Addressing occupational injuries occurred among veterinarians in Southeast Asia: a scoping review

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Abstract. This study aims to identify injuries occurring among veterinarians in the Southeast Asia region and to identify prevention strategies for occupational injuries among veterinarians. PubMed, Scopus, and Google Scholar were used to search for articles reporting injuries among veterinarians. Search terms were explored based on MeSH identification after the determination of population, concept, and context. Only papers in English and reporting the injuries that occur in veterinarians were included in the study. Rayyan.ai - a tool screening website, was used for abstract and title screening. This study uses PRISMA ScR flowchart to guide the screening and process. In total, 369 articles were retrieved, 16 from PubMEd, 303 from Scopus, and 50 from Google Scholar. However, only the first 5 pages of Google Scholar were retrieved for screening as they became less relevant the further back they went. There were no articles that specifically mentioned occupational injuries among veterinarians in the Southeast Asia region. Nevertheless, 3 articles from Malaysia, Singapore, and the Philippines, mentioned occupational injuries among animal health workers. From those 3 articles, it has been identified that animal-related injuries, sharp-related injuries, and ergonomics are the three most commonly reported incidents among animal health workers. Other incidents such as chemical and psychosocial were also reported. The lack of scientific articles reporting occupational safety and health incidents in veterinarians can be a double-edged sword. This could mean that there are no events to report. However, on the other hand, this should be of particular concern as it means that they are not well documented. Veterinarians, including other animal health workers, are one of the spearheads of zoonotic disease transmission. The findings emphasize the urgent need for targeted research and policy formulation in addressing occupational hazards and improving the well-being and safety of veterinarians.

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1 Introduction

The global pandemic has provided a clear example that the spread of disease can have a domino effect on various sectors of life. Although there is still much debate, the evidence through various scientific articles further proves the theory that COVID-19 is a disease transmitted from animals to humans, commonly referred to as a zoonotic disease [1]. In addition to COVID-19, recent reports of the spread of the H5N1 influenza virus in humans, which is usually obtained from poultry, are now obtained from cattle [2].

Veterinarians and other related occupations (animal health workers) are one of the spearheads in the transmission of zoonotic diseases due to the frequency of encountering a wide variety of animals with various conditions [3–5]. Thus, the transmission of disease pathogens can endanger public health and become a threat.

Occupational injuries to veterinarians and animal health workers also vary widely. Starting from the risk of occupational injuries obtained from the laboratory to the field when handling patients [6] In addition, animal behaviour is often unpredictable, putting animal health workers at a higher risk of occupational injury [7].

Several countries, such as India, Saudi Arabia, Portugal, and the United States have reported incidents caused by occupational accidents by veterinarians and other animal health workers [3,8–10]. Furthermore, the British Veterinary Association (BVA) reported an incidence of occupational injuries of 61.6% through a survey taken from 720 veterinarians in 2015 [11]. This shows the importance of providing wellness attention to these workers.

In Indonesia, no publication specifically discusses occupational safety and health for veterinarians and other animal health workers. Given the importance of occupational safety and health (OSH) in veterinarians and animal health workers, it is necessary to know the mapping of its occurrence. However, since there is none and to provide a complete and more comprehensive picture, a case mapping study in neighboring countries regarding occupational injuries in Southeast Asia should be conducted.

This study aims to determine the incidence of occupational injuries among veterinarians in the Southeast Asia region. By knowing this, strategies to prevent occupational injuries in veterinarians can be targeted.

2 Methods

A scoping review was conducted based on Arksey and O'Malley's framework [12]. Scoping review reporting was conducted based on The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 [13].

2.1 Study Selection

PubMed, Scopus and Google Scholar were used to search for articles reporting injuries among veterinarians. Search terms (Table 1) were explored based on MeSH identification after the determination of population, concept, and context. To expand the scope of veterinarian terms, a search was also conducted using the keyword animal care workers and its derivatives obtained from MeSH. Only papers in English and reporting the injuries that occur in veterinarians were included in the study. There is no time restriction for publications intended to be included in the study.

