al., 2000). Veterinarians may even be more vulnerable to suicide by self-poisoning than physicians, since they have extensive experience with animal euthanasia and swift access to potentially lethal means.

**What do veterinarians themselves regard as contributing factors to serious suicidal thoughts and mental health problems?**

Veterinarians most commonly reported work problems as a contributing factors to both mental health problems and serious suicidal thoughts. Females reported work problems more often than their male colleagues.

Since a definition of the different variables was not included in the questionnaire, we do not know what veterinarians interpreted as 'work factors'. Therefore, our findings must be interpreted with caution. The same measure of self-reported contributing factors to serious suicidal thoughts has been used among physicians in Norway. The physicians related their serious suicidal thoughts mainly to personal factors (62.5 %) and family factors (45 %), with no gender differences (Hem et al., 2000).

However, when looking more closely at the life events associated with serious suicidal thoughts both among physicians and veterinarians, this may give some further reflections regarding what variables play a role in suicidal thoughts in the different occupational groups. Family and relationship issues were the most significant life events bivariately associated with serious suicidal thoughts among physicians (Hem et al., 2000). In our study, serious financial problems were the most significant life events bivariately associated with serious suicidal thoughts among veterinarians. Indeed, negative life events, which included serious financial problems, were independently associated with serious suicidal thoughts among veterinarians in the multivariable analyses. Our findings may suggest that economic concerns are more pronounced among veterinarians compared with physicians.

The finding that economic concerns are relevant to suicidal thoughts is in line with previous research, which found that life stressors, such as an economic downturn, can trigger major depressive episodes or other mental disorders in vulnerable individuals (Van Heeringen, 2012, Dooley et al., 1994). Low income and unemployment was associated with both an increase in suicidal thoughts (Gunnell et al., 2004), increased suicide risk (Gerdtham and Johannesson, 2003), and higher suicide attempt rates (Economou et al., 2013). Unemployment is a negligible challenge for veterinarians in Norway. From January 2021 through November 2022, on average 10 veterinarians were registered as unemployed on a monthly basis (Personal communication, Christian Ruff, Norwegian Labour and Welfare Administration, December 14, 2022). However, uncertainty about income could be relevant, especially for those working as self-employed in rural areas. Economic concerns are more prominent among veterinarians than among physicians, as expected. In Norway, tax revenues cover the cost of providing

human healthcare. Animal healthcare is not subsidised in any way. Hence, the animal owner has the sole responsibility for paying for animal healthcare. This may result in cross-pressure for veterinarians at the intersection of animal welfare, costs, and ethics (Springer et al., 2021). Indeed, in a qualitative study from Australia, when asked what aspect of their profession they would change, the majority of veterinarians responded that they wanted to remove money from the decision-making process (Whitnall and Simmonds, 2021), emphasising economic concerns as contributing to the conflicting responsibilities of being a veterinarian. The perceived impact of work factors on serious suicidal thoughts may also be partly influenced by the fact that veterinarians in Norway have less undergraduate training in communication, psychology, and coping skills, and experience more professional isolation. In the field of veterinary medicine, veterinarians may experience significant stress due to their many different, and sometime conflicting, responsibilities.

Our findings indicate that veterinarians perceive work problems as significant with regard to their mental health, both in relation to mental health problems and suicidal thoughts. Due to this instrument being self-reported and the room for interpretation as to what work factors comprise, these results should, however, be interpreted with caution.

**Is work characteristics independently associated with serious suicidal thoughts?**

Work characteristics that were investigated in this study were the field of work and the three job-stress variables: (1) emotional demands; (2) work and personal life balance; and (3) fear of complaints. Further, the frequency of animal euthanasia and attitudes toward euthanasia in humans, working hours, and colleague support were investigated. In Paper I, the field of work and job stress were not independently associated with serious suicidal thoughts among veterinarians. In Paper II, positive attitudes toward euthanasia in humans and the frequency of animal euthanasia were associated with serious suicidal thoughts. Perceived colleague support was associated with a reduced likelihood of serious suicidal thoughts.

The individual independent variables associated with serious suicidal thoughts were being single, experiencing negative life events, and the presence of mental distress, all of which concur with previous research in other professions and population samples (Hem et al., 2000, Tyssen et al., 2001b, Tyssen et al., 2004a, Turecki and Brent, 2016, Fjeldsted et al., 2017). Contrary to previous research (Tyssen et al., 2004a, Berg et al., 2003, Sterud et al., 2008b), the personality trait reality weakness was not independently associated with serious suicidal thoughts. This may be explained by the high

correlation between mental distress and reality weakness. The complexity of predicting suicidal thoughts and suicide attempts has been highlighted (Franklin et al., 2017), and there are usually direct and indirect effects of both individual and contextual predictors (Rich and Bonner, 1987, Rudd, 1990, Franklin et al., 2017). Our study emphasises the individual variables at the expense of the work-related variables in the multiple regression model, except for a novel and original finding in the association between frequent animal euthanasia and serious suicidal thoughts. In regards to perceived colleague support being associated with a lower likelihood of having serious suicidal thoughts, veterinary work has traditionally been an occupation with more professional isolation than other medical professions, especially in rural areas. Professional isolation and a lack of social support have been highlighted as risk factors for suicide among veterinarians (Kelly et al., 1995).

In our study, companion animal veterinarians did not have higher odds of serious suicidal thoughts. Two previous studies found more veterinarians in companion animal practice reporting suicidal thoughts compared to veterinarians working in other fields (Gardner and Hini, 2006, Bartram et al., 2009b). However, both studies are cross-sectional in design, and one study sample had an overrepresentation of females, and a response rate of 48 % (Gardner and Hini, 2006). There is not much known about the transition from suicidal thoughts to suicide attempts and suicide among veterinarians. A recent study, however, reported that among veterinarians who had suicidal thoughts in the previous week, easy access to lethal medication in the workplace was associated with a six-fold increase in the perceived likelihood of a future suicide attempt when compared to those who kept lethal medication locked during business hours (Houtsma et al., 2022). These results should be interpreted as preliminary due to possible selection bias in a sample consisting exclusively of female veterinarians in companion animal practice. Nevertheless, the findings are in line with previous research, suggesting that access to specific methods of suicide may be the factor that leads to the translation of suicidal thoughts into suicide attempts (Hawton and van Heeringen, 2009). Our study is the first nationwide study with a large, representative sample, investigating a possible association between individual and work-related variables and serious suicidal thoughts among veterinarians. Our findings should be validated in other representative samples. There is still too little knowledge to draw any conclusions regarding the main field of work and its possible association with suicidal thoughts among veterinarians.

Emotional demands, work and personal life balance, and fear of complaints and criticism have been suggested as important job-stress variables among veterinarians (Platt et al., 2012b, Wallace, 2017,

Bartram et al., 2009b). This is in line with the results of our factor analysis on job stress. Previous research has suggested that job stress influences the suicide risk in veterinarians (Bartram and Baldwin, 2010), but there is a need for longitudinal research design studies to explore possible mediating or confounding effects. Nevertheless, it is well known that psychosocial variables in the workplace may play a role in mental health (Stansfeld and Candy, 2006), and that individual variables such as stress is related to the way people perceive their jobs (Firth-Cozens and Hardy, 1992). The importance of mental distress with respect to suicidal thoughts is consistent with other research, both among physicians and others (Tyssen et al., 2001b, Turecki and Brent, 2016). A study from Norway found that the job-stress variable of time pressure was not a direct predictor of suicidal thoughts in young physicians but only *via* mental distress (Tyssen et al., 2001b). Also, working hours were not independently associated with serious suicidal thoughts. Our finding of no independent effect of job stress among veterinarians is in keeping with previous research. Further investigation into the role of job-stress variables in the workplace may be beneficial t veterinarians' overall working health. Veterinarians currently dealing with mental health illnesses should be closely followed up, and interventions to decrease perceived job stress may be beneficial.

The finding of an association between animal euthanasia and serious suicidal thoughts is a novel finding in our study. This may indicate that animal euthanasia is a veterinary-specific occupational risk factor with regard to serious suicidal thoughts. However, due to the cross-sectional design of our study, we do not know the direction of the association found. Also, we did not distinguish between 'justified' and 'non-justified' euthanasia, which may have influenced the results. It may be that veterinarians perceive the need for animal euthanasia differently for their animal patients (i.e., some veterinarians perform euthanasia more often than others do). Indeed, it has been suggested that some veterinarians have a reputation for recommending euthanasia (Morris, 2012a), p. 151-152. Additionally, cognitive bias among veterinarians with serious suicidal thoughts cannot be ruled out, possibly leading to an over-reporting of the frequency of animal euthanasia. It is known from previous research that depression may lead to an overestimation of negative events, due to cognitive bias (Nunn et al., 1997). Our findings differ from those of two previous studies, which found no association between animal euthanasia and suicidal thoughts among veterinarians (Tran et al., 2014, Wallace, 2017). Nevertheless, we believe our findings to be more robust, as we have a nationwide, representative sample. Overall, we do not have enough evidence to draw any firm conclusions regarding animal euthanasia and its possible role in suicidal thoughts among veterinarians. Therefore,

our findings should be validated in other representative samples of veterinarians, and this is also a topic of interest for qualitative studies.

In our sample, having positive attitudes toward euthanasia in humans was associated with serious suicidal thoughts among veterinarians. Our findings may lend support to the suggestion that performing animal euthanasia affects veterinarians' attitudes toward suffering or toward alleviating suffering through death (Santander et al., 2022). This should be further investigated, especially with respect to its potential to contribute to suicide risk among veterinarians. We did not control for religious views in Paper II. Religious views could be a possible confounder with regard to attitudes toward euthanasia in humans and serious suicidal thoughts. Therefore, our results should be validated in other veterinarian samples.

Worth noting, a register-based study of suicides among veterinarians found that when decedents with pentobarbital poisoning were excluded, the standardised mortality rate was *not* significantly different from that of the general population (Witte et al., 2019). Animal euthanasia is a common occupational task for veterinarians. Veterinarians have swift access to lethal means and experience in making decisions regarding 'the right time' to euthanise. This may render veterinarians with suicidal thoughts especially vulnerable to suicide by self-poisoning. In most cases, veterinarians have more ready access to potentially lethal drugs than, for instance, physicians do. This is due to the organisation of work-life in veterinary medicine, with more professional isolation and ambulatory practice than physicians. Moreover, the 'slippery slope' argument in the debate on euthanasia in humans ('normalising' suicide as a medical option), may facilitate a view of euthanasia as a 'cure' for suicidal depression (Hendin, 1995). A normalisation or possible habituation process through exposure to animal euthanasia is also one of the three constructs of the interpersonal theory of suicide, namely the acquired capability of suicide (Van Orden et al., 2010). According to the authors, habituation to the pain and fear of suicide may be method-specific and acquired through exposure (Van Orden et al., 2010). The authors exemplified this by presenting the preferred method of suicide in different occupations, i.e., guns in the army, hanging or knots for the navy, and falling or heights for the air force. Such habituation may be especially relevant for veterinarians working in companion animal practice. This is further discussed below, in the section about veterinarians' attitudes toward assisted dying in humans.

Although we investigated several variables in our multiple regression analyses, there are more variables that could be associated with serious suicidal thoughts among veterinarians. A recent meta-analysis of psychological autopsy studies found 40 risk factors for suicide (Favril et al., 2022). As

emphasised in the introduction, suicide is a multifaceted phenomenon, and therefore, no single factor will explain suicidal thoughts or suicide among veterinarians. Hence, veterinary-specific work variables will not be the sole determinant of suicidal thoughts in this occupational group.

In summary, both individual and work-related variables are associated with serious suicidal thoughts among veterinarians. The finding of an independent association between animal euthanasia and serious suicidal thoughts warrants further research. This is two-fold: first, the safe storage of euthanasia agents in veterinary practices should be assessed. This should also be discussed within the veterinary profession as part of the environmental, health, and safety legislation that all workplaces are legally obliged to follow. Secondly, veterinarians are an occupational group of interest in suicide research in general, due to their experience with animal euthanasia, which may result in a changed perspective on death. Since there is a controlled association between individual variables, especially mental distress and serious suicidal thoughts, this also shows how important it is for veterinarians to have access to good mental health services to prevent suicide.

**Veterinarians' attitudes toward assisted dying in humans**

Of the 3464 veterinarians in our study, 63 % agreed strongly or partially to the statements: 'Physician-assisted suicide should be permitted for persons suffering from a fatal disease with a short remaining life expectancy'. Fifty-five per cent agreed strongly or partially to the statement that 'Euthanasia should be permitted for persons suffering from a fatal disease with a short remaining life expectancy', and 51 % agreed strongly or partially to the statement that 'There are cases in which it may be right or morally defensible for the doctor to provide assisted dying, even though it is illegal'. The following statement, 'Assisted dying should be permitted also for persons suffering from an incurable chronic disease but who are not dying' had the lowest consensus (43 %).

Attitudes toward assisted dying in humans have been investigated among physicians and the general population in Norway. It has been suggested that knowledge of what assisted dying entails leads to restrictive attitudes toward such practices (Lerner et al., 2011). In our study, veterinarians had attitudes toward assisted dying comparable to those of the general population (Magelssen et al., 2016), and more liberal attitudes than physicians (Gaasø et al., 2019). However, it should be noted that the general population survey was a survey experiment. A survey on assisted dying was distributed with two variations of question-wording, and two variations of question-order. Although the number

of respondents was relatively high (n = 3050), the response rate was low (13 %) (Magelssen et al., 2016). Therefore, a comparison of our results with those of the general population should be done with caution. As accounted for in detail elsewhere, there are several overarching themes of relevance when discussing attitudes toward assisted dying (Horn and Magelssen, 2020), p.21-34. It is possible to assume that specific regulations of assisted dying would influence attitudes toward these statements. This could mean that those responding 'partially agree' or 'partially disagree' would be more receptive to arguments either in favour of or against the legalisation of assisted dying. As a result, a relatively large proportion of veterinarians are unlikely to hold an extreme attitude in favour of or against legalisation but may be willing to change their minds in different circumstances. However, veterinarians' attitudes toward assisted dying in humans compared to the general population are in line with a similar study from Sweden (Lerner et al., 2011). The measure used is not the same, so a direct comparison between these studies is not possible. Acceptance of assisted dying in humans has increased in most Western European countries (Cohen et al., 2013), and our results may reflect a general trend in society and not a veterinary-specific trend.

Knowledge regarding animal euthanasia acquired by veterinarians through their work does not seem to lead to restrictive attitudes toward assisted dying in humans. Please also refer to the next section on possible associations between veterinary work characteristics and attitudes toward euthanasia in humans.

**Is work characteristics, such as animal euthanasia, associated with veterinarians' attitudes toward euthanasia in humans?**

Working in companion animal practice was independently associated with an increased likelihood of positive attitudes toward euthanasia in humans compared to those working in mixed clinical practice. The frequency of animal euthanasia was not independently associated with positive attitudes toward euthanasia in humans.

A possible association between work characteristics in veterinary medicine and attitudes toward euthanasia in humans has not been extensively studied in veterinarians. The finding that companion animal practitioners have a higher likelihood of having positive attitudes toward euthanasia in humans, may be partly explained by the fact that companion animals are often considered family members. Veterinarians are experienced in shared decision-making with the animal owner regarding 'the right

time' to euthanise, and have extensive knowledge of the euthanasia procedure. It may also be a reflection of veterinarians in companion animal practice viewing animal euthanasia as an 'act of compassion', in which the goal is to facilitate a 'good death' (Matte et al., 2019). Although different measures were used, our finding of no association between animal euthanasia and acceptance of euthanasia in humans is in line with a previous study (Ogden et al., 2012). Additionally, veterinarians of older age may be a population of interest with regard to research on attitudes toward euthanasia in humans, as they may have been habituated through occupational exposure to animal euthanasia. Despite systematic reviews of older adults' attitudes toward euthanasia in humans, the great heterogeneity in definitions of euthanasia and research design makes any conclusion about the possible interplay between different variables difficult (Castelli Dransart et al., 2021).

In summary, our findings may suggest that it is not the caseload of animal euthanasia that affects veterinarians' attitudes, but rather their knowledge and experience of the euthanasia process. Qualitative studies could elaborate further on this matter.

**What is the level of help-seeking behaviour for those with mental health problems and serious suicidal thoughts?**

Fifty-four per cent of veterinarians who reported mental health problems in need of treatment had sought professional help. Among veterinarians with serious suicidal thoughts, 50 % had sought help. Overall, significantly more females than males had sought help.

Is 50 % a low degree of help-seeking behaviour? The degree of help-seeking behaviour among veterinarians is comparable to previous findings among physicians, where 50 % and 41 % of first- and fourth-year postgraduate physicians, respectively, had sought help for mental health problems (Tyssen et al., 2004b). The degree of help-seeking behaviour among physicians has not been studied in Norway. There have been some studies reporting the degree of help-seeking behaviour for mental health problems among veterinarians, ranging from 14 to 59 % of veterinarians not seeking help for mental health problems (Volk et al., 2022, Perret et al., 2020, Nett et al., 2015). The methodological heterogeneity and shortcomings, such as the lack of a comparison population (Volk et al., 2022) and an overrepresentation of females in the sample (Perret et al., 2020, Nett et al., 2015), make it hard to draw any firm conclusions about the degree of help-seeking behaviour among veterinarians. We believe that the findings in the NORVET study are more robust since our results are based on a

nationwide sample and a representative sample of veterinarians. In two population studies, approximately 65 % of those reporting anxiety symptoms and depression symptoms sought help (Bonsaksen et al., 2019). The degree of help-seeking behaviour among veterinarians, therefore, seems to be more in line with that of other medical professionals, than the general population. However, the methodology differs between our study and the population study, which limits direct comparison. In light of the seemingly high prevalence of mental health problems and suicidal thoughts among veterinarians in our sample, the importance of seeking help nonetheless seems obvious.

Nearly 20 % of those reporting serious suicidal thoughts in Paykel's instrument also simultaneously reported 'no significant mental health problems' on the measure of mental health problems in need of treatment. There may be a resistance to taking on the patient role, an unwillingness to reveal illness (Rosvold and Bjertness, 2001, Davidson and Schattner, 2003), or a low perceived need for help (Andrade et al., 2014). Also, a lack of mental health literacy in the veterinary curriculum may influence the way veterinarians perceive the presence of suicidal thoughts. One should try to gain a deeper understanding of these findings, for example, in qualitative studies.

Only half of the veterinarians with mental health problems in our study had sought professional help. Among veterinarians with serious suicidal thoughts, only half had sought help. Seen together with the relatively high prevalence of suicidal thoughts and mental health problems, this warrants action. On a group level, in contrast to physicians, veterinarians may have limited competency in assessing their mental health and do not know the 'warning signs' that suggest that seeking help is recommended. This could render veterinarians more vulnerable to delayed help-seeking for both mental health problems and suicidal thoughts.

**What are veterinarians' attitudes toward mental illness, and are such attitudes independently associated with help-seeking behaviour?**

Ninety-three per cent of veterinarians agreed somewhat or strongly that treatment can help people with mental illness lead normal lives, and 50% somewhat or strongly agreed that people are generally caring and sympathetic to persons with mental illness. Positive attitudes toward the treatment of mental illness were associated with help-seeking behaviour.

