Original article

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Biological hazards, psychological and social concerns among female veterinarians

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ABSTRACT

Introduction. *The veterinary profession in Algeria has traditionally been male-dominated, largely due to the perceived complexity and high-pressure work environment.*

The purpose. *This study aims to identify the primary risks confronting female veterinary professionals.*

Materials and methods. *An online questionnaire consisting of 22 questions was published online. A total of 108 female veterinary practitioners mainly in the private sector from various departments in Algeria have participated.*

Results. *Work-related problems were present in 61.1% of responders, which caused much more flu, heatstrokes and frostbites. A very close percentage was observed for dogs and cats bites and/or scratches (59.2%), primarily observed in the front limb. Even allergies were present in 56.5% of cases, especially to desinfectants. A lower degree of infectious and/or parasitic disease occurrence (38.0%) was observed and dermatophytosis was preponderant. Furthermore, musculoskeletal disorders were extremely common and concerned 54.6%, with a predominance of low back pain. A percentage of 19.4% reported road accidents during the round trip between the workplace and the residence, mainly causing work stoppages of around a month. A majority of female practitioners had psychological concerns (70.3%), stress was the most reported, as well as social difficulties (59.2%) and is especially the problems with the family environment, in addition to insufficient financial income.*

Limitations. *The study could be continued and extended to other professional categories related to the veterinary sector.*

Conclusions. *This study helped to identify problems faced by women practitioners in Algeria, and propose solutions to enhance veterinary practices and strengthen women's position in society.*

Keywords: *veterinary; women; risks; Algeria*

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Биологические угрозы, психологические и социальные проблемы у женщин-ветеринаров

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РЕЗЮМЕ

Введение. *Ветеринарная профессия в Алжире традиционно была преимущественно мужской, поскольку требовала особых умений и тяжёлого физического труда.*

Цель работы *– выявление основных производственных рисков для женщин-ветеринаров.*

Материалы и методы. *Разработана и опубликована онлайн-анкета, состоящая из 22 вопросов. Всего в исследовании приняли участие 108 женщин-ветеринаров из различных областей Алжира, в основном из частного сектора.*

Результаты. *61,1% ответивших на анкету работниц отметили связанные с производственными процессами частые простудные болезни, перегрев и обморожения. Получили травмы из-за укусов и (или) царапин собак и кошек 59,2% женщин, в основном в области рук; 56,5% отметили аллергию, особенно при контакте с дезинфицирующими средствами. Инфекционные и (или) паразитарные болезни указали в анкете 38% женщин-ветеринаров, чаще других отмечен дерматофитоз. Кроме того, были чрезвычайно распространены поражения опорно-двигательного аппарата (54,6% опрошенных), преобладали боли в пояснице. О дорожно-транспортных происшествиях во время поездок между домом и работой сообщили 19,4% респондентов, и это приводило к перерывам в работе примерно раз в месяц. Психологические проблемы, стресс отметили 70,3% практикующих женщин-ветеринаров, социальные трудности – 59,2% (проблемы в семейном окружении, конфликты, в том числе связанные с материальными затруднениями, низким доходом).*

Ограничения исследования. *Исследование возможно продолжить и распространить на другие профессиональные категории, связанные с ветеринарным сектором.*

Заключение. *Исследование помогло выявить проблемы, с которыми сталкиваются в Алжире практикующие женщины-ветеринары, и предложить решения для улучшения ветеринарной практики и укрепления положения женщин в обществе.*

Ключевые слова: *ветеринария; женщины; риски; Алжир*

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Introduction

There is a wealth of evidence indicating that women in a multitude of industries continue to encounter challenges related to gender in the workplace. They are often perceived as less suitable for leadership or management roles in business due to concerns surrounding maternity leave and family responsibilities [1]. The veterinary sector, like other professions, is grappling with similar issues of feminisation [2]. Despite this shift in gender dynamics, there are indications of institutionalised misogyny and sexism that persist [3]. The field of veterinary medicine plays an important role in the health and well-being of both animals and humans. It encompasses a wide range of responsibilities, from clinical care to public health management [4].

It is encouraging to note that Algeria, like many countries, has recorded an increase in the number of women pursuing a career in veterinary medicine. However, despite their progression in the profession, there remains a paucity of research specifically addressing the occupational health and well-being of female veterinary practitioners in the Algerian context. It would be beneficial to gain a deeper understanding of the particular challenges and risks facing this population in order to promote their security, psychological well-being and overall effectiveness in veterinary practice.

Through our survey, the purpose in exploring these issues is to improve knowledge of the veterinary profession and develop strategies to facilitate better working conditions and support systems for women veterinarians which represented approximately thirty percent of the total number of veterinarians which is estimated at 1200 state practitioners and 2300 private practitioners.