Table 1. Search terms used in the study

Database or search engine	**Terms**
PubMed (advanced search)	(((((((((Health, Occupational) OR (Employee Health)) OR (Health, Employee)) OR (Industrial Hygiene)) OR (Health, Industrial)) OR (Hygiene, Industrial)) OR (Industrial Health)) OR (Safety, Occupational)) OR (Occupational Health)) OR (Occupational injuries) AND ((((((((((((((((((((Veterinarians) OR (Veterinarian)) OR (Animal Technician)) OR (Technicians, Animal)) OR (Technician, Animal)) OR (Veterinary Assistants)) OR (Animal Care Assistants)) OR (Animal Care Assistant)) OR (Assistant, Animal Care)) OR (Assistants, Animal Care)) OR (Care Assistant, Animal)) OR (Animal Care Technician)) OR (Care Technician, Animal)) OR (Technician, Animal Care)) OR (Technician, Veterinary)) OR (Veterinary Technician)) OR (Nurse, Veterinary)) OR (Veterinary Nurse)) OR (Assistant, Veterinary)) OR (Veterinary Assistant)) OR (Veterinary Nurses)) OR (Laboratory Animal Technologists)) OR (Animal Technologist, Laboratory)) OR (Technologist, Laboratory Animal) AND ((((((((((((((((ASEAN) OR (South-East Asia)) OR (Southeast Asia)) OR (Brunei)) OR (Brunei Darussalam)) OR (Cambodia)) OR (Indonesia)) OR (Lao PDR)) OR (Laos)) OR (Malaysia)) OR (Myanmar)) OR (Philippines)) OR (Singapore)) OR (Thailand)) OR (Viet Nam)) OR (Vietnam)) OR (Timor Leste)) OR (East Timor)
Scopus (advanced search)	ALL ("Occupational injuries" OR "Health, Occupational" OR "Employee Health" OR "Health, Employee" OR "Industrial Hygiene" OR "Health, Industrial" OR "Hygiene, Industrial" OR "Industrial Health" OR "Safety, Occupational" OR "Occupational Safety" OR "Occupational Health") AND ("Veterinarian*" OR "Animal Technician*" OR "Veterinary Assistants" OR "Animal Care Assistant*" OR "Animal Care Technician*" OR "Veterinary Technician*" OR "Veterinary Nurse*" OR "Laboratory Animal Technologists") AND ("ASEAN" OR "South-East Asia" OR "Southeast Asia" OR "Brunei" OR "Brunei Darussalam" OR "Cambodia" OR "Indonesia" OR "Lao PDR" OR "Laos" OR "Malaysia" OR "Myanmar" OR "Philippines" OR "Singapore" OR "Thailand" OR "Viet Nam" OR "VieArticles obtained from journal databases are then collected into Rayyan.ai- After duplicates were detected and omitted, investigators will screen the titles, and abstracts.tnam" OR "Timor Leste" OR "East Timor")
Google Scholar	(Occupational injuries OR Occupational Safety OR Occupational Health) AND (Veterinarian OR Animal Technician OR Animal Care Assistant OR Animal Care Technician OR Veterinary Technician OR Veterinary Nurse OR Veterinary Assistant OR Laboratory Animal Technologist) AND (ASEAN OR SEA OR Southeast Asia OR South-East Asia OR Brunei OR Brunei Darussalam OR Cambodia OR Indonesia OR Lao PDR OR Laos OR Malaysia OR Myanmar OR Philippines OR Singapore OR Thailand OR Viet Nam OR Vietnam OR Timor Leste OR East Timor)

2.2 Data Analysis

Articles obtained from journal databases are then collected into Rayyan.ai - a website-based application for systematic review [14]. After duplicates were detected and omitted, investigators will screen the titles, and abstracts. Articles that meet the screening are continued to full text screening. Data was extracted and then analysed descriptively.

3 Results and Discussion

In total, 369 articles were retrieved, 16 from PubMEd, 303 from Scopus, and 50 from Google Scholar (Figure 1). Google Scholar came back with 8,800 results. However, only the first 5 pages of Google Scholar were retrieved for screening as they became less relevant the further back they went. Thirty-five articles were detected as duplicates. Articles outside the Southeast Asia region, review type, and using foreign languages were excluded from this study.

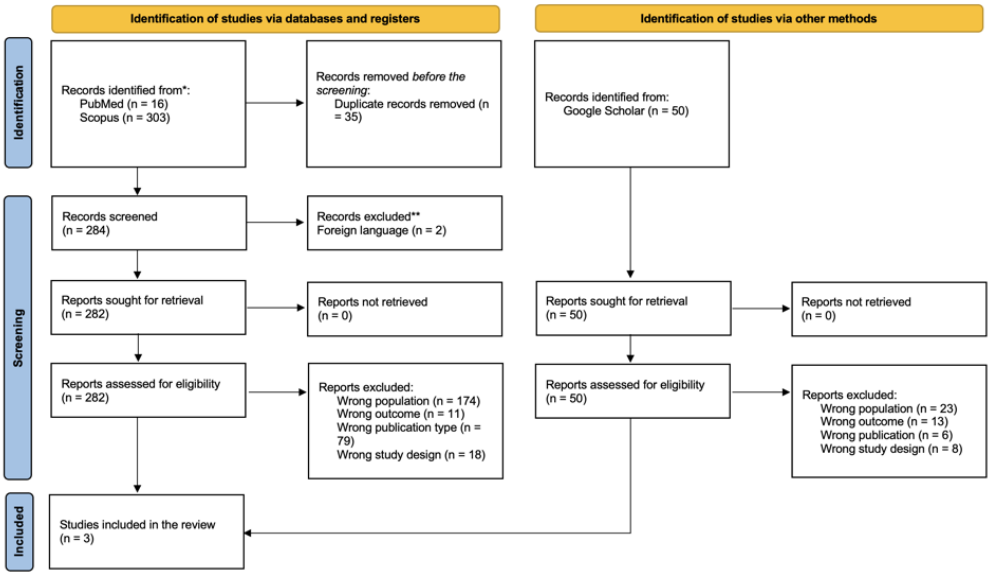

Fig. 1. PRISMA Flow Chart for the Study [13]

There were no articles that specifically mentioned occupational injuries among veterinarians in the Southeast Asia region. However, 3 articles from Malaysia, Singapore, and the Philippines, mentioned occupational injuries among animal health workers (Table 2).