The corresponding numbers for the abovementioned attitudes toward mental illness among veterinarians in the United States were 89 % and 32 %, respectively (Nett et al., 2015). We found an association between positive attitudes toward the treatment of mental illness and help-seeking behaviour. This is in accordance with a previous WHO mental health survey, which found that negative attitudes toward treatment were reported as a barrier to help-seeking (Andrade et al., 2014). As discussed in the introduction, there are a variety of instruments measuring different dimensions of stigma and attitudes toward mental illness. This affects our ability to directly compare our findings to those of other studies. Also, poor mental health literacy has been reported as a barrier to help-seeking (Jorm, 2012). The lack of basic mental health literacy in the veterinary curriculum might influence their attitudes toward mental illness. Also, there was a discrepancy in our findings, with a seemingly large proportion of veterinarians holding positive attitudes toward the treatment of mental illness, while still finding a low prevalence of actual help-seeking behaviour among those with mental health problems. A systematic review of help-seeking interventions for anxiety, depression, and general psychological stress among young adults may provide at least some explanation for this discrepancy (Gulliver et al., 2012). They found that mental health literacy was effective in improving help-seeking attitudes, but not help-seeking behaviour (Gulliver et al., 2012). There has been increasing attention to mental health in the profession over the last decade, which might have influenced veterinarians' attitudes toward mental illness. Contrary to previous research (Tyssen et al., 2004b), the deviant personality trait reality weakness was not a factor significantly associated with help-seeking behaviour in the multivariable analyses. This may be due to the high correlation (Pearson's R = 0.6) between mental distress and reality weakness.

Positive attitudes toward the treatment of mental illness were associated with help-seeking behaviour among veterinarians in our study. It, therefore, seems feasible to ensure that the curriculum and continued education emphasise stigma-reducing interventions among veterinary students and veterinarians.

**Is work characteristics independently associated with help-seeking behaviour?**

The main field of work was associated with help-seeking behaviour for mental health problems, while the three job-stress variables were not. Working in public administration, academia or research, or 'other' fields was associated with *more* help-seeking behaviour, while working in production animal practice was associated with *less* help-seeking behaviour. Among veterinarians with serious suicidal thoughts, being female and the presence of mental distress were bivariately associated with more help-seeking behaviour. No variables were associated with help-seeking for serious suicidal thoughts in the multivariable model.

Females sought more help than males. A higher likelihood of help-seeking behaviour among females compared to males is widely known and also seen among police and ambulance personnel in Norway (Berg et al., 2006, Sterud et al., 2008a). However, this contrasts with findings among physicians, where no gender difference in help-seeking behaviour was found (Tyssen et al., 2004b). In regards to the finding of less help-seeking behaviour among production animal practitioners, the solitary nature of work, less flexible work schedules, and geographical inconvenience could be relevant to the lack of help-seeking behaviour (Ferris-Day et al., 2021). Those working in public administration, research, and academia may have more regulated hours and access to mental health treatment since they more often work in urban areas. Help-seeking behaviour and associated variables among veterinarians are not extensively studied, so our results are quite original. Also, the NORVET study, which is based on a nationwide and representative sample, is likely the most robust study conducted on veterinarians so far. A recent study among veterinarians in the United States found that those with negative attitudes concerning care and sympathy for people with mental illness (item number two in the measure of attitudes toward mental illness) were significantly more likely to be solo practitioners than non-solo practitioners (Kassem et al., 2019). With production animal practitioners in our study having a lower likelihood of help-seeking behaviour, this may indicate that the organisation of work-life for veterinarians influences their help-seeking behaviour.

## 4.3 Conclusions

This is the first study assessing work and some mental health outcomes in a nationwide, representative sample of veterinarians in Norway. The nationwide study design, the high response rate, and the inclusion of all main fields of work make the NORVET study quite comprehensive as compared to other studies of veterinarians. The study intended to create basic knowledge about some mental health outcomes based on a self-report survey. The cross-sectional study design restricts any conclusions about causality. Our findings support previous findings, with higher levels of suicidal thoughts and mental health problems compared to other groups. There is probably an interplay between both individual and work-related variables associated with suicidal thoughts among veterinarians. A novel finding is an association between animal euthanasia and serious suicidal thoughts. Even though animal euthanasia has been suggested as a veterinary-specific risk factor in previous studies, it would be too simplistic to argue that work variables alone explain such a complex phenomenon as suicidal thoughts among veterinarians. But researchers in the field of suicidology may be interested in veterinarians as an occupational group. Hopefully, the generation of knowledge created by this project may contribute to a more knowledge-based debate on how to make the veterinary profession in Norway more sustainable.

# 5 FUTURE PERSPECTIVES

Most of the studies conducted on mental health among veterinarians are cross-sectional, including the NORVET study. Longitudinal studies are required to determine causality, and qualitative studies could be of importance to gain a better understanding of the complexity of suicidality among veterinarians. Animal euthanasia should be further assessed as an occupational risk factor for suicide.

First, veterinarians represent an occupational group where suicide attempts may culminate in completed suicide more often compared to non-medical professionals. A high prevalence of suicidal thoughts, a low suicide attempt rate, and a low degree of help-seeking behaviour in our study may suggest that veterinarians could benefit from implementing preventive mental health measures. The veterinary curriculum and providers of continued education should consider implementing more of the so-called 'non-technical professional competencies', such as clinical communication, as well as mental health literacy and stress management. Even though veterinarians have a broad medical education, the psychological aspects of health have traditionally not been an integrated part of the curriculum or continued education. As opposed to physicians, veterinarians do not have a year of supervision at the start of their careers. Therefore, further development of the mentoring network offered to newly graduated students is important.

Secondly, there is a long way from a cross-sectional study to suggesting suicide prevention measures. Suicide prevention measures can be classified as primary (measures in the general population), secondary (measures for people with heightened suicide risk), and tertiary (measures for people with suicidal acts) (Ekeberg and Hem, 2016), p. 162. Since suicide is a complex phenomenon, no single approach will contribute to a significant decline in suicide rates (Hawton and van Heeringen, 2009), but that does not mean that single-approach strategies are not beneficial. Increasing knowledge has been emphasised (Ekeberg and Hem, 2016), p.162, as it is relevant both for individuals having suicidal thoughts and for their families and friends. A broad suicide prevention campaign in the general population of Norway is currently being launched. This campaign is the result of an action plan ('Handlingsplan for forebygging av selvmord') launched by the government (Departementene, 2020). Hopefully, this campaign will also be noticed by veterinarians in Norway. In addition to increasing knowledge, preventive measures, especially relevant for veterinarians, might include gatekeeper training (recognising individuals expressing suicidal thoughts) in the workplace, and limiting access to potentially lethal drugs (WHO, 2021). Limitations of access should be discussed within the veterinary

profession, as such limitations may lead to difficulties in carrying out ordinary occupational tasks. It is also important that individuals showing signs of suicidal thoughts are encouraged to seek help. The Norwegian Veterinary Association has a colleague support network for veterinarians, offering support and contact if someone feels the need to talk to someone. From 2008 through 2022, annually, there has been an average number of seven requests to the colleague support network (personal communication, Anne-Barbro Vatle, December 23, 2022). However, the possibility of establishing a low-threshold, easily accessible professional counselling service for struggling veterinarians, as has been available for physicians in Norway for decades should be assessed. It has been suggested that such counselling interventions do affect measures of burnout among physicians (Rø et al., 2008).

Third, it has been emphasised to not individualise mental health problems in occupational groups, but to acknowledge that this is also a responsibility of the workplace (Hilton et al., 2022). Among physicians, most of the responsibility for improving mental health has been assigned to the physicians themselves, such as through resilience training, coping mechanisms, and self-care (Montgomery et al., 2019). However, a broader perspective emphasises the need to improve how healthcare staff works together and their well-being to meet needs of patients, and this is also associated with financial considerations (Rø et al., 2020), p.108. There is no reason to think that this interplay differs among veterinarians. However, financial concerns are probably more pronounced in the veterinary profession compared to human health care. Furthermore, there is a current shortage of veterinarians in almost all clinical positions in Norway, which may be a symptom of broader job dissatisfaction. The veterinary profession should discuss improvements to organisational measures, aiming to make the profession more sustainable in the long term.

Fourth, there has traditionally been a pathogenic approach to mental health research (i.e., focusing on the problems and risk factors for poor mental health). A more salutogenic approach would be of value, namely investigating the variables that are supporting health and well-being. We could learn from organisations and workplaces where veterinarians thrive, teams are self-efficient and there is high psychological safety.

Lastly, the professional culture of veterinary medicine plays an important role regarding expectations of what it is like to work as a veterinarian. The culture of the medical profession has been suggested to play an important role in many of the challenges that physicians face in their work (Shanafelt et al., 2019). Hopefully, the NORVET study has contributed to a shift in how we address mental health

problems in the veterinary profession. It has been pointed out that, among the other variables, expectations that are impossible to live up to could be one way of understanding suicidality (Hjelmeland, 2022), p. 385. Such expectations could stem both from the society you are a part of and from the internalisation of such perceived expectations (Hjelmeland, 2022), p.385. In the context of veterinary medicine, the profession has the common responsibility of not creating or maintaining unreachable expectations or standards of what a veterinarian should be like or be able to achieve. If we look at it that way, we could all contribute to preventing suicide in the veterinary profession. Although there is still a long way to go before mental health is an integrated part of occupational health among veterinarians, the NORVET study has hopefully contributed to a step on the way.

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# ORIGINAL PAPERS AND QUESTIONNAIRE

# I

BMJ Open

# Prevalence and individual and work-related factors associated with suicidal thoughts and behaviours among veterinarians in Norway: a cross-sectional, nationwide survey-based study (the NORVET study)

Helene Seljenes Dalum ,[1] Reidar Tyssen ,[1] Erlend Hem [1,2]

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[1]Department of Behavioural Medicine, Institute of Basic Medical Sciences, Faculty of Medicine, University of Oslo, Oslo, Norway
[2]Institute for Studies of the Medical Profession, Oslo, Norway

**Correspondence to**
Helene Seljenes Dalum;
h.s.dalum@medisin.uio.no

## ABSTRACT

**Objectives** Several studies have shown increased suicide rates among veterinarians. We investigated the self-reported prevalence of suicidal thoughts and behaviours and contributing and independent factors associated with suicidal thoughts and behaviours among veterinarians in Norway.

**Design** Cross-sectional, nationwide survey.

**Participants** 2596 veterinarians in Norway (response rate: 75%).

**Main outcome measure** Paykel's five-item questionnaire.

**Results** In total, 27% (n=682/2567) of veterinarians in Norway felt that life was not worth living during the last year, 5% (n=139/2562) had serious suicidal thoughts, and 0.2% (n=6/2537) had attempted suicide. Female veterinarians reported significantly higher prevalence of suicidal feelings and thoughts than males. For serious suicidal thoughts, women had nearly twice the prevalence as their male colleagues (6.2% (n=108/1754) vs 3.6% (n=28/766), $\chi^2$: 6.5, p=0.011). Independent factors associated with serious suicidal thoughts were being single (OR 1.76, 95% CI 1.13 to 2.72, p<0.05), negative life events (OR=1.43, 95% CI 1.22 to 1.68, p<0.001) and the presence of mental distress (OR 2.75, 95% CI 2.14 to 3.52, p<0.001). The veterinarians related their serious suicidal thoughts to work and personal problems, and a lesser degree to family, social and other problems. Nearly twice as many women (53%, n=57/108) as men (28%, n=7/25) reported work problems as the most important contributing factor to their serious suicidal thoughts ($\chi^2$: 4.99, p=0.03). 4% (n=6/139) reported work problems as the only factor of importance.

**Conclusions** Veterinarians in Norway have relatively high prevalence of suicidal feelings and thoughts, including serious suicidal thoughts. In multivariable analyses, the individual factors were more important than work-related ones, while work problems were the most reported contributing factor to serious suicidal thoughts by the veterinarians themselves. The role of gender and specific work-related factors should be further investigated to better understand the complexity of suicidal behaviour among veterinarians.

## Strengths and limitations of this study

- ► A major strength of our study is the high response rate (75%), incorporating all authorised veterinarians nationwide, in all main fields of work.
- ► An extensive questionnaire was used, making multivariable analysis feasible.
- ► This is a cross-sectional study, which limits any conclusions regarding causality.
- ► The study possibly has limited generalisability, due to differences in organisation of work life in other countries.

## INTRODUCTION

Several studies have shown increased suicide rates among veterinarians. A review from 2010 found elevated suicide rates in all but 1 of the 15 studies published at the time. The suicide rate among veterinarians in the UK was three times that of the general population.[1] Recent studies have also indicated increased suicide rates in the profession.[2–4] Furthermore, three recent studies found a higher prevalence of suicidal ideation among veterinarians than the general population.[5–7]

There is little knowledge about the contribution of individual and work-related factors to suicidal behaviour in veterinarians. In a systematic review from 2012, which included 52 papers, the authors highlighted the paucity of research that investigated the factors that contribute to suicide among veterinarians, and that many of the studies were of poor quality.[8] An interview study found that patient issues, responsibility and poor work/life balance contributed to suicidal ideation among veterinarians.[9] It has been suggested that suicidal ideation among veterinarians is linked to the demanding nature of

their work.[10] Dealing with bereaved clients (ie, animal owners) has been shown to impact the mental health of veterinarians,[11] and attachment loss and trauma can contribute to both depression and suicidality.[12] Preoccupation, self-doubt, conflicting responsibilities (care of animals/human clients/financial demands) and insufficient support were important factors of job stress among veterinarians in a qualitative study.[13] When searching for independent work-related factors associated with suicidal thoughts and behaviour, it is important to control for known individual factors. These include having no partner,[14 15] negative life events,[16] anxiety symptoms, depressive symptoms,[15 17] personality problems[18 19] and the problematic use of alcohol.[17]

The gender balance among veterinarians has changed significantly over the past decades, from 66% male veterinary students in Norway in 1980 to only 16% in 2020 (personal communication, Ann Kristin Egeli, Norwegian University of Life Sciences, 22 June 2021). As of June 2021, 69% of veterinarians holding authorisation in Norway were women (personal communication, Bente N. Reve, The Norwegian Food Safety Authority, 12 July 2021). The gender shift in the profession corresponds to that in several other countries.[20–22] Studies have shown that being female and of younger age increases the risk of serious psychological distress as a veterinarian.[7 8 11] The prevalence of psychological distress, such as anxiety symptoms and depressive symptoms, is also higher among female veterinarians compared with that among male veterinarians.[5 11 23]

Furthermore, there is substantial evidence that certain personality traits may increase the risk of suicide.[19 24] Reality weakness is a deviant personality trait including chronic illusions, paranoid traits, identity-insecurity and relational problems.[25] This trait has demonstrated predictive validity in Norwegian medical doctors regarding the aggravation of suicidal ideation.[18] It is a significant predictor of serious suicidal ideation in other occupational groups as well.[26 27]

Over the last decades, the veterinary profession has turned from agriculture and food-producing animal medicine to an increasing proportion working with companion animals. Two US studies have found a higher suicide rate among companion animal practitioners compared with other specialisations,[3 28] and it has been shown that veterinarians in this field more often reported suicidal thoughts than other veterinarians.[29] Thus, attention is required in the different fields of veterinary medicine.

Few studies have investigated the direct association and contribution of individual and work-related factors to suicidal thoughts and behaviour. Therefore, we investigated the following questions:

1. What is the prevalence of suicidal thoughts and behaviour among veterinarians in Norway, and are there any gender differences?
2. What do veterinarians in Norway regard as contributing factors to their serious suicidal thoughts?
3. What are the independent individual and work-related predictors for serious suicidal thoughts?

## METHODS

### Sample

The sample included all veterinarians in Norway, holding valid authorisation as of May 2020 (n=4256), according to information retrieved from the Norwegian Food Safety Authority. We excluded veterinarians for the following reasons: no residential address in Norway (n=527), current address unknown (n=196), those working abroad (n=62) and those who were deceased (n=7). This resulted in an eligible sample of 3464 veterinarians.

### Questionnaire

A 12-page questionnaire, an information sheet and a prepaid postage envelope were distributed by mail in November 2020. The information sheet included contact information of a psychiatrist in the research group and the colleague-support network of the Norwegian Veterinary Association. Two reminders were sent in January and February 2021, respectively. Five gift cards from a sports shop were placed in a drawing for respondents as incentives to increase the response rate. An external company managed both the data collection and prize awards. Respondents returned their questionnaires in a sealed envelope, and the identities of the respondents were unknown to the researchers throughout. The complete questionnaire in Norwegian can be found as online supplemental file 1—Full questionnaire NORVET.pdf.

### Instruments: dependent variable

Paykel's questionnaire about suicidal thoughts and attempts was the dependent variable in this study.[30] It is a five-item instrument developed to study suicidal feelings in the general population. The items represent increasing severity, from unspecific suicidal feelings to actual suicide attempt. Previous studies on several professions in Norway have validated this instrument.[14 15 26 27 31] The five items have the following wording: (1) 'Have you ever felt that life was not worth living?' (2) 'Have you ever wished you were dead—for instance, that you could go to sleep and not wake up?' (3) 'Have you ever thought of taking your life, even if you would not really do it?' (4) 'Have you ever reached the point where you seriously considered taking your life, or perhaps made plans how you would go about doing it?' and (5) 'Have you ever made an attempt to take your life?' Question four was slightly altered in the Norwegian translation, to: '… and even made plans…', reinforcing the seriousness in this statement.[15] The responses to each question were never, hardly ever, sometimes or often. Responses were dichotomised into never (0) and any frequency (1) according to Paykel's original work. The preceding year's suicidal thoughts and attempts were investigated in this study. For questions 4 and 5, an additional question was asked: 'To what extent do you think the following factors contributed to your consideration of taking your life', with the following factors: (1) Personal

problems, (2) Family problems, (3) Social problems, (4) Work problems and (5) Other problems. Each of the factors had five response categories from 'not at all' (1) to 'very much' (5). For the regression analyses, Paykel item number four was used (serious suicidal thoughts) as the outcome variable, dichotomised as specified above.

### Independent variables: individual factors

The personality trait reality weakness was measured using the nine-item reality weakness dimension of Torgersen's Basic Character Inventory (BCI).[32] Each item had a dichotomous ('agree'/'do not agree') response, with a total sum score from 0 to 9. BCI-Reality weakness is an original, deviant trait related to perceptions and ideations on the borderline between reality and fantasy; this dimension also measures chronic illusions, paranoid traits, and traits related to severe personality disorders.[25 33] Examples of items are: 'I feel lonely most of the time' and 'Sometimes I feel I am not myself'. This measure has previously been validated to predict emotional disturbance, such as serious suicidal thoughts, severe depression, and lack of help-seeking among physicians.[33]

The Norwegian Centre for Research Data claimed the use of age intervals to keep the data as unidentifiable as possible. Therefore, age was reported in the following intervals: 20–25, 26–30 (…) up to 66–70 and >70 years. In this study, marital status was dichotomised into married/cohabitant and single/divorced/separated/widow(er) (coded 0 and 1, respectively).