Materials and methods

Questionnaire. A questionnaire was created in French using Google Forms to collect information on professional risks associated with veterinary practice, specifically targeting female veterinarians in Algeria. Prior to implementation, the questionnaire was rigorously tested for two weeks to ensure its comprehensibility and accessibility. This testing phase aimed to refine the questionnaire and address any potential ambiguities or difficulties in understanding. Twenty-one questions were retained, mainly with a choice of single or multiple answers to facilitate data collection. The questionnaire was divided into three sections to enhance the clarity of responses. It was designed to be anonymous, and a consent form was presented at the beginning. No financial compensation was offered to participants.

The questionnaire was published online via social media, specifically Facebook veterinary groups, for six months, from November 2022 to April 2023.

Statistical analysis. To compare observations and determine significant of each proportion, the sample test for equality of proportions with continuity correction was using by the 'prop. test ()' function in R Studio software (version 1.0.136 RStudio, Inc.). The test is significant when its p-value is < 0.05. The confidence interval (CI) for proportions was calculated using the Wilson method, which is more accurate than the traditional normal approximation, especially for small samples or extreme proportions. The Wilson method adjusts the interval conservatively by accounting for increased variability.

$$\mathrm{CI}_{\mathrm{lower}} = \frac{\hat{p} + \frac{z^2}{2n} - z\sqrt{\frac{\hat{p}(1-\hat{p})}{n} + \frac{z^2}{4n^2}}}{1 + \frac{z^2}{n}},$$

$$\mathrm{CI}_{\mathrm{upper}} = \frac{\hat{p} + \frac{z^2}{2n} + z\sqrt{\frac{\hat{p}(1-\hat{p})}{n} + \frac{z^2}{4n^2}}}{1 + \frac{z^2}{n}}.$$

In the equation, $\hat{p}$ is the observed proportion, n is the sample size, and z is the critical value for the chosen confidence level (1.96 for 95%).

Results

Table 1 presents the main results of the description of the target population. Most of the women who responded to the survey were married (75.0%). Half of the responses (51.9%) came from the central region of the country (Algiers, Boumerdes, Blida and Tipaza). We received responses from a large majority of women with between 1 and 10 years' experience (71.3%), with very few practitioners with more than 20 years' experience (2.8%). In addition, the majority work in the private sector (86.1%) compared to only 13.9% in the public sector, with a preponderance of activity in urban areas (59.3%) compared to rural areas (40.7%).

Table 2 clearly shows that musculoskeletal disorders are a significant issue, with low back pain being the most common (32 cases), altough the difference is not significant (p>0.05). During daily trips, road accidents were reported by 19.4% of practitioners, resulting in them being away from work for approximately a month (in 10 cases) with a significant difference (p<0.05). Furthermore, a high number of practitioners reported problems related to difficult climates (61.1%), with a very significant value, the majority involved flu (26 cases). Bites and/or scratches from carnivores were present in 59.2% of cases, mainly in the front limb (51 cases). Concerning infectious and/or parasitic diseases, they were present in 38% of those surveyed, with the majority being dermatophytosis (29 cases), as well as abortions caused by toxoplasmosis (5 cases) and brucellosis (3 cases). Allergies were also very common, with 56.5% of people suffering from them, and disinfectants were the main incriminated (27 cases), but without statistical significance.

It was observed that there is a high rate of psychological disorders among practitioners with significant differences (Table 3), with 70.3% of them reporting it. Stress was found to be the main cause (with 55 cases). Social problems were reported by 59.2% of the practitioners, and personal problems with peers and/or family members, as well as financial problems, were found to be the most common causes (with 34 and 28 cases respectively), differences were significant statistiqually.

Table 1 / Таблица 1

Descriptive statistics of the women veterinarians who responded
Описательная статистика анкетированных женщин-ветеринаров

Criterion Критерий	Variable Переменная	*n* (%)
Marital status Семейное положение	Married / Замужем	81 (75)
	Single / Не состоит в браке	27 (25)
Department Область	East / Восток	18 (16.7)
	West / Запад	20 (18.5)
	North / Север	56 (51.9)
	South / Юг	14 (13)
Experience in the field, years Рабочий стаж, лет	< 1	20 (18.5)
	1–10	77 (71.3)
	10–20	8 (7.4)
	> 20	3 (2.8)
Activity Деятельность	Private / Частное хозяйство	93 (86.1)
	State / Государственная	15 (13.9)
Area Среда	Urban / Городская	64 (59.3)
	Rural / Сельская	44 (40.7)

Table 2 / Таблица 2

Occupational physical accident incidence and associated risks among women veterinarians: Confidence Intervals for proportions and Chi-Squared test comparisons

Частота несчастных случаев на производстве и связанные с ними риски среди женщин-ветеринаров: доверительные интервалы для пропорций и сравнений с использованием критерия хи-квадрат