Life events during the last 12 months was measured by 17 items, previously used by among others, Tyssen *et al*[15 34] and adapted to veterinarians. The adaptations were mainly linguistic and included the removal of items specific to physicians. Examples of life events were 'serious disease or accident', 'death of a relative/close friend' and 'serious economic problems'. All items were coded as 0 or 1, and the variable comprised the sum score of all items. To test the effects on serious suicidal thoughts, we used the weighted total score of all items significantly associated with such thoughts.

Mental distress (anxiety symptoms and depressive symptoms) in the last 14 days was measured using SCL-5, a five-item version of the Symptom Check List-25.[35] This five-item version is based on a factor analysis by Tambs and Moum,[36] and contains questions about how much one is bothered by the following: (1) 'Feeling fearful', (2) 'Nervousness or shakiness inside', (3) 'Feeling hopeless about the future', (4) 'Feeling blue' and (5) 'Worrying too much about things'. Each item was measured on a scale from 1 to 5 from 'not at all' to 'very much'. The sum score is used to indicate the level of mental distress. This version has been validated in medical students and physicians in Norway.[37 38]

Alcohol to cope was measured by a single item originally used in national surveys in the USA.[39] The item is: 'When you feel worried, tense, or nervous, do you ever drink alcoholic beverages to help you handle things?' The alternatives were 'never', 'seldom', 'now and then' and 'often'. In the analyses, responses were dichotomized into 0 'Never' and 1 'Any frequency', as validated in previous Norwegian studies.[40–42] The reason for dichotomising the response was for cultural purposes and we wanted a clear distinction between drinking to cope with tension or not, as accounted for in detail elsewhere.[40]

### Independent variables: work-related factors

The main fields of work were reported as 'companion animal practice', 'production animal practice', 'mixed clinical practice', 'equine practice', 'aquaculture', 'public administration', 'academia/researcher', 'pensioners' and 'others'. Those who classified themselves as pensioners were excluded from the logistic regression analyses, because work-related factors were included in the model.

Job stress was measured by a modified version of Cooper's Job Stress Questionnaire,[43 44] with minor adaptations to veterinarians' work conditions. These adaptations were mainly linguistic, but some items specific to the veterinary profession were added (as 'cross pressure between economy/animal welfare/ethics'). The veterinarians were asked how much different situations/factors made them stressed, with the response alternatives being reported by a five-point Likert type rating scale ranging from no stress at all (1) to a source of extreme stress (5). A factor analysis (principal component with varimax rotation, including scree plot evaluation) identified three job stress factors: emotional demands, work/life balance and fear of complaints/criticism. The first factor, emotional demands (Cronbach's alpha=0.87), contained six items: (1) 'Daily contact with dying and critically ill animals', (2) 'Taking care of terminally ill animals and their owners', (3) 'Taking care of suffering animals', (4) 'Requests about animals from friends and family', (5) 'Requests about animals from relatives' and (6) 'Emotional involvement with patients'. The second factor, work/life balance (Cronbach's alpha=0.86), consisted of five items: (1) 'Work affects family life', (2) 'Managing a balance between work and personal life', (3) 'Work affects social life', (4) 'Time pressure' and (5) 'Interruptions and nagging at work'. The third factor, fear of complaints/criticism (Cronbach's alpha=0.88), consisted of three items: (1) 'Worries about complaints from animal owners/customers', (2) 'Animal owners/customers do not appreciate your work' and (3) 'Dealing with challenging animal owners/customers'.

### Statistical analysis

SPSS V.27 and StataSE V.16 were used for the statistical analyses. Table analyses and the $\chi^2$ test were used to test for gender differences. Controlled effects were reported as ORs, analysed through hierarchical logistic regression. The following variables were examined as possible predictors of serious suicidal thoughts: gender, age, civil status, negative life events, mental distress, reality weakness, use of alcohol to cope, main field of work and job stress. Initially, all independent variables were analysed bivariately with the dependent variable (crude ORs). In the adjusted model, all independent variables were entered

simultaneously in a logistic regression (adjusted ORs). In order to study possible mediating or confounding effects of mental distress and reality weakness, we performed an additional multivariable regression leaving out the variables mental distress and reality weakness. A p<0.05 was considered statistically significant for all analyses. To investigate gender-specific effects, we entered two-way interaction terms between gender and the other independent variables in separate analyses with the main effect included in the equations. Missing values were coded as 'system missing'.

### Patient and public involvement

The Norwegian Veterinary Association appointed a reference group for this project consisting of seven veterinarians from each of the professional subgroups: Small Animal, Equine, Production Animal and Aquaculture Veterinary Association, the Association of Veterinarians in Public Health Medicine, the Veterinary Students' Association and the Pensioners' Association. These veterinarians contributed with valuable input both to the design of the questionnaire, hypotheses and aims of this study.

## RESULTS

### Demographics

Of the 3464 eligible participants, we received 2596 responses, resulting in a response rate of 75%.

The most frequently reported age category was 41–45 years of age. The age varied between genders, with a higher proportion of younger women, and the majority of men were older than 50 years. In total, 69% were female and 31% male (table 1), which is an accurate reflection of the actual gender distribution of veterinarians in Norway.

### Prevalence of suicidal thoughts and behaviour during the last year

Twenty-seven per cent of the veterinarians reported that they felt that life was not worth living, and 20% had thought of suicide, even though they knew that they would not do it. Five per cent reported that they had serious suicidal thoughts, and six persons (0.2%) had attempted suicide (table 2). Female veterinarians reported significantly higher prevalence of suicidal feelings and thoughts than male colleagues did. This gender difference remained throughout all items; for serious suicidal thoughts; women had nearly twice the prevalence as their male colleagues (6.2% vs 3.6%, $\chi 2$: 6.5, p=0.011). Economic problems (OR=10.88, 95% CI 5.20 to 22.78, p<0.001) were the most significant negative life event for veterinarians. Descriptive statistics for the veterinarians with serious suicidal thoughts is included as online supplemental file 2—Descriptives for veterinarians with serious suicidal thoughts.

### Self-reported factors contributing to serious suicidal thoughts

Among the veterinarians reporting serious suicidal thoughts (n=139), work problems were the most

**Table 1** Description of study population

| | Range of values | Frequency (%) | Mean (SD) |
|---|---|---|---|
| Gender | | | |
| Female | | 1776 (69.6) | |
| Male | | 776 (30.4) | |
| Age | | | |
| 20–30 | | 274 (10.8) | |
| 31–40 | | 697 (27.4) | |
| 41–50 | | 667 (26.2) | |
| 51–60 | | 432 (16.9) | |
| 61–70 | | 318 (12.5) | |
| >70 | | 159 (6.2) | |
| Marital status | | | |
| Married/ cohabiting | | 1962 (78) | |
| Single/ divorced/ widow(er) | | 552 (22) | |
| Life events | 0–9 | | 0.54 (0.89) |
| SCL-5 | 1–5 | | 2.00 (0.98) |
| Reality weakness | 0–9 | | 1.38 (1.85) |
| Alcohol to cope | | | |
| Never | | 1769 (71) | |
| Any frequency | | 722 (29) | |
| Main field of work | | | |
| Companion animal practice | | 802 (31.8) | |
| Public administration | | 402 (15.9) | |
| Mixed clinical practice | | 268 (10.6) | |
| Academia/ research | | 202 (8.0) | |
| Production animal practice | | 177 (7.0) | |
| Aquaculture | | 121 (4.8) | |
| Equine practice | | 102 (4.0) | |
| Other | | 250 (9.9) | |
| Pensioner | | 198 (7.9) | |
| Job stress | | | |
| Emotional demands | 1–5 | | 1.98 (0.79) |
| Work/life balance | 1–5 | | 2.67 (0.97) |
| Fear of complaints | 1–5 | | 3.06 (1.17) |

Continued

**Table 1** Continued

| | Range of values | Frequency (%) | Mean (SD) |
|---|---|---|---|
| Connection to work–life | | | |
| Employed | | 1561 (63.0) | |
| Self-employed | | 573 (23.1) | |
| Other | | 217 (8.8) | |
| Two or more connections to work life | | 127 (5.1) | |
| Position type | | | |
| Permanent position | | 2023 (88.1) | |
| Temporary position | | 70 (3) | |
| Temporary educational position | | 50 (2.2) | |
| Other | | 153 (6.7) | |
| Working full time | | 1922 (81.1) | |
| Frequency of working overtime (weekly or biweekly) | | 1550 (67.9) | |

SCL-5, Symptom Check List-5.

frequently reported contributing factor (48%), followed by personal problems (37%) (table 3). The only significant gender difference was regarding work problems, with nearly twice as many women (53%) as men (28%) reporting work problems as the most important contributing factor to their serious suicidal thoughts (χ2: 4.99, p=0.03, Fisher's exact) and 4.3% reported work problems as the only factor of importance.

### Predictors of serious suicidal thoughts

Being single, negative life events, mental distress, reality weakness, use of alcohol to cope and the three job stress factors were significant unadjusted (crude) predictors (table 4). In the adjusted model, the significant predictors were being single, negative life events and mental distress. There was no gender effect. No significant effect was found within the different fields of work or any of the three job stress factors in the adjusted model (table 4).

Post hoc, and in order to investigate any confounding or mediating effect of mental distress and reality weakness on the job stress-variables, we conducted an additional multivariable analysis. When processing the individual and work-related factors without the two variables of reality weakness and mental distress, the significant predictors were: being single, negative life events, use of alcohol to cope with tension and all three job stress factors. The results from the additional analysis can be found in online supplemental file 3—Additional analysis predictor model.

We found significant interactions between gender and negative life events (OR 0.65, 95% CI 0.46 to 0.92, p=0.015), with clearly steeper gradients for females. There was also an interaction between gender and work/life balance (OR 1.11, 95% CI 1.01 to 1.22, p=0.026), and the increase in suicidal thoughts with higher work/life imbalance was stronger among males than among females. A figure illustrating the interaction analysis can be found as online supplemental files 4-1, 4-2.

## DISCUSSION

A main finding of this study was that 27% of the veterinarians in Norway felt that life was not worth living during the last year, 5% had serious suicidal thoughts, and 0.2% had attempted suicide. Female veterinarians reported significantly more suicidal feelings and thoughts than their male colleagues. The veterinarians considered their serious suicidal thoughts mainly as related to work and personal problems, and to a lesser degree, family, social and other problems. Independent factors associated with serious suicidal thoughts were: being single, negative life events and mental distress.

Furthermore, veterinarians reported both suicidal feelings and serious suicidal thoughts more frequently (26.6% and 5.4%, respectively) than physicians (16.6% and 2.6%, respectively),[14] and police (8.9% and 1.7%, respectively)[26] in Norway. Furthermore, veterinarians, especially females, regarded work problems as the most

**Table 2** Prevalence of suicidal feelings and thoughts among veterinarians in Norway according to gender

| | All | Men | Women | Total N for each item | $\chi^2$ and p- value |
|---|---|---|---|---|---|
| 1. Felt life was not worth living | 682 (26.6%) | 148 (19.3%) | 522 (29.7%) | 2567 | 29.4, <0.001 |
| 2. Wished you were dead | 498 (19.4%) | 96 (12.5%) | 394 (22.5%) | 2565 | 33.6, <0.001 |
| 3. Thoughts of taking life | 503 (19.6%) | 102 (13.3%) | 391 (22.3%) | 2565 | 26.9, <0.001 |
| 4. Seriously considered taking your life | 139 (5.4%) | 28 (3.6%) | 108 (6.2%) | 2562 | 6.5, 0.011 |
| 5. Made a suicide attempt | 6 (0.2%) | 1 (0.1%) | 5 (0.3%) | 2537 | NA |

Not all veterinarians reported gender (n=2554). This leads to a difference in total sum for men+women compared with 'all.'
NA, not available.

Table 3 Self-reported contributing factors to serious suicidal thoughts among veterinarians in Norway

| | Not at all+a little+somewhat | | | Quite a bit+very much | | | |
|---|---|---|---|---|---|---|---|
| | N (%) | | | N (%) | | | |
| | Total | Men | Women | Total | Men | Women | Total, n |
| Personal problems | 84 (63.2%) | 17 (65.4%) | 67 (63.8%) | 49 (36.8%) | 9 (34.6%) | 38 (36.2%) | 133 |
| Family problems | 91 (68.4%) | 19 (79.2%) | 72 (67.9%) | 42 (31.6%) | 5 (20.8%) | 34 (32.1%) | 133 |
| Social problems | 108 (81.2%) | 21 (84.0%) | 86 (81.1%) | 25 (18.8%) | 4 (16.0%) | 20 (18.9%) | 133 |
| Work problems | 70 (51.9%) | 18 (72.0%) | 51 (47.2%) | 65 (48.1%) | 7 (28.0%) | 57 (52.8%) | 135 |
| Other problems | 90 (72.6%) | 20 (83.3%) | 70 (71.4%) | 34 (27.4%) | 4 (16.7%) | 28 (28.6%) | 124 |

Item four of Paykel's questionnaire was answered by n=2562 veterinarians (men=766, women=1754). The question was answered positively by n=139 (see table 1).

important contributing factor to their suicidal thoughts. A previous study found that physicians most frequently regarded personal and family problems as the most important factors for serious suicidal thoughts,[14] which may suggest that self-reported work factors play a more important role in suicidal thoughts in veterinarians than in physicians. Regarding suicide attempts, veterinarians had a prevalence (0.2%) comparable to those of physicians and police (0.3% and 0.1%, respectively).[14 26]

The relatively high prevalence of suicidal feelings and thoughts concurs with findings among veterinarians in other countries. Two studies used 'National Survey of Psychiatric Morbidity',[5 45] an item originally sourced from Paykel's instrument.[30] These items use the same

Table 4 Predictors of serious suicidal thoughts among veterinarians in Norway

| | Crude | | Adjusted* | |
|---|---|---|---|---|
| | OR | 95% CI | OR | 95% CI |
| Female | 1.55 | 0.999 to 2.401 | 0.88 | 0.49 to 1.57 |
| Age | 0.93 | 0.86 to 1.00 | 1.11 | 0.996 to 1.235 |
| Single | 2.38*** | 1.65 to 3.43 | 1.76** | 1.13 to 2.72 |
| Negative life events | 1.78*** | 1.55 to 2.04 | 1.43*** | 1.22 to 1.68 |
| SCL-5 | 3.08*** | 2.61 to 3.64 | 2.75*** | 2.14 to 3.52 |
| Reality weakness[2] | 1.47*** | 1.37 to 1.59 | 1.10 | 0.99 to 1.22 |
| Alcohol to cope | 2.14*** | 1.51 to 3.04 | 1.09 | 0.72 to 1.67 |
| Main field of work (ref. category=mixed clinical practice) | | | | |
| Companion animals | 1.38 | 0.74 to 2.57 | 1.01 | 0.50 to 2.06 |
| Production animals | 1.28 | 0.56 to 2.94 | 1.97 | 0.77 to 5.05 |
| Equine practice | 1.21 | 0.45 to 3.28 | 1.02 | 0.32 to 3.26 |
| Aquaculture | 1.01 | 0.37 to 2.73 | 1.07 | 0.32 to 3.61 |
| Public administration | 1.08 | 0.53 to 2.20 | 1.15 | 0.49 to 2.71 |
| Academia/research | 1.12 | 0.49 to 2.56 | 1.07 | 0.39 to 2.99 |
| Other | 0.82 | 0.35 to 1.91 | 0.70 | 0.24 to 2.02 |
| Job stress | | | | |
| Emotional demands | 1.12*** | 1.08 to 1.16 | 1.02 | 0.97 to 1.07 |
| Work/life balance | 1.13*** | 1.09 to 1.17 | 1.00 | 0.95 to 1.05 |
| Fear of complaints | 1.18*** | 1.11 to 1.25 | 1.01 | 0.93 to 1.09 |

**P<0.05.
[1]The variable life events was entered into the model as a weighted variable ('Negative life events'), comprising the sum score of life events that was significant in a univariate model with the dependent variable.
[2]There was a high correlation between SCL-5 and reality weakness (Pearson's R=0.6).
*In the adjusted model, all listed variables were simultaneously entered in the model, that is, gender, age, civil status, negative life events, SCL-5, reality weakness, use of alcohol to cope, main field of work and the three job stress factors.
SCL-5, Symptom Check List-5.

wording for items one and three, which makes comparison possible. The prevalence of suicidal feelings in the past year among veterinarians in Norway was slightly higher (26.6%) than among those in the UK (23.0%)[45] and Canada (17.9%),[5] whereas suicidal thoughts in the past year were at the same level (19.6%, 21.3%, and 19.4%, respectively). However, veterinarians in Canada reported higher prevalence (17.0%) of serious suicidal thoughts than in Norway (5.4%), which is probably due to the reporting period for serious suicidal thoughts in the Canadian survey being 'since the start of veterinary education', while in this study, the reporting period was the preceding year.

Moreover, like female physicians,[14] female veterinarians had higher levels of suicidal feelings and thoughts than their male colleagues. Gender differences were also present in the self-reported contributing factors, as female veterinarians reported work problems more frequently than men. According to our own results and those of others',[14] work problems are more often considered a contributing factor to suicidal thoughts by veterinarians than by physicians. The perceived impact of work factors on serious suicidal thoughts may be partly influenced by the fact that veterinarians in Norway have less undergraduate training in communication, psychology and coping skills, and experience more professional isolation. Additionally, animal healthcare poses a cost issue (in Norway, human healthcare costs are funded by tax revenues), resulting in cross pressure for veterinarians at the intersection of animal welfare, costs and ethics. Conflicting responsibilities in the veterinary profession may be an overarching theme contributing to significant stress among veterinarians.[13]

Today, approximately 70% of veterinarians in Norway are female, and this proportion is expected to increase. There was no significant effect of gender in the adjusted model. This may be because age was highly correlated with the female gender. Being single and experiencing negative life events predicted serious suicidal thoughts in this study (76% and 43% higher odds, respectively). These findings are consistent with studies on physicians and others.[14 15 18] In contrast to physicians, where family and relationship issues were the most significant negative life events,[14] economic problems were the most significant negative life event for veterinarians. This also supports the hypothesis that there are other factors associated with suicidal thoughts among veterinarians than with physicians and that economic concerns are more important with veterinarians. In an Australian qualitative study, veterinarians were asked what they would do if they could change something in the profession, and the most common response was to remove money from the decision-making process.[13] Contrary to the findings in a recent review,[16] experiencing negative life events had a greater impact on serious suicidal thoughts among women than among men. Furthermore, work/life balance had a greater impact on serious suicidal thoughts among men than among women. These findings warrant further research.

Bivariately, drinking to cope was a significant predictor for serious suicidal thoughts, but not in the multivariable model. Previous research indicates that alcohol use is a risk factor for suicidal behaviour.[17] Research on veterinarians and alcohol use is scarce.[8 46] In a study examining drug-caused deaths in Australia, veterinarians were the group with the highest prevalence of alcohol detected in postmortem examinations.[47] Another study found that veterinarians who turned to alcohol to cope with their work-related stress were more likely to have suicidal thoughts.[10] In a recent study examining different occupational groups in the US Army, there was no significant difference in problem drinking in veterinarians, physicians and dentists.[48] The impact of alcohol regarding to mental health among veterinarians warrants further research.

There was no significant effect on serious suicidal thoughts regarding the main field of work, neither in the bivariate nor in the adjusted model. Subsequently, all job stress factors were significantly associated with serious suicidal thoughts bivariately, but not in the adjusted model. However, in the additional analyses, the use of alcohol to cope with tension and all three job stress factors remained significant without reality weakness and mental distress included in the model. The findings of emotional demands, work/life balance and fear of complaints/criticism as important job stress factors concur with previous research.[8 10 49] Although previous studies have suggested that work-related stress influences suicide risk in veterinarians,[50] longitudinal research design may further elaborate on the role of mediating and confounding effects.

Contrary to previous research,[18 26 27] the personality trait reality weakness, was not significant in the adjusted model. This may be explained by the high correlation between mental distress and reality weakness. The impact of mental distress on suicidal thoughts was high, with a nearly three times increase in odds for each step on the 1–5 scale. The direction of causality obtaining between job stress and mental health in this study cannot be unequivocally assessed. On the assumption that job stress actually is an effect of mental distress and reality weakness, our results would indicate that the effect of job stress factors probably was confounded by mental distress and reality weakness. However, if job stress is defined as the underlying causal factor, as posited above, our results would indicate that mental distress and reality weakness mediate the effect of job stress. Previous studies have found that psychosocial factors in the workplace may play a role for mental health,[51] and that individual factors such as stress are related to the way people perceive their jobs.[52] The importance of mental distress with respect to suicidal ideation is consistent with other research, both among medical doctors and others.[15 17] A previous study among junior physicians during internship found that the effect of work stress on suicidal thoughts and behaviour was absorbed by mental distress, in keeping with our finding.[15] First, our study emphasises the importance of using multivariable models when studying single factors

and self-report measures, in order to identify independent and more objective effects. Second, it is in keeping with previous research, that emphasises the complexity in predicting suicidal thoughts and behaviour, there may be both direct and indirect effects of several individual and contextual predictors.[53 54] Third, there may be specific work-related factors of importance for veterinarians with serious suicidal thoughts that we have not captured by our variables in the regression model. Altogether, this explains the apparent discrepancy in our study with regard to the role of work-related factors in serious suicidal thoughts.

To our knowledge, this is the only nationwide study of suicidal behaviour in veterinarians, incorporating all authorised veterinarians, in all main fields of work. A major strength was the high response rate (75%), making multivariable analyses feasible, and reducing the effect of selection and response biases. Additionally, the questionnaire was quite extensive, allowing the use of a comprehensive predictor model and controlling for several variables. An important limitation is the cross-sectional design, which restricts conclusions about causality. Another limitation is the disparity in referred time span measured by serious suicidal ideation (last 12 months) and mental distress (past 2 weeks), this can lead to more recall bias with respect to suicidal ideation, and a relative overestimation of mental distress. The generalisability of the results may also be limited due to differences in the organisation of work life, including workload in other countries. Nevertheless, we believe the findings are representative of veterinarians in Northern Europe. The study was conducted during the COVID-19-pandemic, which may have affected the results. The survey was planned before the pandemic, and any potential effects of COVID-19 (eg, redundancy and economic effects in the practices) were not accounted for.

## CONCLUSION

In summary, the level of suicidal behaviour among veterinarians in Norway is relatively high, and both individual and work-related factors contribute to serious suicidal thoughts. In the multivariable analyses, the individual factors, and particularly mental distress, played a more important role than the work-related factors, while veterinarians themselves regarded work problems as the most contributing factor to their suicidal thoughts. The roles of gender and specific work-related factors should be further investigated to better understand the complexity of suicidal behaviour among veterinarians.

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**ORCID iDs**
Helene Seljenes Dalum http://orcid.org/0000-0003-0362-7696
Reidar Tyssen http://orcid.org/0000-0003-0223-9456
Erlend Hem http://orcid.org/0000-0002-1845-1147

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II

**TITLE:** Euthanasia of animals - Impact on veterinarians' suicidal thoughts and views on assisted dying in humans: A nationwide study (the NORVET study)


**AUTHORS' NAMES AND AFFILIATIONS**

Helene Seljenes Dalum[1], Reidar Tyssen[1], Torbjørn Moum[1], Magne Thoresen[2], Erlend Hem[1,3]

[1] Department of Behavioural Medicine, Institute of Basic Medical Sciences, Faculty of Medicine, University of Oslo, Norway

[2] Department of Biostatistics, Institute of Basic Medical Sciences, Faculty of Medicine, University of Oslo, Oslo, Norway

[3] Institute for Studies of the Medical Profession, Oslo, Norway

**CORRESPONDING AUTHOR**

Helene Seljenes Dalum

Department of Behavioural Medicine, Institute of Basic Medical Sciences

Faculty of Medicine, University of Oslo

P.O. Box 1111 Blindern, NO-0317 Oslo, Norway

E-mail: h.s.dalum@medisin.uio.no

**ORCID of the authors:**

Helene Seljenes Dalum: 0000-0003-0362-7696

Reidar Tyssen: 0000-0003-0223-9456

Torbjørn Moum: 0000-0003-1791-1057

Magne Thoresen: 0000-0003-1511-5938

Erlend Hem: 0000-0002-1845-1147



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**Abstract**

**Purpose**

Veterinarians are an occupational group with an increased suicide risk. Euthanasing animals may influence both veterinarians' views on assisted dying in humans and their suicide risk. We investigated (I) attitudes towards assisted dying, (II) whether the field of work and the frequency of euthanasing animals were associated with positive attitudes towards human euthanasia, and (III) whether frequently euthanasing animals was associated with serious suicidal thoughts.

**Methods**

We conducted a nationwide cross-sectional study on veterinarians (response rate: 75 %). Logistic regression models were used to calculate the odds ratios for both positive attitudes towards human euthanasia and serious suicidal thoughts. The analyses were adjusted for socio-demographic and work-related factors.

**Results**

Fifty-five percent of the veterinarians agreed that euthanasia should be permitted for humans with a fatal disease and short life expectancy. Working with companion animals was independently associated with positive attitudes towards human euthanasia (OR=1.66 (95 %CI: 1.23-2.23)), while veterinarians' frequency of euthanasing animals was not. Frequency of euthanasing animals was independently associated with serious suicidal thoughts, OR=2.51 (95 %CI: 1.34-4.71).

**Conclusion**

Veterinarians' attitudes toward assisted dying in humans did not differ from those of the general population. Veterinarians' frequency of euthanasing animals was not associated with positive attitudes towards euthanasia in humans. However, veterinarians working in companion animal practices were more likely to have positive attitudes towards euthanasia in humans. Moreover, euthanising animals five times or more a week was associated with serious suicidal thoughts. We need more research to infer about causality in these findings.

Keywords: Veterinarians, suicidal thoughts, euthanasia, assisted dying

**Introduction**

Several studies have found that veterinarians have higher suicide rates than the general population [1-3]. The reasons for elevated suicide risk among veterinarians remain unclear, and more studies exploring psychological and work-related risk factors are needed. Euthanasing animals is a task unique to veterinarians. It has been hypothesised that euthanasing animals may influence veterinarians' view of assisted dying in humans [4] (see Figure 1) and veterinarians' suicide risk [4, 5]. Studies on both of these possible influences are scarce.

*Insert Figure 1 approximately here.*

It has been hypothesised that knowledge of assisted dying through work experience is associated with restrictive attitudes [6, 7], and physicians have been found to have a more restrictive view on assisted dying than the general population in several studies [8-10]. One study on veterinarians found that they have a more liberal view of assisted dying than physicians, thus questioning the hypothesis that knowledge of assisted dying is unambiguously associated with restrictive attitudes [7]. Moreover, palliative care and animal hospices are emerging in veterinary medicine [11]. This may also influence veterinarians' views on assisted dying in humans. To date, little is known about the factors associated with the apparently more liberal attitudes among veterinarians to assisted dying in humans.

To our knowledge, only one study has investigated the possible association between euthanasing animals and being in favour of human euthanasia [12]. No such association was observed. However, the cited study included only veterinary students and recent graduates (32 % response rate).

Veterinarians may experience several challenges with euthanasing animals, in both decision-making and ethical considerations, and this could be a source of moral stress [13]. These challenges may be partly due to major developments in veterinary medicine and the fact that companion animals are often considered family members. Most studies investigating the impact of euthanasing animals have been conducted on companion animal veterinarians. Thus, the impact of euthanising other animal species such as food-producing animals is not well known.

Job stress and field of work were not independently associated with serious suicidal thoughts among veterinarians in a previous study. Nevertheless, veterinarians reported work factors as contributing to their suicidal thoughts [14]. One study among veterinarians found a positive correlation between attitudes towards human euthanasia and an accepting attitude towards human suicide [12]. Moreover, an association between animal euthanasia and a lack of fear of death among veterinary students has been demonstrated [15]. Among graduate veterinarians, lower distress towards euthanasing animals was associated with a greater lack of fear of death, in line with findings among veterinary students [16]. Conversely, frequently euthanising animals was shown to attenuate the impact of depression on suicide risk, suggesting that euthanasia may be a protective factor against suicide [17]. Self-poisoning is a common method of suicide among veterinarians [1, 2, 5, 18-20]. Barbiturates (the drug used for euthanasing animals) have been shown to be the most commonly used drug for

self-poisoning [2, 21]. Therefore, we need to further explore the role of euthanasing animals in relation to veterinarians' suicidal thoughts.

As mentioned, veterinarians are a high-risk occupational group for suicide. Their experience and knowledge about animal euthanasia, both in terms of decision-making and procedural knowledge, makes veterinarians an occupational group of high interest in suicide research. Work experience with euthanasing animals may alter veterinarians' attitudes towards death, leading them to view death as a way to alleviate suffering [22]. Further, it could lead them to view death as a way to alleviate their own suffering when they struggle with suicidal thoughts [4].

To our knowledge, this is the first nationwide study with a large representative sample of veterinarians investigating whether the main field of work and frequency of euthanasing animals is associated with positive attitudes towards human euthanasia, and whether the frequency of euthanasing animals is associated with serious suicidal thoughts among veterinarians.

The research questions were as follows:

1) What are veterinarians' attitudes to physician-assisted suicide and euthanasia in humans?
2) Is the main field of work and veterinarians' frequency of euthanasing animals associated with positive attitudes towards euthanasia in humans?
3) Is veterinarians' frequency of euthanasing animals associated with serious suicidal thoughts?

## Methods

The sample included all the veterinarians in Norway, holding valid authorisation in May 2020 (n = 4256). We excluded some of the veterinarians based on the following criteria: no residential address in Norway (n = 527), unknown current address (n = 196), working abroad (n = 62), and those deceased (n = 7), resulting in an eligible sample of 3464 participants.

A 12-page questionnaire, together with an information sheet, and a reply paid envelope were distributed by mail to 3464 veterinarians in November 2020, with two reminders being sent in January and February. Five sports shop-gift cards were placed in a random draw to increase the response rate. The researchers did not know the identities of the participants.

This study was approved by the Regional Committee for Medical and Health Research Ethics South-East C (132704) and the Norwegian Centre for Research Data (674793).

### Instruments

#### Dependent variable – Research question 1 and 2

Attitudes towards assisted dying were investigated using four statements previously used on physicians in Norway [10], namely; 1) 'Physician-assisted suicide should be permitted for persons suffering from a fatal

disease with a short remaining life expectancy'; 2) 'Euthanasia should be permitted for persons suffering from a fatal disease with a short remaining life expectancy'; 3) 'Assisted dying should be permitted also for persons suffering from an incurable chronic disease, but who are not dying'; and 4) 'There are cases in which it may be right/morally defensible for the doctor to provide assisted dying, even though it is illegal'. The veterinarians were asked to state their agreement, on a Likert scale from 1-5 ranging from 'strongly agree' to 'strongly disagree'. For research question 1, we investigated the level of agreement with each statement.

We assumed that veterinarians would be the most familiar with the second statement as it relates to euthanasing animals. Thus, we chose this statement as the dependent variable for research question two. The variable was dichotomised so that 'agreed' included both 'strongly agree' and 'partially agree', and 'disagree' encompasses the remaining alternative responses, in line with a previous study [10].

**Dependent variable – Research question 3**

Serious suicidal thoughts were measured using a modified version of the fourth question of Paykel's questionnaire on suicidal thoughts and attempts [23, 24]: 'Have you ever during the last year reached the point where you seriously considered taking your life, and even made plans how you would go about doing it?' The responses were 'never', 'hardly ever', 'sometimes', and 'often'. Responses were dichotomised into 'never' and 'any frequency', in line with Paykel's original work. Serious suicidal thoughts were used as the dependent variable for research question three.

**Exposure variables**

The participants reported the following as their main fields of work: 'companion animal practice', 'production animal practice', 'mixed clinical practice', 'equine practice', 'aquaculture', 'public administration', 'academia/research', 'pensioners', and 'others' [14]. Since work-related factors were included in the model, pensioners were excluded from the regression analyses. Field of work was used as an exposure variable for research question 2.

Frequency of euthanasing animals was measured using a single item: 'If you work in clinical practice, how many euthanasia procedures do you perform on average in a normal week?' Responses were categorised as follows; 0–4, 5–9, 10–14, and 15 or more. Due to low numbers in the latter three categories, the variable was dichotomised into 0–4/week and 5 or more/week. A large proportion (70-90 %) of veterinarians working in aquaculture, public administration, academia/research, and other fields did not respond to this question. Most veterinarians in these fields do not routinely perform euthanasia. Therefore, this lack of response was recoded to category '0-4', as this seemed to be the most likely reason for the high proportion of missing answers. Veterinarians' frequency of euthanasing animals was used as an exposure variable in research questions 2 and 3.

**Confounders**

The use of age intervals was encouraged by The Norwegian Centre for Research Data to keep collected data as unidentifiable as possible. Age was therefore reported in the following intervals: 20–25, 26–30 (…) up to 66–70, and >70 years old. These age categories were entered as continuous variables in the regression models. Marital status was dichotomised into married/cohabitant and single/divorced/separated/widow(er). Gender, age, and civil status were included as possible confounders in research questions 2 and 3.
In addition to gender, age, and marital status, the self-reported average number of working hours per week was used as a measure of workload in research question 3.

Attitudes towards euthanasia in humans could be a possible confounder for serious suicidal thoughts, as well as for euthanasia of animals. A previous study on veterinarians found a significant positive correlation between attitudes towards human euthanasia and suicide [12]. Although scarcely studied, veterinarians' positive attitudes towards euthanasia in humans may also influence attitudes towards animal euthanasia, possibly leading to a higher frequency of euthanasia of animals compared to the frequency among those with a negative attitude to human euthanasia. Therefore, attitudes towards euthanasia in humans were included as a possible confounder in research question 3.

Colleague support could be a confounder in the possible association between suicidal thoughts [25] and veterinarians' frequency of euthanasing animals (lack of colleague support may lead to more euthanasia, as there is no one to consult). Colleague support was measured using the mean of two questions: 'To what degree do you enjoy working with your colleagues?' and 'To what degree are you taken care of by your colleagues?'. Responses were given on a scale from 1 (not at all) to 7 (to a very high degree), as in previous studies [26, 27]. Cronbach's α in our sample was 0.84. The mean scores of the two questions were used in the regression analyses for research question 3.

**Demographics**

We received 2596 responses from 3464 participants (response rate: 75 %). The most frequently reported age category was 41 – 45 years. Age varied between genders, with a higher proportion of younger women on the women's side, and 65 % of the men being older than 50 years old. In total, 70 % of the participants were female and 30 % were male. A total of 139 (5 %) veterinarians reported serious suicidal thoughts, a finding described in a past study [14].

**Statistical analyses**

StataSE 17 was used for statistical analyses. The $\chi^2$ test was used to test for difference by gender. Bivariate and multivariable logistic regression models were used to estimate the odds ratios (OR) for the associations between exposure and dependent variables. Initially, all variables were analysed bivariately with the dependent variable (crude OR).

Goodness-of-fit was satisfactory in all of the logistic regression models. The level of significance was set at 5 % ($p<0.05$). Two-way interaction terms between gender and the independent variables was made to investigate

gender-specific effects, with the main effect included in the model. Interaction terms were entered individually. A missing-data analysis was performed. With the exception of the high prevalence of missing data on the item on frequency of euthanasing animals (see above), no other missing data trends were found.

**Results**

Table 1 provides a description of the sample.

*Insert Table 1 approximately here.*

Of the veterinarians in this study, 63 % of the veterinarians strongly agreed or partially agreed to the statement: 'Physician-assisted suicide should be permitted for persons suffering from a fatal disease with a short remaining life expectancy'. A total 55 % strongly or partially agreed that 'Euthanasia should be permitted for persons suffering from a fatal disease with a short remaining life expectancy' and 51 % strongly or partially agreed to the statement 'There are cases in which it may be right/morally defensible for the doctor to provide assisted dying, even though it is illegal'. The statement, 'Assisted dying should be permitted also for persons suffering from an incurable chronic disease, but who are not dying' had the lowest consensus (43 %) (Table 2).

*Insert Table 2 approximately here.*

Agreements in all four questions was significantly higher among females than among males (Additional Table 1 – Veterinarians' agreement on assisted dying by gender.docx).

Working in companion animal practice was independently associated with an increased likelihood of positive attitudes towards euthanasia in humans in the multivariable model (Table 3), with companion animal practitioners having 1.66 higher odds of holding positive attitudes toward euthanasia in humans compared to veterinarians working in mixed clinical practice. Veterinarians' frequency of euthanasing animals was not independently associated with positive attitudes towards euthanasia in humans. Being younger and being single were also significantly associated with positive attitudes towards euthanasia in humans. We found a significant interaction between gender and civil status (OR=1.94, 95 %CI 1.18 – 3.23), indicating that single women have more positive attitudes towards euthanasia in humans than women with a partner.

*Insert Table 3 approximately here.*

Performing euthanasia more than five times per week was independently associated with a higher likelihood of serious suicidal thoughts in the multivariable model (Table 4). Veterinarians performing euthanasia five or more times per week had 2.51 higher odds of having serious suicidal thoughts than those performing euthanasia four or less times per week. Being single, having a positive attitude towards human euthanasia, and low perceived colleague support were also significantly associated with a higher likelihood of serious suicidal thoughts. No interaction with gender was found.

*Insert Table 4 approximately here.*

**Discussion**

A major finding of this study is that veterinarians' views on assisted dying in humans do not differ from those of the general population. Working in companion animal practices was independently associated with positive attitudes towards euthanasia in humans, while veterinarians' frequency of euthanasing animals was not. Performing euthanasia more than five times per week was independently associated with serious suicidal thoughts compared to those performing euthanasia four or fewer times per week.