Criterion Критерий	Presence or absence Наличие или отсутствие	Variable Переменная	*n*	Proportion, % [CI, 95%] Доля, % [ДИ, 95%]	*p*-value Значение *p*
Musculoskeletal disorders Болезни опорно-двигательного аппарата	No / Не было		52	48.14 [0.38, 0.57]	0.68
	Yes / Было		56	51.85 [0.42, 0.61]	–
		Low back pain / Боли в пояснице	32	58.2 [0.44, 0.69]	< 0.001
		Osteoarthritis / Остеоатрит	11	20 [0.11, 0.31]	–
		Tendonitis / Тендинит	6	10.9 [0.05, 0.21]	–
		Herniated disc / Грыжа позвоночного диска	5	9.1 [0.03, 0.19]	–
		Scoliosis / Сколиоз	1	1.8 [0.003, 0.094]	–
Road accidents Дорожные происшествия	No / Не было		87	80.6 [0.72, 0.86]	< 0.001
	Yes / Было		21	19.4 [0.13, 0.27]	–
		One week away / Неделю назад	7	33.3 [0.17, 0.27]	0.003
		One month away / Месяц назад	10	47.6 [0.28, 0.67]	–
		Several months away / Несколько месяцев спустя	4	19.1 [0.07, 0.4]	–
Work-related problems in hard weathers Проблемы в связи с работой в неблагоприятных погодных условиях	No / Не было		42	38.9 [0.3, 0.48]	0.0017
	Yes / Было		66	61.1 [0.51, 0.69]	–
		Flu / ОРЗ	26	39.4 [0.28, 0.51]	< 0.001
		Heatsroke / Перегрев	21	31.8 [0.21, 0.43]	–
		Frosbite / Обморожения	17	25.8 [0.17, 0.37]	–
		Other / Другие	2	3.0 [0.008, 0.1]	–
Carnivore bites and/or scratches Укус или царапины у животных	No / Не было		40	37.03 [0.32, 0.5]	< 0.001
	Yes / Было		68	63 [0.5, 0.68]	–
		Front limb / Руки	51	75 [0.64, 0.83]	< 0.001
		Hind limb / Ноги	15	22 [0.14, 0.33]	–
		Head / Голова	1	1.5 [0.003, 0.08]	–
		Trunk / Туловище	1	1.5 [0.003, 0.08]	–
Development of infectious and (or) parasitic diseases Развитие инфекционных и (или) паразитарных заболеваний	No / Не было		67	62.0 [0.53, 0.7]	< 0.001
	Yes / Было		41	38.0 [0.29, 0.47]	–
		Dermatophytosis / Дерматофития	29	70.7 [0.55, 0.82]	< 0.001
		Toxoplasmosis / Токсоплазмоз	5	12.2 [0.05, 0.25]	–
		Brucellosis / Бруцеллёз	3	7.3 [0.03, 0.2]	–
		Tuberculosis / Туберкулёз	3	7.3 [0.03, 0.2]	–
		Q Fever / Ку-лихорадка	1	2.4 [0.004, 0.12]	–
Allergies Аллергии	No / Не было		47	43.5 [0.35, 0.53]	0.076
	Yes / Было		61	56.5 [0.47, 0.65]	–
		Desinfectants / Дезинфицирующие средства	27	44.3 [0.32, 0.57]	< 0.001
		Dog and cat hair / Собачья и кошачья шерсть	15	24.6 [0.15, 0.36]	–
		Drugs / Наркотические лекарственные средства	10	16.4 [0.09, 0.28]	–
		Dust / Пыль	5	8.2 [0.03, 0.18]	–
		Not determined / Не определено	4	6.5 [0.02, 0.16]	–

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Table 3 / Таблица 3

Occupational psychological and social preoccupations incidence and associated risks among women veterinarians: Confidence Intervals for Proportions and Chi-Squared test comparisons

Распространённость профессиональных, психологических и социальных проблем и связанные с ними риски среди женщин-ветеринаров: доверительные интервалы для сравнения пропорций и критерия хи-квадрат

Criterion Критерий	Presence or absence Наличие или отсутствие	Variable Переменная	*n*	Proportion, % [CI, 95%] Доля, % [ДИ, 95%]	*p*-value Значение *p*
Psychological disorders Психологические расстройства	No / Не было		32	29.6 [0.22, 0.39]	< 0.001
	Yes / Были		76	70.4 [0.61, 0.78]	
		Stress / Стресс	55	72.4 [0.61, 0.81]	< 0.001
		Burn-out / Выгорание	14	18.4 [0.11, 0.28]	
		Nervous breakdowns / Нервные срывы	5	6.7 [0.03, 0.14]	
		Anxiety / Тревожность	2	2.6 [0.007, 0.09]	
Social problems Социальные проблемы	No / Не было		27	25 [0.18, 0.34]	< 0.001
	Yes / Были		81	75 [0.66, 0.82]	
		Personal problems with the family circle Личные конфликты в кругу семьи	34	42 [0.32, 0.53]	< 0.001
		Financial problems / Материальные трудности	28	34.5 [0.25, 0.45]	
		Mistreatment of most men Неуважительное отношение со стороны мужчин	15	18.5 [0.11, 0.28]	
		Negative view of the society / Осуждение в обществе	4	4.9 [0.02, 0.12]	