Knowledge regarding euthanasia acquired by veterinarians through their work does not seem to lead to a restrictive view of assisted dying in humans. In our study, veterinarians had attitudes towards assisted dying comparable to those of the general population [28], and more liberal attitudes than physicians [10]. This trend is in line with a similar study from Sweden that included veterinarians, physicians, and the general population [7]. This may reflect a general trend in society, as acceptance of assisted dying in humans has increased in most Western European countries [29].

Working with companion animals was independently associated with positive attitudes towards human euthanasia. This finding may be partly explained by the nature of working with companion animals, which are often considered family members. Veterinarians are experienced with shared decision-making with the animal owner regarding 'the right time' to euthanise, and have extensive knowledge of the euthanasia procedure. It may also be a reflection of veterinarians in companion animal practice viewing euthanasia as an 'act of compassion', in which the goal is facilitating a 'good death' [30]. However, veterinarians' frequency of euthanasing animals was not independently associated with positive attitudes towards human euthanasia. This may suggest that it is not the euthanasia case-load which affects veterinarians' attitudes, but rather their knowledge and experience of the euthanasia process.

Being younger and being single were also significantly associated with positive attitudes towards euthanasia in humans. This is in line with a recent systematic review that found that being younger and being divorced or being a widow(er) predicted higher endorsement of assisted dying [31].

Performing euthanasia five times or more per week was independently associated with serious suicidal thoughts. A systematic review including 12 papers reported that performing euthanasia may generate traumatic stress and decrease the well-being of animal care workers [32]. Furthermore, several studies have shown that euthanasia is a source of moral and job stress [33-35], while another study did not find a significant relationship between euthanasia and psychological distress or compassion fatigue [36]. Veterinarians have emphasised the lack of sufficient training in euthanasia-related decision-making and euthanasia consultations [30, 34, 36], as they are also responsible for managing animal owners' grief, guilt and loss during euthanasia consultations [37]. Our findings suggest that euthanasing animals may be an occupational stressor. This should be further investigated, especially with respect to it potentially contributing to suicide risk. Moreover, positive attitudes towards euthanasia in humans was independently associated with serious suicidal thoughts among veterinarians. Although different measures were used, our findings may support a previous study that found a significant positive correlation between attitudes towards human euthanasia and suicide among veterinarians [12].

Being single was associated with serious suicidal thoughts among veterinarians, consistent with previous findings [24, 38]. Perceived support from colleagues was associated with a reduced likelihood of having serious suicidal thoughts. Traditionally, veterinary work has been an occupation with more professional isolation than other medical professions, especially so in rural areas. In fact, professional isolation and a lack of social support have been emphasised as risk factors for suicide among veterinarians [21]. Interventions to strengthen collegiality and facilitate colleague support networks could be an important aim for preventive mental health measures for veterinarians at the organisational level.

"Normalising" suicide as a medical option, the slippery slope argument in the euthanasia debate, may facilitate a view of euthanasia being a "cure" for suicidal depression [39]. Among veterinarians, a register-based study found that when excluding decedents with pentobarbital poisoning, the standardised mortality rate for suicide was not significantly different from that of the general population [2]. Restriction to means has previously been highlighted as an important strategy for suicide prevention [40], and the secure storage of euthanasia solutions has been proposed as a method for addressing veterinarian suicide [41]. With euthanasing animals being a common occupational task for veterinarians, and with experience in decision-making regarding 'the right time' to euthanise, veterinarians may be rendered with suicidal thoughts especially vulnerable to suicide by self-poisoning. Indeed, a recent study found that among veterinarians with suicidal ideation in the past week, easy access to lethal medication in their workplace was associated with a six-fold increase in the perceived likelihood of a future suicide attempt, compared to those locking away lethal medication during business hours [42]. Our findings coincide with a recent study that suggests that performing euthanasia affects veterinarians' attitudes towards suffering, or towards alleviating suffering through death [22]. As self-poisoning is the most commonly used method for suicide, addressing this as an occupational hazard for suicide among veterinarians seems appropriate.

To our knowledge, this is the only nationwide study investigating attitudes towards assisted dying in humans and the impact of euthanasing animals on veterinarians' serious suicidal thoughts among veterinarians. A major strength was the study's high response rate (75 %), which made multivariable analyses feasible, while reducing the possible effects of selection and response biases. The questionnaire was extensive, allowing the use of a comprehensive multivariable model. An important limitation is the study adopted a cross-sectional design, which

restricts conclusions regarding causality. Additionally, this being a self-report study introduces the possibility of recall bias. The generalisability of our results may also be limited. Nevertheless, we believe that our findings are representative of veterinarians in Northern Europe. The study was conducted during the coronavirus-pandemic, which may have affected the results. We did not control for religious views in our study, which could be a possible confounder with regard to attitudes towards assisted dying and serious suicidal thoughts. When measuring veterinarians' frequency of euthanasing animals, '0' should have been a separate category, instead of it being grouped with 0-4 per week. There is a possibility that there is a confounding variable affecting both serious suicidal thoughts and veterinarians' frequency of euthanasing animals that we have not accounted for in our study. Therefore, a possible association between euthanasing animals and serious suicidal thoughts should be validated in other representative veterinarian samples in future.

## Conclusion

Veterinarians' attitudes towards assisted dying in humans did not differ from those of the general population. Veterinarians' frequency of euthanasing animals was not associated with positive attitudes towards euthanasia in humans. However, veterinarians working with companion animals were more likely to have positive attitudes towards euthanasia in humans. Moreover, euthanising animals five times a week or more was associated with serious suicidal thoughts. Therefore, veterinarians with suicidal thoughts may benefit from not working on euthanasia. Qualitative studies could further elaborate on the role of animal euthanasia on veterinarians' suicide risk. The role of euthanasia as an occupational risk for suicide among veterinarians should also be further assessed in prospective studies, both in terms of possibly altered attitudes towards death and professional access to means.

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## Declarations

### Conflict of interest

The authors declare that they have no conflict of interest.

### Availability of data and materials

Data are available upon reasonable request.

### Ethics approval

The questionnaire and methodology for this study were approved by the Regional Committee for Medical and Health Research Ethics South-East C (132704), and the Norwegian Centre for Research Data (674793) approved this study, and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

### Consent to participate

Informed consent was deemed unnecessary because the collected data were unidentifiable. This was approved by the Regional Committee for Medical and Health Research Ethics South-East C, and the Norwegian Centre for Research Data.

### Authors' contribution to the manuscript

HSD, RT, and EH designed the study and HSD, TM, MT, RT, and EH analysed the data. HSD wrote the first draft of the manuscript. All authors revised the manuscript and approved the final version. The corresponding author attests that all listed authors meet the authorship criteria, and that no other meeting the criteria has been omitted. HSD and EH acted as guarantors.

**FIGURE LEGENDS**

Figure 1

Title: Definitions of Assisted Dying, Physician-assisted suicide, and Euthanasia

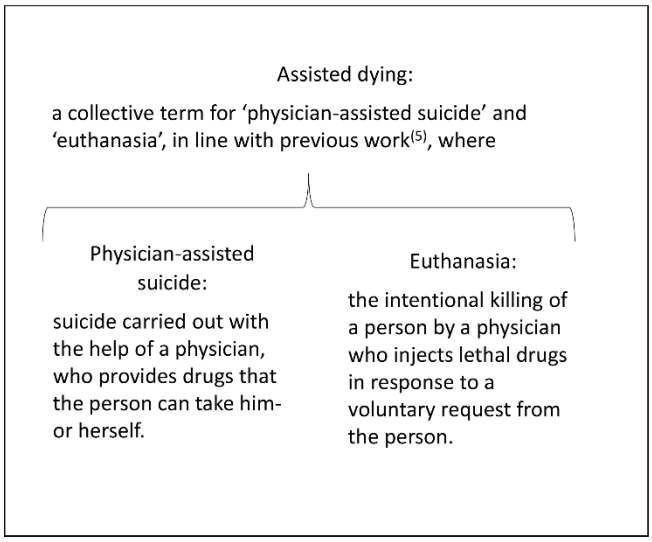


Figure text: Definitions of the terms were included in the questionnaire.

Table 1 – Description of the independent variables in the present sample

| Variable | Range of values | Frequency (%) | Mean (SD) |
|---|---|---|---|
| **Gender** | | | |
| Female | | 1776 (70 %) | |
| Male | | 776 (30 %) | |
| **Age**[1] | | | |
| 20–30 | | 274 (11 %) | |
| 31–40 | | 697 (27 %) | |
| 41–50 | | 667 (26 %) | |
| 51–60 | | 432 (17 %) | |
| 61–70 | | 318 (13 %) | |
| >70 | | 159 (6 %) | |
| **Marital status** | | | |
| Married/cohabiting | | 1962 (78 %) | |
| Single/divorced/widow(er) | | 552 (22 %) | |
| **Main field of work** | | | |
| Companion animal practice | | 802 (32 %) | |
| Public administration | | 402 (16 %) | |
| Mixed clinical practice | | 268 (10 %) | |
| Academia/research | | 202 (8 %) | |
| Production animal practice | | 177 (7 %) | |
| Aquaculture | | 121 (5 %) | |
| Equine practice | | 102 (4 %) | |
| Other | | 250 (10 %) | |
| Pensioner | | 198 (8 %) | |
| **Working hours** | 0-99 | | 41.6 (12.07) |
| **Serious suicidal thoughts** | | 139 (5.4 %) | |
| **Colleague support** | 1-7 | | 5.29 (1.38) |

| | | | |
|---|---|---|---|
| **Frequency of performance of euthanasia** | | | |
| 0-4/week | | 1441 (92.5 %) | |
| 5 or more/week | | 117 (7.5 %) | |

[1]Age was reported in five-year categories. In Table 1, age distribution is showed in 10-year categories, to improve readability.

Table 2: Veterinarians´ attitudes toward physician-assisted suicide and euthanasia in humans.

| Statement | Strongly agree, n (%) | Partially agree, n (%) | Neither agree, nor disagree, n (%) | Partially disagree, n (%) | Strongly disagree, n (%) | Total, n |
|---|---|---|---|---|---|---|
| 1. ‘Physician-assisted suicide should be permitted for persons suffering from a fatal disease with a short remaining life expectancy.’* | 805 (31.5%) | 814 (31.9%) | 318 (12.5%) | 198 (7.8%) | 420 (16.4%) | 2555 |
| 2. ‘Euthanasia should be permitted for persons suffering from a fatal disease with a short remaining life expectancy.’* | 666 (26.0%) | 738 (28.9%) | 399 (15.6%) | 252 (9.9%) | 500 (19.6%) | 2555 |
| 3. ‘Assisted dying should be permitted also for persons suffering from an incurable chronic disease, but who are not dying.’* | 414 (16.3%) | 690 (27.1%) | 545 (21.4%) | 309 (12.1%) | 590 (23.2%) | 2548 |
| 4. ‘There are cases in which it may be right/morally defensible for the doctor to provide assisted dying, even though it is illegal.’* | 525 (20.6%) | 787 (30.8%) | 432 (16.9%) | 243 (9.5%) | 568 (22.2%) | 2555 |

* The prevalence of positive attitudes was significantly higher among female veterinarians compared to their male colleagues in all four statements.

Table 3 – Factors associated with positive attitudes to human euthanasia

| | Crude | | Adjusted | |
|---|---|---|---|---|
| | OR | 95 % CI | OR | 95 % CI |
| Female | 1.46*** | 1.21 – 1.75 | 1.02 | 0.82 – 1.26 |
| Age | 0.86*** | 0.83 – 0.89 | 0.87*** | 0.83 – 0.91 |
| Single | 1.38** | 1.13 – 1.69 | 1.35* | 1.10 – 1.67 |
| **Main field of work (ref. category= mixed clinical practice)** | | | | |
| Companion animals | 1.69*** | 1.27 – 2.23 | 1.66** | 1.23 – 2.23 |
| Production animals | 0.85 | 0.58 – 1.25 | 1.04 | 0.69 – 1.56 |
| Equine practice | 1.16 | 0.73 – 1.83 | 1.29 | 0.80 – 2.09 |
| Aquaculture | 1.10 | 0.71 – 1.69 | 1.07 | 0.69 – 1.67 |
| Public administration | 0.83 | 0.61 – 1.14 | 0.98 | 0.70 - 1.35 |
| Academia/research | 1.15 | 0.79 – 1.66 | 1.35 | 0.92 – 1.98 |
| Other | 0.96 | 0.68 – 1.36 | 1.07 | 0.74 – 1.53 |
| Frequency of euthanasia (ref. 0-4/week) | | | | |
| 5 or more/week | 1.42 | 0.95 – 2.11 | 1.32 | 0.88 – 2.00 |

N=2222

* P<0.05, ** p<0.01, *** p< 0.001

Table 4 – Factors associated with serious suicidal thoughts

| | Crude | | Adjusted | |
|---|---|---|---|---|
| | OR | 95 % CI | OR | 95 % CI |
| Female | 1.55 | 0.999 – 2.401 | 1.33 | 0.81 – 2.20 |
| Age | 0.93 | 0.86 – 1.00 | 0.95 | 0.86 – 1.04 |
| Single | 2.38*** | 1.65 – 3.43 | 2.11*** | 1.42 – 3.13 |
| Positive attitudes towards euthanasia in humans | 2.68*** | 1.79 – 4.02 | 2.02** | 1.31 – 3.12 |
| Working hours | 1.00 | 0.99 – 1.02 | 1.00 | 0.99 – 1.02 |
| Colleague support | 0.64*** | 0.57 – 0.71 | 0.64*** | 0.57 – 0.72 |
| Frequency of euthanasia (ref. 0-4/week) | | | | |
| 5 or more/week | 2.48** | 1.38 – 4.46 | 2.51** | 1.34 – 4.71 |

N=2087

** p<0.01, *** p< 0.001

Additional table 1 - Veterinarians´ attitudes toward physician-assisted suicide and euthanasia of humans, gender differences

| Statement | Strongly agree + Partially agree n (%) | | Neither agree, nor disagree+ Partially disagree + Strongly disagree n (%) | | Total, n | $\chi^2$ |
|---|---|---|---|---|---|---|
| | Women | Men | Women | Men | | |
| 5. 'Physician-assisted suicide should be permitted for persons suffering from a fatal disease with a short remaining life expectancy.'* | 1190 (67.8%) | 402 (53.2%) | 566 (32.2%) | 354 (46.8%) | 2512 | 48.5, p<0.001 |
| 6. 'Euthanasia should be permitted for persons suffering from a fatal disease with a short remaining life expectancy.'* | 1021 (58.2%) | 358 (47.3%) | 734 (41.8%) | 399 (52.7%) | 2512 | 25.3, p<0.001 |
| 7. 'Assisted dying should be permitted also for persons suffering from an incurable chronic disease, but who are not dying.'* | 816 (46.6%) | 270 (35.8%) | 937 (53.5%) | 484 (64.2%) | 2507 | 24.8, p<0.001 |
| 8. 'There are cases in which it may be right/morally defensible for the doctor to provide assisted dying, even though it is illegal.'* | 946 (53.9%) | 342 (45.1%) | 808 (46.1%) | 417 (54.9%) | 2513 | 16.7, p<0.001 |

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RESEARCH Open Access

# Professional help-seeking behaviour for mental health problems among veterinarians in Norway: a nationwide, cross-sectional study (The NORVET study)

Helene Seljenes Dalum[1*], Reidar Tyssen[1], Torbjørn Moum[1], Magne Thoresen[2] and Erlend Hem[1,3]

## Abstract

**Background:** Veterinarians have a relatively high prevalence of mental health problems; however, research on professional help-seeking is limited. The main purpose of the present study was to investigate the prevalence of mental health problems and professional help-seeking behaviour for such problems, and the independent factors associated with help-seeking behaviour among veterinarians in Norway.

**Method:** This cross-sectional study included all veterinarians in Norway (response rate 75%, 70% women). Logistic regression was used to calculate odds ratios (OR) for professional help-seeking for mental health problems. Analyses were controlled for socio-demographic, individual (personality trait reality weakness, SCL-5, attitudes toward mental illness), and work-related factors (work field, job stress).

**Results:** The prevalence of self-reported mental health problems in need of treatment was 30% (746/2494), significantly higher among women than men (36% vs. 15%). Fifty-four percent had sought professional help, women significantly more often (56%) than men (41%). Among veterinarians with serious suicidal thoughts, 50% (69/139) had sought help. Veterinarians most frequently related mental health problems to work problems (47%), women significantly more often (49%) than men (34%). Factors significantly associated with help-seeking were being female, OR = 2.11 (95% CI: 1.24–3.60), working with production animals, OR = 0.35 (0.13–0.98), public administration, OR = 2.27 (1.15–4.45), academia/research, OR = 4.78 (1.99–11.47) or 'other' fields, OR = 2.79 (1.23–6.32), and attitudes toward mental illness, OR = 1.32 (1.03–1.68).

**Conclusions:** Thirty percent of veterinarians in Norway reported mental health problems in need of treatment, and only half of them had sought professional help. A low degree of help-seeking was also seen among those with serious suicidal thoughts. Being female, positive attitudes toward treatment of mental illness, working in public administration, academia/research and 'other' field were associated with more help-seeking, while working in production animal practice was associated with less help-seeking. Interventions to increase help-seeking behaviour for mental health problems among veterinarians are warranted.

**Keywords:** Veterinarians, Mental health problems, Suicidal behaviour, Personality traits, Help-seeking behaviour

*Correspondence: h.s.dalum@medisin.uio.no

[1] Department of Behavioural Medicine, Institute of Basic Medical Sciences, Faculty of Medicine, University of Oslo, P.O. Box 1111 Blindern, Oslo NO-0317, Norway
Full list of author information is available at the end of the article

## Background

Several studies have found that veterinarians have a high prevalence of suicidal thoughts, anxiety symptoms, and depressive symptoms compared to the general population [1–3]. Thus, there is a need to investigate professional help-seeking behaviour for such problems [4].

In a systematic review, thirteen papers on mental health difficulties among veterinarians were reviewed. Females, younger veterinarians, and those working alone seemed more likely to experience difficulties with poor wellbeing [5]. Recent studies have found a higher prevalence of both anxiety symptoms and depression symptoms among veterinarians than in the general population [3, 6, 7].

There is limited knowledge on factors associated with professional help-seeking for mental health problems among veterinarians. A recent study found that among veterinarians with a history of mental illness, 86% had sought treatment, with no significant gender difference [3]. A study from the US showed that 59% of veterinarians with psychological distress were not receiving mental health treatment [8]. When investigating work-related factors associated with help-seeking, it is important to control for other factors that could affect help-seeking, such as age [9, 10], gender [11–13], and civil status [14]. Functional impairment has been shown to be a strong mediator of help-seeking [9, 14], indicating that people seek help when mental health problems become more severe. This is in line with a longitudinal study in physicians, where the perceived level of mental health problems predicted help-seeking [15].

To our knowledge, only one study reported help-seeking among veterinarians with suicidal behaviours. In a qualitative study, approximately half of veterinarians with a history of suicidal behaviour did not seek help because they felt guilty or ashamed [16]. In the general population, help-seeking among suicidal individuals is usually low, and several barriers, such as being male [17, 18], lack of perceived need, preference for self-management, and structural factors such as time and geographical inconvenience have been reported [17, 19]. Veterinarians and other care-giving professions may find it hard to receive help for mental health problems due to role reversal, i.e., they are used to helping others but not receiving help [15, 20]. In summary, there is a knowledge gap regarding help-seeking for mental health problems among veterinarians.

Personality traits are putative factors associated with help-seeking. Reality weakness appears to be particularly relevant; it is a deviant personality trait encompassing chronic illusions, paranoid traits, identity insecurity, and relational problems [21]. Reality weakness has previously predicted lack of help seeking among physicians, possibly because persons with this trait tend to deny their own problems, and because reality weakness is associated with severe personality disorders [15].

To the best of our knowledge, professional help-seeking behaviour among veterinarians in different fields of work has not been investigated. This could be of importance since organizational aspects differ between different fields of work, e.g., some may have more flexible work schedules as well as better accessibility to professional mental health treatment than others. Emotional demands have previously been found as a job stress factor among veterinarians in Norway [22]. The role of job stress factors has not previously been investigated with regard to help-seeking for mental health problems.

A study from the US showed that veterinarians were less likely to have positive attitudes toward mental illness than the general population [8]. Stigma associated with mental illness may lead to a reduction in help-seeking among veterinarians [23]. Recent systematic reviews in the general population and subgroups such as health professionals found that stigma is an important barrier to help-seeking [24, 25], and for health professionals, disclosure/confidentiality concerns and negative social judgements were more frequently reported than that for other groups [24].

Given this background, we investigated the following research questions:

1) What is the prevalence of self-reported mental health problems in need of treatment among veterinarians in Norway, and how many of them have sought professional help?
2) What do veterinarians regard as factors contributing to their mental health problems, and what are their overall attitudes toward mental illness?
3) What are the factors associated with actual professional help-seeking among those who consider themselves to be in need of treatment, and what are the factors associated with professional help-seeking among veterinarians with serious suicidal thoughts?

## Methods

### Sample

The sample included all veterinarians in Norway holding valid authorisation as of May 2020 ($n=4256$), according to the Norwegian Food Safety Authority. Veterinarians were excluded for the following reasons: no residential address in Norway ($n=527$), unknown address ($n=196$), working abroad ($n=62$), or deceased ($n=7$). This resulted in an eligible sample of 3464 veterinarians.

### Questionnaire

A 12-page questionnaire, an information sheet and a prepaid envelope were distributed by mail in November 2020. The information sheet included contact information of a psychiatrist in the research group and the colleague-support network of the Norwegian Veterinary Association. Reminders were sent in January and February, 2021. Five gift cards from a sports shop were placed in a drawing as incentives to increase the response rate. An external company managed both the data collection and prize awards. Respondents returned their questionnaires in a sealed envelope, and the identities of the respondents were kept unknown to the researchers. The complete questionnaire can be found elsewhere [22].

### Instruments – dependent variable

Our main dependent variable was mental health problems in need of treatment and help-seeking for such problems, first used in physicians [26] and later a slightly altered version has been validated in the same profession [15, 27]. The veterinarians were asked the following, in line with previous studies [15, 27]: 'If you have experienced mental health problems in the preceding year, have you sought/received help for this?' The question had five response options from 1 to 5, indicating a higher level of perceived and/or received care with increasing scores: 1. 'Have not had any mental health problems of significance', 2. 'Have not sought help despite having been in need for this', 3. 'Yes, consulted general practitioner', 4. 'Yes, consulted psychologist/psychiatrist', 5. 'Yes, have been admitted to psychiatric hospital'. In case of multiple responses to this question, the highest level of care was retained for the analyses.

To assess the prevalence of mental health problems in need of treatment, we dichotomised the abovementioned variables into those in need of or having sought help (response option 2–5) and those with no mental health problems of significance (response option 1). To assess the prevalence of help-seeking among those who considered themselves in need of treatment (i.e., those who answered 2–5), we computed a dichotomy with those who had actually sought help (answers 3–5 = 1) and those who had not sought help (answer 2 = 0). This dichotomy was used as the dependent variable in logistic regression analyses.

Serious suicidal thoughts were measured by a modified version of the fourth question of Paykel's questionnaire about suicidal thoughts and attempts [28, 29]: 'Have you ever during the last year reached the point where you seriously considered taking your life, and even made plans how you would go about doing it?' The responses were never, hardly ever, sometimes, or often. Responses were dichotomized into never and any frequency in line with Paykel's original work.

For those who reported having mental health problems in need of treatment, an additional question was asked: 'To what extent do you think the following factors contributed to your difficulties?'; the factors were: 1. 'Personal problems', 2. 'Family problems', 3. 'Social problems', 4. 'Work problems', 5. 'Other problems'. Each of the factors were rated on a categorical, ordinal five point scale ranging from 'not at all' (1) to 'very much' (5). The responses were dichotomized into 'Not at all', 'A little' and 'Somewhat' (0) and 'Quite a bit' and 'Very much' (1), to clearly identify factors that had a significant contribution, according to previous studies [22, 30].

### Independent variables – individual factors

The Norwegian Centre for Research Data required use of age intervals to keep the data unidentifiable. Therefore, age was reported using the following intervals: 20–25, 26–30 (…) up to 66–70 and > 70 years. In the regression analysis, we entered age as a continuous variable, since age can be considered ordinal data, and because using age categories would have generated an excessive number of effect estimates for our model. In this study, marital status was dichotomised into married/cohabitant and single/divorced/separated/widow(er).

The personality trait reality weakness was measured using the nine-item reality weakness dimension of Torgersen's Basic Character Inventory (BCI) [31]. Each item has a dichotomous ('agree'/'do not agree') response, with a total sum score ranging from 0 to 9. BCI-Reality weakness is a deviant trait related to perceptions and ideations on the borderline between reality and fantasy; this dimension associates with chronic illusions, paranoid traits, and traits related to severe personality disorders [21, 32]. Examples of items in this scale are 'I feel lonely most of the time' and 'Sometimes I feel I am not myself'. This measure predicts emotional disturbance in physicians, such as serious suicidal thoughts, severe depression, and lack of help-seeking [32].

Mental distress (anxiety symptoms and depressive symptoms) in the last 14 days was measured using SCL-5, a five-item version of the Symptom Check List-25 [33]. This five-item version is based on a factor analysis by Tambs and Moum [34], and contains questions about how much one is bothered by the following: 1. 'Feeling fearful', 2. 'Nervousness or shakiness inside', 3. 'Feeling hopeless about the future', 4. 'Feeling blue', 5. 'Worrying too much about things'. Each item was measured on a scale from 'not at all' (1) to 'very much' (5). Previous studies have validated this version in medical students and physicians in Norway [35, 36].

Attitudes toward mental illness were investigated using two items originally used in public health surveys in the US [37], as well as in US veterinarians [8]. The veterinarians were asked to state their level of agreement with the following statements: 1. 'Treatment can help people with mental illness lead normal lives', 2. 'People are generally caring and sympathetic to persons with mental illness'. The response categories were 'strongly agree', 'somewhat agree', 'not sure/undecided', 'somewhat disagree' and 'strongly disagree', coded from 1 to 5, respectively. The response scales for the two items were reversed, meaning that increasing values on the scale indicated a more positive attitude. It was then entered as continuous variables in the regression models, with increasing values on the scale indicating more positive attitudes to the two statements.

#### Work-related factors

Main field of work was reported as 'companion animal practice', 'production animal practice', 'mixed clinical practice', 'equine practice', 'aquaculture', 'public administration', 'academia/research', 'pensioners', and 'others' [22]. Those who classified themselves as pensioners were excluded from the logistic regression analyses. In the regression analyses, 'mixed clinical practice' was chosen as the reference category, as this could be viewed as the most traditional veterinary work in Norway.

Job stress was measured using a modified version of Cooper's Job Stress Questionnaire [26, 38], with minor adaptations to veterinarians' work conditions [22]. The veterinarians were asked how much 27 different situations/factors made them stressed, with the responses reported on a five-point Likert type rating scale ranging from no stress at all (1) to a source of extreme stress (5). An exploratory factor analysis with principal component extraction and varimax rotation, including scree plot evaluation, identified three job stress factors: emotional demands (Cronbach's alpha = 0.87), work/life balance (Cronbach's alpha = 0.86), and fear of complaints/criticism (Cronbach's alpha = 0.88). The job stress measure and the three sub-dimensions are explained in detail elsewhere [22].

#### Statistical analysis

StataSE 16 was used for the statistical analyses. Table analyses and the $\chi^2$ test were used to test for gender differences. Bivariate and multivariable logistic regression models were used to estimate odds ratios (ORs) for associations between individual and work-related variables with professional help-seeking. The following factors were used as independent variables: gender, age, civil status, mental distress, reality weakness, attitudes toward mental illness, main field of work, and job stress. Initially all independent variables were analysed bivariately with the dependent variable help-seeking.

The binary variable of help-seeking ("not sought help" = 0, "sought help" = 1) was used in two logistic regression analyses, one for the group of veterinarians that considered themselves in need of treatment for mental health problems and one for veterinarians reporting serious suicidal thoughts.

For the group of veterinarians reporting mental health problems in need of treatment, we ran a multiple logistic regression analysis with all the mentioned independent variables. For veterinarians reporting serious suicidal thoughts, the independent variables in the multiple logistic regression were limited to gender, age, civil status, mental distress, reality weakness, and main field of work (due to the limited N in this subgroup).

We tested the goodness of fit of the logistic regression models, and all models were found satisfactory. The level of significance was set at 5% ($p < 0.05$). To investigate gender-specific effects, we entered two-way interaction terms between gender and the independent variables with the main effect included in the model. Interaction terms were entered one at a time.

## Results

Of 3464 eligible participants, we received 2596 responses, resulting in a response rate of 75%. The ages varied between genders, with a higher proportion of younger women, and the majority of men being older than 50 years. In total, 70% were female and 30% male, which is an accurate reflection of the actual gender distribution of veterinarians in Norway. A total of 139 veterinarians reported serious suicidal thoughts, a finding which is described in detail elsewhere [22]. See Table 1 for a description of the sample and the independent variables.

#### Prevalence of mental health problems in need of treatment and professional help-seeking

The prevalence of mental health problems in need of treatment was 30% (746/2494) (95% CI 28.1%–31.8%). Overall, more women (36%, $n = 625/1726$) than men (15%, $n = 111/730$) reported mental health problems in need of treatment ($\chi 2$:107.9, $p < 0.001$).

Of the veterinarians considering themselves in need of treatment, 54% ($n = 401/746$) had sought/received professional help, and females sought help more often (56%, $n = 350/625$) than their male (41%, $n = 45/111$) colleagues ($\chi 2$: 9.06, $p = 0.003$). The prevalence of professional help-seeking was similar in all age groups (measured in ten-year intervals).

**Table 1** Description of the independent variables in the present sample

| Variable | Range of values | Frequency (%) | Mean (SD) |
|---|---|---|---|
| **Gender** | | | |
| Female | | 1776 (70%) | |
| Male | | 776 (30%) | |
| **Age**[a] | | | |
| 20–30 | | 274 (11%) | |
| 31–40 | | 697 (27%) | |
| 41–50 | | 667 (26%) | |
| 51–60 | | 432 (17%) | |
| 61–70 | | 318 (13%) | |
| > 70 | | 159 (6%) | |
| **Marital status** | | | |
| Married/cohabiting | | 1962 (78%) | |
| Single/divorced/widow(er) | | 552 (22%) | |
| **SCL-5** | 1–5 | | 2.00 (0.98) |
| **Personality trait reality weakness** | 0–9 | | 1.38 (1.85) |
| **Main field of work** | | | |
| Companion animal practice | | 802 (32%) | |
| Public administration | | 402 (16%) | |
| Mixed clinical practice | | 268 (10%) | |
| Academia/research | | 202 (8%) | |
| Production animal practice | | 177 (7%) | |
| Aquaculture | | 121 (5%) | |
| Equine practice | | 102 (4%) | |
| Other | | 250 (10%) | |
| Pensioner | | 198 (8%) | |
| **Job stress** | | | |
| Emotional demands | 1–5 | | 1.98 (0.79) |
| Work/life balance | 1–5 | | 2.67 (0.97) |
| Fear of complaints | 1–5 | | 3.06 (1.17) |
| **Attitudes toward mental illness** | | | |
| Treatment help those with mental illness (somewhat agree + strongly agree) | | 2388 (93%) | |
| People are caring toward those with mental illness (somewhat agree + strongly agree) | | 1273 (50%) | |

[a] Age was reported in five-year categories. In Table 1, age distribution is showed in 10-year categories, to improve readability

Of the veterinarians with serious suicidal thoughts, 50% ($n=69/139$) had sought help. Significantly more women (57%, $n=61/108$) than men (21%, $n=6/28$) had sought help ($\chi 2$: 10.9, $p=0.001$). Notably, 18% ($n=24$) reported 'no mental health problems of significance' (response option 1).

**Table 2** Factors contributing to mental health problems among veterinarians in Norway ($n=746$)

| | Not at all + A little + Somewhat N (%) | Quite a bit + Very much N (%) | Total n |
|---|---|---|---|
| Personal problems | 454 (64%) | 252 (36%) | 706 |
| Family problems | 465 (66%) | 240 (34%) | 705 |
| Social problems | 608 (88%) | 84 (12%) | 692 |
| Work problems[a] | 375 (53%) | 337 (47%) | 712 |
| Other problems | 517 (79%) | 139 (21%) | 656 |

Of the veterinarians reporting mental health problems in need of treatment, there were 111 men and 625 women

[a] The only significant gender difference was in work problems

### Self-reported factors contributing to mental health problems and attitudes toward mental illness

The most commonly reported contributing factor to mental health problems was work problems (47%, $n=337/712$), followed by personal problems (36%, $n=252/706$), and family problems (34%, $n=240/705$) (Table 2). The only significant gender difference was regarding work problems, with females reporting work problems more often (49%, $n=296/599$) than their male colleagues (34%, $n=36/105$) ($\chi 2$: 8.2, $p=0.004$).

Of the 50% ($n=1273/2568$) agreeing that people are caring toward persons with mental illness, significantly more men than women had positive attitudes (men $443/764=0.58$ vs. women $811/1761=0.46$, $\chi 2$: 30.3, $p<0.001$). There was a significant difference among age groups with regard to prevalence of positive attitudes ($\chi 2$: 20.94, $p<0.001$), with higher prevalence in the lower (20–30 years) and higher (> 70 years) age groups (measured in ten-year intervals).

### Factors associated with professional help-seeking for mental health problems

In the multivariable analyses, the significant factors associated with increased likelihood of professional help-seeking were being female, working in public administration, academia/research, and 'other' field of work, and positive attitudes toward treatment of mental illness. The only factor significantly associated with a lower likelihood of professional help-seeking was working in production animal practice (Table 3). Among those veterinarians with mental health problems in need of treatment, no significant interactions with gender were found.

### Factors associated with professional help-seeking among veterinarians with serious suicidal thoughts

Being female (OR = 4.42, 95% CI 1.64–11.89) and mental distress (OR = 1.61, 95% CI 1.13–2.30) were significant

**Table 3** Factors associated with professional help-seeking among veterinarians with self-reported mental health problems in need of treatment ($n=618$)

| | Bivariate | | Multivariable | |
|---|---|---|---|---|
| | OR | 95% CI | OR | 95% CI |
| Female | 1.89** | 1.24–2.86 | 2.11** | 1.24–3.60 |
| Age | 1.02 | 0.95–1.10 | 1.00 | 0.92–1.12 |
| Single | 1.20 | 0.87–1.65 | 1.25 | 0.86–1.81 |
| SCL-5 | 1.03 | 0.89–1.18 | 1.14 | 0.93–1.40 |
| Reality weakness[a] | 0.93* | 0.87–0.99 | 0.93 | 0.85–1.01 |
| **Attitudes toward mental illness** | | | | |
| Treatment helps those with mental illness | 1.26* | 1.03–1.55 | 1.32* | 1.03–1.68 |
| People are caring toward those with mental illness | 1.03 | 0.91–1.18 | 1.10 | 0.93–1.28 |
| **Main field of work (ref. category = mixed clinical practice)** | | | | |
| Companion animals | 1.39 | 0.84–2.32 | 1.43 | 0.82–2.50 |
| Production animals | 0.33* | 0.13–0.85 | 0.35* | 0.13–0.98 |
| Equine practice | 1.67 | 0.72–3.87 | 1.75 | 0.70–4.36 |
| Aquaculture | 1.23 | 0.55–2.73 | 1.18 | 0.47–2.97 |
| Public administration | 2.31** | 1.29–4.13 | 2.27* | 1.15–4.45 |
| Academia/research | 3.44** | 1.64–7.18 | 4.78*** | 1.99–11.47 |
| Other | 2.75** | 1.39–5.46 | 2.79* | 1.23–6.32 |
| **Job stress** | | | | |
| Emotional demands | 1.02 | 0.85–1.23 | 1.17 | 0.91–1.50 |
| Work/life-balance | 0.95 | 0.82–1.11 | 0.97 | 0.79–1.19 |
| Fear of complaints | 0.91 | 0.80–1.05 | 0.97 | 0.80–1.18 |

* $P<0.05$, ** $P<0.01$, *** $P<0.001$

[a] There was a high correlation between SCL-5 and reality weakness (Pearson's $R=0.6$)

bivariate factors associated with increased likelihood of professional help-seeking. There were no factors significantly associated with professional help-seeking for serious suicidal thoughts in the multivariable analyses. A full description of the analyses is found as an additional file (Additional Table 1 – help-seeking among veterinarians with serious suicidal thoughts.docx). Among those veterinarians with serious suicidal thoughts, significant interactions between gender and attitudes toward treatment of mental illness (OR = 7.15, 95% CI 1.54 to 33.27, $p=0.012$), with clearly steeper gradients among females.

## Discussion

A major finding in this study is that 30% of veterinarians reported mental health problems in need of treatment. Only half of the veterinarians in need of treatment had sought professional help, and this also applied to veterinarians with serious suicidal thoughts. 'Work problems' was the most common self-reported contributing factor to mental health problems, and women reported work-related factors as contributing to mental health problems more often than men. In the multivariable analyses, being female, working in public administration, academia/research, and 'other' field of work, and positive attitudes toward treatment of mental illness were associated with more help-seeking, while working in production animal practice was associated with less help-seeking.

The frequency of veterinarians in Norway reporting mental health problems in need of treatment seems relatively high. The corresponding figures among physicians in Norway in their first and fourth postgraduate years were 11% and 17%, respectively [15]. However, the samples are not directly comparable due to different age groups. Higher prevalence of mental health problems among female veterinarians compared to their male colleagues is in line with the general population [39–41] and should probably not be interpreted as an occupational risk.

'Work problems' was the most commonly self-reported contributing factor to mental health problems among the veterinarians, especially for females; it was also the most common self-reported contributing factor for serious suicidal thoughts among veterinarians in this group [22]. These findings indicate that veterinarians perceive work problems as significant contributors to their mental health problems.