Discussions

Numerous studies have highlighted occupational hazards within veterinary practice affecting both men and women [5]. In light of these considerations, this study seeks to identify the primary risk factors for occupational injuries and diseases, emotional well-being, and challenges encountered specifically by female veterinarians in Algeria. In the intricate construction of family systems, women emerge as key figures embodying multiple roles. In particular, a significant proportion of the female participants in our study have decided to pursue a professional career as a veterinarian, with a particular focus on the private sector. This choice highlights the nuanced interplay between professional activities and family responsibilities, which can lead to various challenges.

In our survey, women veterinary practitioners who reported musculoskeletal disorders were predominantly affected by low back pain. This could be linked to the varied manipulations of heavy or uncooperative animals, which could potentially result in damage to the musculoskeletal system, particularly the spine [6]. Additionally, prolonged standing while performing all care tasks could also contribute [7].

We also observed a small number of individuals who had been involved in road accidents, which might be associated with working in rural areas. As rural veterinarians commonly travel 500 to 1000 kilometres by car each week, they are particularly exposed to traffic accidents, especially given that they sometimes need to make urgent visits [8]. Furthermore, participants were exposed to health problems related to work in harsh weather conditions, notably flu, headstroke, and frostbite. It is worth noting that climate change can result in alterations to one or more climate variables, such as temperature, precipitation, wind, and sunlight. These alterations can potentially affect the survival, reproduction, or distribution of disease pathogens and their hosts, as well as the availability and conditions of their transmission environment [9].

Furthermore, female practitioners have been known to experience bites from carnivores, particularly on the front limb. In addition to the traumatic damage that bites may cause, the saliva of these animals may be contaminated to a significant extent with pathogens, which could potentially lead to human infection even without a bite [10].

Veterinarians are commonly exposed to zoonotic pathogens at work. Globally, the zoonoses most frequently reported in veterinarians include campylobacteriosis, salmonellosis, brucellosis, cryptosporidiosis, bite infections, and ringworm [11]. In our study, participants acquired an infectious disease, dermatophytosis. It is worth noting that the most commonly reported disease was a zoonotic disease transmitted to humans by direct contact with an infected animal [12]. It is also important to consider that a number of these hazards may pose a particularly high risk to maternal and fetal health and especially, to immunocompromised individuals (including pregnant women) [13].

Allergies were also recorded, developping an allergy to disinfectants may present hazards by contact or by inhalation causing an inflammation of the mucous membranes, at the respiratory tract and the conjunctiva, and special attention should be paid to products that have toxic, carcinogenic and teratogenic effects [14].

On the psychological side, a majority of respondents were exposed to mental disorders, notably, stress, which represents a consequence of social and family problems reported by female veterinary practitioners such as personal problems, mistreatment of most men and the negative view of society to a worker female especially veterinarian. This can lead to have a suicidal ideation which is linked with mental health disorders such as depression and psychosis, and also with anxiety and other disorders related to personality [15].

Burn-out , which is a psycho-emotional syndrome that affects workers in any activity or profession was also reported by female veterinarians, it could be linked to low financial income also, to stress at the workplace and long work hours [16].

Several previous studies have demonstrated the high risk of using radiography, which is used for many diseases diagnostic as well as; fractures, gastrointestinal ailments. Radiation poses significant risks to human embryos and fetuses [17]. Exposure to high doses can result in a range of adverse outcomes including sterility, miscarriage, genetic mutations, cancer, developmental abnormalities, and cognitive impairments in offspring. Research suggests that exposure to ionizing radiation in the early stages of pregnancy, particularly within the first three weeks, may elevate the risk of spontaneous abortion [18, 19].

Original article

Conclusion

Our online cross-sectional study has demonstrated that the veterinary profession has a negative impact on the well-being of female practitioners on multiple levels. This starts with innumerable physical problems such as musculoskeletal disorders, work-related health issues, zoonotic diseases and allergies. There are also psychological hazards which are consequences of stressful work situations, and these could intensify by personnel problems including conflicts with both family and society that judge negatively women in that profession.

These challenges not only affect the physical and mental health of veterinary professionals in Algeria, but they also increase the likelihood of them leaving the profession, reduce job satisfaction and diminish the quality of animal care.

This study highlights the urgent need to protect the well-being of female veterinarians. Future studies should focus on developing effective solutions to protect both human and animal health.

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