The low prevalence of professional help-seeking for mental health problems among veterinarians (54%) is comparable to physicians in Norway. A study showed that 50% and 41% of physicians had sought help for mental health problems during the first and fourth postgraduate year, respectively [15]. Among veterinarians, 9% received help from a psychologist/psychiatrist for their mental health problems. This is in line with Norwegian police, where less than 10% of those reporting anxiety symptoms or depressive symptoms or serious suicidal ideation had contacted a psychologist/psychiatrist [11]. Veterinarians in need of treatment for mental health problems had mainly sought help from their general practitioner or a psychologist/psychiatrist. In Norway, individuals are generally referred by their regular general practitioner to a psychologist/psychiatrist. This could explain the fact that there was a similar prevalence of help-seeking from both general practitioners and psychologists/psychiatrists in our sample. Accessibility to mental health specialists vary widely in Norway, and this may also have affected the results.

Female veterinarians sought help for mental health problems more often than their male colleagues. This is in line with studies on help-seeking among ambulance personnel [12] and police [11], but is in contrast to physicians, where no gender difference was found

[15]. Lack of professional help-seeking for mental health problems among men is widely reported [42, 43]. Several studies have found that help-seeking is largely unaffected by age [11, 12]. Nevertheless, a recent longitudinal study among medical students found an increase in help-seeking among female students over the past 20 years [35]. In our study, the prevalence of help-seeking was not higher in the younger age groups, indicating that there was no trend toward more help-seeking among the younger veterinarians.

Mental distress was not significantly associated with professional help-seeking in the multivariable analyses. This is in line with findings among ambulance personnel, where help-seeking was independent of the level of anxiety and depressive symptoms [12]. A study among police found that less than 10% of those reporting symptoms of anxiety or depression or serious suicidal thoughts had contacted a psychologist or psychiatrist [11]. On the other side, a study among physicians in Norway found that those with higher levels of perceived mental health problems sought help more often [15]. This is also shown in the general population [9]. The finding that mental distress is associated with serious suicidal thoughts among veterinarians [22], but not professional help-seeking, may indicate that many veterinarians struggle, but do not seek help for their problems despite high symptom levels. The fact that only half of the veterinarians with self-reported mental health problems and half of those with serious suicidal thoughts sought help points to a treatment gap.

Contrary to previous research [15], the personality trait reality weakness was not a factor significantly associated with professional help-seeking in the multivariable analyses. This may be due to the high correlation between mental distress and reality weakness. Additionally, the three job stress factors were not significantly associated with professional help-seeking, neither in bivariate nor the multivariable analyses.

Working in production animal practice was associated with less professional help-seeking, and working in public administration, academia/research, and other field was associated with more help-seeking. The solitary nature of work for production animal practitioners, less flexible work schedules and geographical inconvenience could be of relevance for not seeking help [44]. Those working in public administration, research and academia may have more regulated hours and access to mental health treatment, since they more often work in urban areas. A recent study among veterinarians in the US found that those with negative attitudes concerning care and sympathy for people with mental illness were significantly more likely to be solo practitioners than being non-solo practitioners [45]. An analysis was performed to assess whether those with one or more missing items on the independent variables differed from those with no items missing. There was a slight predominance of veterinarians in public administration that had one or more missing items on the independent variables. Nevertheless, this was not suspected to have introduced any substantial bias in the model. No other trends were found in respondents with missing data.

In this survey, 93% of veterinarians somewhat or strongly agreed that treatment can help people with mental illness lead normal lives, and 50% somewhat or strongly agreed that people are generally caring and sympathetic to persons with mental illness. The corresponding figures among veterinarians in the US were 89% and 32%, respectively [8]. Positive attitudes toward treatment of mental illness was significantly associated with professional help-seeking. This contrasts with a recent review among people with mental health problems, finding that personal and perceived stigma did not have a direct effect on help-seeking [9]. However, negative attitudes toward treatment have previously been reported as a barrier to help-seeking [46], as well as poor mental health literacy [47]. Disclosure and confidentiality concerns may also be of importance for help-seeking [24, 44], with confidentiality and potential consequences for career found as significant barriers for physicians [20]. Lack of undergraduate training in psychology and 'non-technical skills' such as clinical communication for veterinarians may influence their attitudes toward mental illness.

The youngest and oldest age groups reported a higher prevalence of positive attitudes toward people with mental illness; however, age was not significantly associated with actual help-seeking. A recent study also showed that older age is associated with less public and self-stigma [10]. A systematic review of help-seeking interventions for anxiety, depression, and general psychological stress among young adults found that mental health literacy was effective in improving help-seeking attitudes, but not help-seeking behaviour [48]. This may partly explain the discrepancy between the relatively positive attitudes toward treatment of mental illness reported among veterinarians in Norway, and the low prevalence of actual help-seeking among those with mental health problems.

Among those with serious suicidal thoughts, the bivariate factors significantly associated with professional help-seeking were being female and the presence of mental distress, but no significant factors were found in multivariable analyses. A strong interaction between genders was found regarding attitudes toward treatment of mental illness, with women having approximately 7 times higher odds for help-seeking than men. Only one third of the veterinarians with serious suicidal thoughts had received help from a psychologist/psychiatrist, and

the lack of professional help-seeking in this group is evident. Almost 20% of those reporting serious suicidal thoughts simultaneously reported 'No significant mental health problems' on the measure of mental health problems in need of treatment. The cause for this should be further studied qualitatively. There could be a resistance to undertake the patient role, an unwillingness to reveal any illness to their colleagues [49, 50], or there could be a low perceived need for help [46]. Reducing the barriers for seeking mental health treatment has been suggested as one measure that might reduce the risk for suicide among veterinarians [8].

To the best of our knowledge, the NORVET study is the only nationwide study of veterinarians, including all authorised veterinarians, in both clinical and non-clinical field of work. The present study is also the first to investigate factors associated with professional help-seeking behaviour among veterinarians. Major strengths of our study are the high response rate (75%) and the extensive questionnaire allowed the use of a comprehensive multivariable statistical model, controlling for several variables. Important limitations are the cross-sectional design, and the fact that generalisability of the results may be limited due to possible differences in organization of work life in different countries. Nevertheless, we believe the findings are representative of veterinarians in Northern Europe. Further studies should aim to include multiple data sources, for example from health registers. The study was conducted during the coronavirus pandemic, which may have affected the results, since potential effects of the pandemic (e.g., redundancy, economic effects) were not accounted for. Another limitation is that the dependent variable was based on a single-item, self-reporting measure, although there were several response categories with respect to professional help-seeking. Due to social desirability, this may have led to under-reporting and type II errors (false negatives). Veterinarians may have limited competency in assessing their own mental health and may not be aware that they actually have symptoms of mental illness, which also could lead to under-reporting. Additionally, since the measure did not define mental health problems, we do not know what kind of mental health problems comprise the dependent variable. Another limitation is the disparity in the referred time span measured by mental health problems (12 months) and mental distress (past 2 weeks).

## Conclusions

Thirty percent of veterinarians in Norway reported mental health problems in need of treatment, and only half of them had sought professional help. First, continued research on veterinarians and mental health is of importance, both longitudinal studies which can elaborate further on possible causal factors for mental health problems, and qualitative studies to achieve a deeper understanding of factors impacting mental health. Second, interventions on different levels should be assessed, for instance inclusion of mental health literacy in the curriculum and establishing a low-threshold, easily accessible help service for struggling veterinarians, which has been available for physicians in Norway for decades [36]. Such interventions may decrease stigma and increase help-seeking behaviour for mental health problems among veterinarians in Norway.

## Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-022-13710-y.

**Additional file 1: Table 1.** Factors associated with professional help-seeking among veterinarians with serious suicidal thoughts (n=127).

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### Authors' contributions

HSD, RT, and EH designed the study and HSD, TM, MT, RT, and EH analysed the data. HSD wrote the first draft of the manuscript. All authors revised the manuscript and approved its final version. The corresponding author attests that all listed authors meet the authorship criteria and that no others meeting the criteria have been omitted. HSD and EH acted as guarantors.

### Authors' information

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### Availability of data and materials

Data are available upon reasonable request. Requests can be directed to the corresponding author.

## Declarations

### Ethics approval and consent to participate

The questionnaire and methodology for this study were approved by the Regional Committee for Medical and Health Research Ethics, Region South-East C (132704), and the Norwegian Centre for Research Data (674793) approved this study, and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Ethics committee of Regional Committee for Medical and Health Research Ethics, Region South-East C, approved informed consent waiver. A waiver was approved since the data collected was unidentifiable.

**Consent for publication**
Not applicable.

**Competing interests**
The authors declare that they have no conflict of interest.

**Author details**
[1]Department of Behavioural Medicine, Institute of Basic Medical Sciences, Faculty of Medicine, University of Oslo, P.O. Box 1111 Blindern, Oslo NO-0317, Norway. [2]Department of Biostatistics, Institute of Basic Medical Sciences, Faculty of Medicine, University of Oslo, Oslo, Norway. [3]Institute for Studies of the Medical Profession, Oslo, Norway.

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## Publisher's Note

# Questionnaire

UiO : Universitetet i Oslo

Oslo, 18. november 2020

**Kjære veterinær!**

Psykisk helse har fått økende oppmerksomhet i samfunnet de siste årene. Veterinærer i Norge har over to ganger høyere selvmordsrate enn andre yrker, sammenfallende med funn i andre land. Forskningsprosjektet NORVET skal undersøke arbeid, trivsel og psykisk helse hos veterinærer i Norge med spesielt fokus på mekanismer bak hjelpsøking og selvmordsatferd.

Nå trenger vi din hjelp! Vi er helt avhengig av høy svarprosent for å få gode data. **Svarfrist er 10. desember 2020**. Av de som svarer, trekkes det fem personer som hver får et gavekort på 5 000,- hos Skandinavisk Høyfjellsutstyr (kan brukes i alle Sport1-butikker).

**NORVET-undersøkelsen er sendt til alle veterinærer i Norge**

Vi har fått din adresse fra Mattilsynet. Vi håper du er villig til å bruke litt av din tid til å hjelpe oss med å skaffe et godt datagrunnlag til undersøkelsen. Størrelsen på spørreskjemaet er på 11 sider, og en pilotgruppe brukte ca. 15-30 minutter på å fylle det ut. Dine svar fra spørreskjemaet blir registrert elektronisk. Tilsvarende undersøkelser er gjennomført blant en rekke andre yrkesgrupper, bl.a. leger, politi og ambulansepersonell. Disse har gitt viktig ny kunnskap om psykisk helse, trivsel, arbeidsbelastning og fungering i disse yrkesgruppene.

Vi håper at undersøkelsen blant veterinærene i Norge kan finne risiko- og forebyggende faktorer som gir mulighet til å bedre veterinærers trivsel og helse.

***På forhånd mange takk!***

Vennlig hilsen

Helene Seljenes Dalum
Stipendiat, cand.med.vet.

Erlend Hem
Professor dr.med.

Reidar Tyssen
Professor dr.med.

På baksiden av dette brevet finner du mer informasjon om undersøkelsen og kontaktinfo.

## Spørreskjemaet

Flere spørsmål kan likne på hverandre, men disse er deler av forskjellige validerte instrumenter som er valgt for å sammenlikne med andre undersøkelser. Undersøkelsen er godkjent av Regional komite for medisinsk og helsefaglig forskningsetikk (REK) (godkjenning nr. 132704), og vurdert av Norsk Senter for Forskningsdata (NSD) (ref.nr. 674793).

## Frivillig deltagelse

Det er frivillig å delta i studien. Det vil bli sendt ut to purringer. Dersom du ikke ønsker å besvare spørreundersøkelsen kan du kontakte prosjektleder, så mottar du ikke purringer. Det har ikke noen negativ effekt for deg hvis du ikke vil delta.

## Ansvarlige for prosjektet

Prosjektet gjennomføres ved Avdeling for atferdsmedisin, Institutt for medisinske basalfag, Universitetet i Oslo (professorene Erlend Hem og Reidar Tyssen, samt stipendiat Helene Seljenes Dalum). Utsending og mottak av spørreundersøkelsen, samt purringer gjøres av eksternt firma (ViaScan). Premiering vil også håndteres av ViaScan.

## Hva skjer med opplysningene om deg?

Opplysningene som registreres om deg skal kun brukes slik som beskrevet i dette informasjonsskrivet, og planlegges brukt til 2025. ViaScan inngår som en databehandler i prosjektet, og gjennomfører innsamlingen basert på en avtale med prosjektet.

En kode knytter deg til dine opplysninger gjennom en adresseliste. Det er kun ViaScan som har tilgang til denne kodede adresselisten. ViaScan vil etter datainnsamlingen sende èn avidentifisert statistikkfil (kryptert og passordbeskyttet), og alle opplysningene som forskerne behandler vil bli behandlet uten navn eller andre direkte gjenkjennende opplysninger (=kodede opplysninger). Når ViaScan har sendt over statistikkfilen vil de slette koblingsnøkkelen etter tre dager. Du vil derfor ikke være direkte identifiserbar i datamaterialet etter at koblingsnøkkelen slettes.

De avidentifiserte opplysningene om deg vil bli oppbevart i fem år etter prosjektslutt av kontrollhensyn. Eventuelle utvidelser i bruk og oppbevaringstid kan kun skje etter godkjenning fra REK og andre relevante myndigheter. Du har rett til å få innsyn i sikkerhetstiltakene ved behandling av opplysningene. Så lenge du kan identifiseres har du rett til innsyn i hvilke opplysninger som er registrert om deg og rett til å få korrigert eventuelle feil i de opplysningene som er registrert. Du har også rett til å protestere på behandlingen av personopplysninger. Du har også rett til å bli slettet. Adgangen til å kreve sletting gjelder ikke dersom materialet eller opplysningene er anonymisert eller dersom opplysningene er inngått i utførte analyser. Du kan klage på behandlingen av dine opplysninger til Datatilsynet og institusjonen sitt personvernombud.

## Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på «Allmenn interesse eller offentlig myndighet (art. 6 nr. 1 bokstav e i personvernforordningen)» og «Arkivformål i allmenhetens interesse, eller for formål knyttet til vitenskapelig eller historisk forskning eller for statistiske formål (art. 9 nr. 2 bokstav j i personvernforordningen)».

På oppdrag fra Universitetet i Oslo har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket (ref.nr. 674793).

## Økonomisk støtte

Den norske veterinærforening (DNV) har bidratt med 450 000,- i finansiell støtte til prosjektet. I tillegg har en brukergruppe bestående av medlemmer i DNV bidratt med tilbakemeldinger på spørreskjema. Det oppgis ingen interessekonflikter i forbindelse med finansiell støtte og de øvrige bidragene fra DNV. DNV er ikke involvert i behandling av resultatene.

## Kontakt

Slike spørreskjemaer er ikke kjent å påvirke deltagerne negativt. Hvis du etter å ha svart på spørsmålene i skjemaet trenger hjelp med psykiske problemer oppfordrer vi deg til å ta kontakt med det vanlige hjelpeapparatet (fastlege/legevakt). Hvis ønskelig så kan psykiater Reidar Tyssen kontaktes direkte. Du kan også kontakte kollegahjelpen i Den norske veterinærforening.

Dersom du har spørsmål til studien kan du kontakte prosjektleder:

**Kontaktinfo prosjektleder:**
Erlend Hem
Avdeling for atferdsmedisin
Institutt for medisinske basalfag
Universitetet i Oslo
erlend.hem@medisin.uio.no

**Kontaktinfo ved behov for helsehjelp:**
Psykiater/Professor Reidar Tyssen, tlf. 22 85 11 87
reidar.tyssen@medisin.uio.no

**Kontaktinfo Kollegahjelpen – Den norske veterinærforening:**
https://www.vetnett.no/kollegahjelpen/

**Kontaktinfo ved spørsmål om personvern:**
Personvernombud ved Universitetet i Oslo:
personvernombud@uio.no

Spørsmål knyttet til NSD sin vurdering av prosjektet:
personverntjenester@nsd.no, tlf. 55 58 21 17.

# NORVET-undersøkelsen

## Arbeid, trivsel og mental helse hos veterinærer i Norge

På de fleste spørsmålene skal du angi svar ved å sette et kryss i en rute slik ☒
Vennligst benytt en penn og sett krysset tydelig i ruten.

Noen steder skal du sette tall eller bokstaver i en eller flere ruter, slik [1] eller slik [A]

Skjemaene vil bli lest maskinelt, derfor er det viktig at du skriver tydelig i rutene.

Det er svært viktig at du velger å merke av bare ett svaralternativ, der ikke annet fremgår av teksten. Hvis to alternativer synes like dekkende, bes du velge det ene. Dette vil jevne seg ut på gruppenivå.

Selv om det kanskje er noen spørsmål du synes er mindre viktige, ber vi deg svare likevel.
Det vil bidra til å styrke undersøkelsen.

Det vil være en del spørsmål som blir gjentatt flere ganger i skjemaet. Dette skyldes at de utgjør en integrert del av standardiserte måleinstrumenter. Noen ganger spørres det også om opplysninger for ulike tidsperioder. Dette gjøres for å kunne foreta pålitelige sammenligninger med flere andre grupper, nasjonalt og internasjonalt.

***LYKKE TIL, OG PÅ FORHÅND TUSEN TAKK FOR INNSATSEN!***

# A. BAKGRUNNSOPPLYSNINGER

**A1 Kjønn:**

☐ Kvinne
☐ Mann
☐ Annen kjønnsidentitet

**A3 Nåværende sivilstatus**

☐ Ugift ☐ Separert
☐ Samboende ☐ Skilt
☐ Gift ☐ Enke/enkemann

**A2 Alder:**

☐ 20-25 ☐ 26-30 ☐ 31-35 ☐ 36-40 ☐ 41-45 ☐ 46-50 ☐ 51-55 ☐ 56-60 ☐ 61-65 ☐ 66-70 ☐ >70

**Partner**

**A4 Har du fast partner (kjæreste/samboer/ektefelle)?**

☐ Nei
☐ Ja

**A5 Hvis JA, er din partner i arbeid?**

☐ Nei
☐ Ja

**A6 Hvis JA, er din partner veterinær?**

☐ Nei
☐ Ja

**Barn og familie**

**A7 Hvor mange barn har du?**

☐ Ingen ☐ 1 barn ☐ 2 barn ☐ 3 eller flere barn

**HAR DU I LØPET AV DE SISTE 12 MND. OPPLEVD NOE AV DET FØLGENDE?**

**A8** En alvorlig sykdom eller ulykke ☐

**A9** Skilsmisse/separasjon med samboer eller kjæreste ☐

**A10** Giftet deg/flyttet sammen med samboer ☐

**A11** Fått barn ☐

**A12** Dødsfall familie/nære venner ☐

**A13** Andre vansker hos nær familie ☐

**A14** Alvorlige økonomiske problemer ☐

**A15** Ektefelle har vært arbeidsløs/permittert ☐

**A16** Alvorlige bomessige problemer ☐

**A17** Du selv, eller noen i nær familie, har vært utsatt for, eller innblandet i, alvorlig lovbrudd ☐

**A18** Samlivsproblemer ☐

**A19** Flyttet fra foreldre ☐

**A20** Permisjon ☐

**A21** Sykefravær 21 dager eller mer ☐

**A22** Du selv har vært involvert i tilsynssak fra tilsynsmyndigheter ☐

**A23** Alvorlig sykdom hos et nærtstående familiemedlem (partner/barn/foreldre) ☐

**A24** Andre alvorlige hendelser ☐
Spesifiser:

# B. ARBEIDSFORHOLD OG ARBEIDSBELASTNING

**Hovedstilling**

**B1 Hvilken tilknytningsform har du til arbeidslivet?**

☐ Ansatt ☐ Selvstendig næringsdrivende ☐ Annet, spesifiser:_____

**B2 Har du en lederrolle?**

☐ Ja ☐ Nei

**B3 Hva slags hovedstilling har du nå?**

☐ Smådyrpraksis
☐ Produksjonsdyrpraksis
☐ Kombinertpraksis
☐ Hestepraksis
☐ Akvakultur
☐ Offentlig forvaltning
☐ Akademia/forskning
☐ Pensjonist
☐ Annet, eventuelt spesifiser: _____

**B3a Hva slags stilling er dette?**

☐ Fast stilling
☐ Tidsbegrenset utdanningsstilling
☐ Vikariat Hvis vikariat, fyll inn antall mnd (samlet lengde) | | |
☐ Annet

**B3b Jobber du i**

☐ Bedrift som er del av kjede ☐ Frittstående bedrift

**B4 Hvor mange måneder har du vært i din nåværende stilling?** I ca. | | | måneder

**Arbeidstidsforhold**

Angi prosent:

**B5 Hvor mange prosent er din hovedstilling?** | | | %

**B6 Hvor lang er din fastlagte arbeidstid i timer per uke i din hovedstilling?**

| | timer og | | minutter pr uke

**B7 Hvor mange timer jobber du faktisk i gjennomsnitt pr. uke (inkludert alle stillinger)?**

| | timer

**B8 I en gjennomsnittlig arbeidsuke, inkludert ev. bistilling(er), omtrent hvor mange timer pr. uke bruker du på:**

| | | | |
|---|---|---|---|
| 1.1 Klinisk arbeid | | timer | 1.2 Møtevirksomhet | | timer |
| 1.3 Papirarbeid | | timer | 1.4 Telefoner/e-post | | timer |
| 1.5 Reisetid | | timer | 1.6 Totalt | | timer |

**B9 Hvor mange timer overtid har du i gjennomsnitt i din hovedstilling i en vanlig arbeidsuke? (Ikke forlenget arbeidstid eller utrykning på vakt, kun tilfeldig overtid.)**

Betalt: ☐☐ timer pr. uke

Ubetalt: ☐☐ timer pr. uke

**B10 Hvor ofte har du overtidsarbeid/forlenget arbeidstid (betalt eller ubetalt)?**

☐ Aldri
☐ Sjeldnere enn en gang i måneden
☐ Minst en gang i måneden
☐ Omtrent annenhver uke
☐ Hver uke

**Bistilling**

**B11 Har du noen fast bistilling eller ekstrajobb i tillegg til din hovedstilling?**

☐ Nei
☐ Ja

**B12 Hvis du har en bistilling, hvor mange arbeidstimer utgjør denne stillingen gjennomsnittlig pr. uke?**

☐☐ timer pr. uke

**Vakter som veterinær**

**B13 Hvis du har faste vakter ut over normal arbeidstid i din hovedstilling, hva slags vaktdelingsordning har du nå?**

☐ Tar ikke faste vakter * ☐ 9-delt **Gå til spørsmål B18*
☐ 2-3-delt ☐ 10-delt
☐ 4-5-delt ☐ 11-delt
☐ 6-7-delt ☐ >12-delt
☐ 8-delt

**B14 Hvilken type vaktordning deltar du i?**

☐ Offentlig vakt ☐ Privat vakt

**B15 Hvis du tar faste vakter ut over normal arbeidstid i din hovedstilling, hvor lange er vaktene?**

☐ Ca 1/2 døgn
☐ Ca. 1 døgn
☐ Mer enn 1 døgn
☐ Annet; hva _____

**B16 Ca. hvor mange timer av dine <u>faste vakter</u> tilbringer du**

Aktiv: ☐☐ timer

Hvilende: ☐☐ timer

Sovende: ☐☐ timer

Har du

☐ tilstedevakt eller ☐ hjemmevakt

**B17 Hvis du har faste vakter, cirka hvor lenge arbeider du dagen etter vakt?**

☐ Arbeider ikke rett etter vakt
☐ 1-3 timer
☐ 4-6 timer
☐ 7 timer eller mer

**B18 Hvis du har vakter som en del av en <u>bistilling,</u> cirka hvor mange timer av disse vaktene tilbringer du**

*Hvis du ikke har vakt som del av bistilling, gå til B19*

Aktiv: ☐☐ timer

Hvilende: ☐☐ timer

Sovende: ☐☐ timer

Har du

☐ tilstedevakt eller ☐ hjemmevakt

**B19 Cirka hvor mange avspaseringsuker pr. halvår benytter du til ikke-faglig aktivitet?**

☐ Ingen uke
☐ 1 uke
☐ 2 uker
☐ 3 uker
☐ 4 uker
☐ 5 uker
☐ 6 uker eller flere

**B20 Dersom du jobber i klinisk praksis, hvor mange avlivinger utfører du omtrent på en vanlig uke?**

☐ 0-4
☐ 5-9
☐ 10-14
☐ 15 eller fler

**Belastningsfaktorer**

**I hvilken grad gjør de følgende situasjoner/faktorer deg belastet (stresset)?**
**Sett ett kryss i den ruten som passer best for deg.**

| | | Ikke noen belastning | Litt belastning | Endel belastning | Mye belastning | Svært mye belastning |
|---|---|---|---|---|---|---|
| **B21** | Kritikk av veterinærer i media | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B22** | Kundene/dyreeierne setter ikke pris på det du gjør | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B23** | Bekymring over klager fra kunder/dyreeiere | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B24** | Å ha ansvar for dyrenes liv 24 timer i døgnet | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B25** | Telefoner, sykebesøk og utrykning om natten | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B26** | Å ta seg av vanskelige veterinærmedisinske problemstillinger | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B27** | Å ta seg av vanskelige kunder/dyreeiere | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B28** | Krysspress mellom økonomi og dyrevelferd/etikk | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B29** | Bekymringer knyttet til egen økonomi | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B30** | Bekymringer knyttet til bedriftens økonomi | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B31** | Sykejournaler og annet papirarbeid | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B32** | Kirurgiske inngrep | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B33** | Arbeidsmiljøet | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B34** | Tidspress | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B35** | Jobben går ut over familieliv | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B36** | Jobben går ut over sosialt liv | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B37** | Daglig kontakt med døende og kritisk syke dyr | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B38** | Å ta seg av dødssyke dyr og deres eiere | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B39** | Forespørsler om dyr fra venner og bekjente | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B40** | Forespørsler om dyr fra slektninger | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B41** | Være i generell beredskap | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | Ikke noen belastning | Litt belastning | Endel belastning | Mye belastning | Svært mye belastning |
|---|---|---|---|---|---|---|
| **B42** | Følelsesmessig engasjement i dyrene | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B43** | Forventninger om at veterinæren også skal hjelpe med ikke-medisinske problemer | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B44** | Avbrytelser og mas i arbeidssituasjonen | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B45** | Å ta seg av lidende dyr | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B46** | Konflikt med kolleger/medarbeidere | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B47** | Å få til en balanse mellom arbeid og privatliv | ☐ | ☐ | ☐ | ☐ | ☐ |

**Forhold til kolleger**

| | | Ingen grad | | | | | | I svært høy grad |
|---|---|---|---|---|---|---|---|---|
| **B48** | I hvilken grad trives du i det store og det hele blant dine kolleger? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B49** | I hvor stor grad har du følt deg ivaretatt av dine veterinærkolleger? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | Stemmer helt | Stemmer ganske bra | Stemmer ikke særlig bra | Stemmer ikke |
|---|---|---|---|---|---|
| **B50** | Det er rolig og behagelig stemning på min arbeidsplass | ☐ | ☐ | ☐ | ☐ |
| **B51** | Det er godt samhold | ☐ | ☐ | ☐ | ☐ |
| **B52** | Mine arbeidskolleger stiller opp for meg | ☐ | ☐ | ☐ | ☐ |
| **B53** | Det er forståelse for at jeg kan ha en dårlig dag | ☐ | ☐ | ☐ | ☐ |
| **B54** | Jeg kommer godt overens med mine overordnede* | ☐ | ☐ | ☐ | ☐ |
| **B55** | Jeg trives bra med mine arbeidskolleger | ☐ | ☐ | ☐ | ☐ |

**Besvares bare dersom du har en overordnet.*

**B56 Når du føler deg bekymret, engstelig eller nervøs - drikker du noen gang alkohol for å klare situasjonen bedre?**

☐ Aldri ☐ Sjelden ☐ Av og til ☐ Ofte

| **Vedrørende ditt arbeid** | | Meget sjelden eller aldri | Nokså sjelden | Av og til | Nokså ofte | Meget ofte eller alltid |
|---|---|---|---|---|---|---|
| **B57** | Er det fastsatt klare mål for din jobb? | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B58** | Vet du hva som er ditt ansvarsområde? | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B59** | Vet du nøyaktig hva som forventes av deg i jobben? | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B60** | Må du gjøre ting du mener burde vært gjort annerledes? | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B61** | Får du oppgaver uten tilstrekkelig hjelpemidler og ressurser til å fullføre dem? | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B62** | Mottar du motstridende forespørsler fra to eller flere personer? | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B63** | Fordeler din nærmeste sjef arbeidsoppgaver rettferdig og upartisk?* | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B64** | Behandler din nærmeste sjef de ansatte rettferdig og upartisk?* | ☐ | ☐ | ☐ | ☐ | ☐ |
| **B65** | Er forholdet mellom deg og din nærmeste sjef en kilde til stress for deg?* | ☐ | ☐ | ☐ | ☐ | ☐ |

**Besvares bare dersom du har en overordnet.*

| | | Ja, ofte | Ja, noen ganger | Nei, sjelden | Nei, så godt som aldri |
|---|---|---|---|---|---|
| **B66** | Krever arbeidet ditt at du arbeider meget raskt? | ☐ | ☐ | ☐ | ☐ |
| **B67** | Krever arbeidet ditt at du arbeider meget hardt? | ☐ | ☐ | ☐ | ☐ |
| **B68** | Krever arbeidet ditt for stor arbeidsinnsats? | ☐ | ☐ | ☐ | ☐ |
| **B69** | Har du tilstrekkelig tid til å utføre arbeidsoppgavene dine? | ☐ | ☐ | ☐ | ☐ |
| **B70** | Forekommer det ofte motstridende krav i arbeidet ditt? | ☐ | ☐ | ☐ | ☐ |
| **B71** | Får du lære nye ting i ditt arbeid? | ☐ | ☐ | ☐ | ☐ |
| **B72** | Krever ditt arbeid dyktighet? | ☐ | ☐ | ☐ | ☐ |
| **B73** | Krever ditt arbeid oppfinnsomhet/kreativitet? | ☐ | ☐ | ☐ | ☐ |
| **B74** | Innebærer ditt arbeid at du gjør samme ting om og om igjen? | ☐ | ☐ | ☐ | ☐ |
| **B75** | Har du frihet til å bestemme hvordan ditt arbeid skal utføres? | ☐ | ☐ | ☐ | ☐ |
| **B76** | Har du frihet til å bestemme hva som skal utføres i ditt arbeid? | ☐ | ☐ | ☐ | ☐ |

# C HELSE

**Nedenfor finner du en oppstilling av plager som man av og til har.**
**Les nøye gjennom dem, en for en, og angi deretter <u>hvor mye hvert enkelt problem har plaget deg eller vært til besvær i løpet av de siste 14 dagene</u>**

| | | Ikke i det hele tatt | Litt | Måtelig | Ganske mye | Veldig mye |
|---|---|---|---|---|---|---|
| **C1** | Nervøsitet, indre uro | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C2** | Stadig redd eller engstelig | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C3** | Følelse av håpløshet med tanke på fremtiden | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C4** | Mye bekymret eller urolig | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C5** | Nedtrykt, tungsindig | ☐ | ☐ | ☐ | ☐ | ☐ |

**C6 Hvis du har hatt psykiske problemer <u>i løpet av det siste året,</u> har du da søkt/fått hjelp for dette?**

☐ Ikke hatt psykiske problemer av betydning* **Gå til spørsmål C13*
☐ Har ikke søkt hjelp selv om jeg nok kunne ha hatt behov for det
☐ Ja, har konsultert allmennlege eller fastlege
☐ Ja, har konsultert psykolog/psykiater
☐ Ja, har vært innlagt i psykiatrisk avdeling

**C7 Hvis du har vært i kontakt med psykolog/psykiater, hva slags behandling har du fått?**
*Det er mulig å sette flere klyss*

☐ 1-5 samtaler
☐ Flere enn 5 samtaler
☐ Psykoterapi/psykoanalyse
☐ Gruppeterapi
☐ Medikamentell behandling

**Hvis du har hatt psykiske problemer <u>i løpet av det siste året</u>, i hvilken grad mener du at følgende forhold var medvirkende til at det ble vanskelig for deg?**

| | | Betydde ingenting | Betydde litt | Betydde endel | Betydde ganske mye | Betydde svært mye |
|---|---|---|---|---|---|---|
| **C8** | Personlige forhold | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C9** | Forhold til familie/ektefelle/partner | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C10** | Sosiale forhold | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C11** | Problemer i forbindelse med veterinæryrket | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C12** | Andre forhold | ☐ | ☐ | ☐ | ☐ | ☐ |

**Livslyst**

**De følgende spørsmål dreier seg om du i løpet av det siste året har mistet livslysten, og i så fall i hvilken grad?**

**C13** **Har du noen gang i løpet av det siste året følt at livet ikke er verdt å leve?**

☐ Aldri ☐ Nesten aldri ☐ Noen ganger ☐ Mange ganger

**C14** **Har du i løpet av det siste året ønsket at du var død - f.eks. at du skulle sovne inn og aldri våkne igjen?**

☐ Aldri ☐ Nesten aldri ☐ Noen ganger ☐ Mange ganger

**C15** **Har du noen gang i løpet av det siste året tenkt på å ta livet ditt, selv om du vet at du ikke vil gjøre det?**

☐ Aldri ☐ Nesten aldri ☐ Noen ganger ☐ Mange ganger

**C16** **Har du noen gang i løpet av det siste året vært i den situasjonen at du alvorlig har overveiet å ta livet ditt og til og med planlagt hvordan du i såfall skulle gjøre det?**

☐ Aldri ☐ Nesten aldri ☐ Noen ganger ☐ Mange ganger

**Hvis det har hendt, i hvilken grad mener du de følgende forhold var medvirkende til at det ble så vanskelig for deg?**

| | | Betydde ingenting | Betydde litt | Betydde endel | Betydde ganske mye | Betydde svært mye |
|---|---|---|---|---|---|---|
| **C17** | Personlige forhold | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C18** | Forhold til familie/ektefelle/partner | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C19** | Sosiale forhold | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C20** | Problemer i forbindelse med veterinæryrket | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C21** | Andre forhold | ☐ | ☐ | ☐ | ☐ | ☐ |

**C22** **Har du i løpet av det siste året forsøkt å ta ditt eget liv?**

☐ Aldri ☐ Nesten aldri ☐ Noen ganger ☐ Mange ganger

**Hvis det har hendt, i hvilken grad mener du de følgende forhold var medvirkende til at det ble så vanskelig for deg?**

| | | Betydde ingenting | Betydde litt | Betydde endel | Betydde ganske mye | Betydde svært mye |
|---|---|---|---|---|---|---|
| **C23** | Personlige forhold | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C24** | Forhold til familie/ektefelle/partner | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C25** | Sosiale forhold | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C26** | Problemer i forbindelse med veterinæryrket | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C27** | Andre forhold | ☐ | ☐ | ☐ | ☐ | ☐ |

## Holdninger til aktiv dødshjelp

**Aktiv dødshjelp** er en samlebetegnelse på eutanasi og legeassistert selvmord. I noen europeiske land er aktiv dødshjelp tillatt, men i Norge er det ulovlig.

**Eutanasi** er en leges tilsiktede drap på en person ved å sette en sprøyte med dødbringende medikamenter etter at personen frivillig har bedt om det.

**Legeassistert selvmord** er en leges hjelp til selvmord, ved å skaffe til veie medikamenter som personen kan innta selv.

| | **Ta stilling til følgende påstander** | Svært enig | Litt enig | Verken enig eller uenig | Litt uenig | Svært uenig |
|---|---|---|---|---|---|---|
| **C28** | Legeassistert selvmord bør tillates for personer som har en dødelig sykdom med kort forventet levetid. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C29** | Eutanasi bør tillates for personer som har en dødelig sykdom med kort forventet levetid. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C30** | Aktiv dødshjelp bør tillates også for personer som har en uhelbredelig kronisk sykdom, men ikke er døende. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C31** | Det finnes tilfeller der det kan være riktig/moralsk forsvarlig av legen å utføre aktiv dødshjelp, selv om det er ulovlig. | ☐ | ☐ | ☐ | ☐ | ☐ |

## Holdninger til psykiske lidelser

| | **Ta stilling til følgende påstander** | Svært enig | Noe enig | Ikke sikker/ ubestemt | Noe uenig | Svært uenig |
|---|---|---|---|---|---|---|
| **C32** | Behandling kan hjelpe mennesker med psykiske lidelser til å føre et normalt liv. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **C33** | Folk er generelt sett omsorgsfulle og positivt innstilte overfor personer med psykiske lidelser. | ☐ | ☐ | ☐ | ☐ | ☐ |

# D Personlige egenskaper

**Ta stilling til følgende påstander**

| | | Stemmer ikke | Stemmer |
|---|---|---|---|
| **D1** | Det er vanskelig for meg å stole på folk ettersom de så ofte vender seg mot meg eller lar meg i stikken | ☐ | ☐ |
| **D2** | På en eller annen måte føler jeg at jeg ikke vet hvordan jeg skal oppføre meg sammen med andre mennesker | ☐ | ☐ |
| **D3** | Jeg opplever meg selv som helt ulik til ulike tidspunkter | ☐ | ☐ |
| **D4** | Jeg føler meg ensom mesteparten av tiden | ☐ | ☐ |
| **D5** | Folk som virker bra til å begynne med, ender ofte opp med å skuffe meg | ☐ | ☐ |
| **D6** | Jeg føler det av og til som om jeg lever i en tåke | ☐ | ☐ |
| **D7** | Noen ganger føler jeg at jeg ikke er meg selv | ☐ | ☐ |
| **D8** | Folk kan oppfatte meg som uhøflig eller hensynsløs uten at jeg skjønner hvorfor | ☐ | ☐ |
| **D9** | Av og til får jeg rare tanker i hodet som jeg ikke er i stand til å få vekk | ☐ | ☐ |

**D10 Eventuelle kommentarer til spørreskjemaet?**