From those 3 articles, it has been identified that animal-related injuries include animal bites, scratches, stamped-on feet, and kicking. Sharp-related injuries reported incidents such as needlestick injuries, and knife-related injuries for workers in abattoirs. Ergonomics also rise among animal health workers, this includes upper limb, neck, and back pain.

Veterinarians and other animal health workers have high-hazard jobs [6,18]. Various types of animals, ranging from small animals are often considered as pets such as dogs and cats. Livestock animals such as cows and horses, along with the wildlife that live freely in nature must be encountered in various health conditions by animal health workers. Due to this high work pressure, work-related stress was also reported in this study [16]. The report is also supported by recent research on work-stress among animal health workers, including the need to euthanize patients [19].

Table 2. Study characteristics

Authors, year of publication	Location	Method	Population	Sample Size (N)	Occupational Injuries Reported
Abdullahi et al., 2016 [15]	Malaysia	Cross sectional	Abattoir Workers	121	Injury by sharp equipment, noise exposure, offensive odour, ergonomics issue which include experienced upper limb, neck, and back pain.
Bibay and Agapito, 2021 [16]	Singapore and Philippines	Cross sectional	Laboratory Animal Workers	280	Animal-related injuries (animal bite, scratch), sharp-related injuries, allergy from animals.
Bibay and Agapito, 2022 [17]	Philippines	Cross sectional	Laboratory Animal Workers	44	Animal-related injuries, ergonomics, sharp-related injuries

Another hazard from this encounter is the transmission of disease agent pathogens from animals to humans. It is known that many disease agents are found in animal saliva, such as Streptococci sp., Pasteurella sp., and others from viruses to parasites which are possible to transmit from the skin of humans through animal bites and animal scratching [4,18]. Animal bites and scratches were also the most common incidents reported in our study. If not addressed properly, this incident is also one of the transmissible zoonoses that can pose a public health threat.

In addition, animal-related injuries reported included kicks from animals also reported in the study. The same was also reported in the United States, Edinburgh, and India [3,7,10]. Typically, animal kicks are obtained from large animals, such as cattle and horses. From the data retrieved, the animal kick was reported by workers at the abattoir [15]. Although animal behaviour is still difficult to predict, it is also important to consider animal restraint devices. The knowledge regarding animal behavior also needed to be increased around people working as animal health workers. This led to the motivation for one veterinary school in Edinburgh to develop a practical-based curriculum for occupational health and safety, particularly for working with horses [7].

Veterinarians also work with several sharp tools to provide the necessary treatment to their patients, including syringes. Reports of needle stick accidents have also been reported among veterinarians in India, Japan, and Portugal [9,10,20]. It is important to note, however, that needle stick injuries have also been reported to be most prevalent among junior veterinarians or those with less work experience [16].

Despite the multitude of evidence surrounding the potential hazards and occupational risks faced by veterinarians and other animal workers, the aspect of occupational safety and health in this field has not been emphasized. Given its wide-ranging implications for public health, it is crucial to enhance awareness of this issue to attract more attention, particularly within the relevant professions.

Protection against various hazards in the workplace needs to be encouraged in animal health workers. It is expected that workers have awareness and knowledge of how to protect themselves as prevention, such as maintaining personal hygiene through hand washing before and after work, the use of proper personal protective equipment (PPE), and the tools to be used in work.

Our study found the importance of conducting occupational safety and health (OSH) studies on veterinarians and other animal health workers. The emphasis on worker awareness is also

important, as is the work carried out in Edinburgh [7]. Reports in other articles also highlight the importance of OSH education for new staff, as well as continuing education in OSH [3,16]. To date, there is still no OSH curriculum for veterinarians in veterinary schools in Indonesia. For this reason, in addition to formulating an appropriate curriculum and increasing awareness as one of the efforts, approaches to decision-makers are also important to ensure the implementation of OSH on all fronts.

4 Conclusion

The lack of scientific articles reporting occupational health incidents in veterinarians can be a double-edged sword. This could mean that there are no events to report. However, on the other hand, this should be of particular concern as it means that they are not well documented. Veterinarians, including other animal health workers, are one of the spearheads of zoonotic disease transmission.

This scoping review outlines a pioneering effort to illuminate the occupational risks faced by veterinarians in the Southeast Asia region. The findings emphasize the urgent need for targeted research and policy formulation in addressing occupational hazards and improving the well-being and safety of veterinarians. By addressing these challenges, we can guarantee a more secure working environment for veterinarians, ultimately benefiting animal welfare and public health throughout the region.

Veterinarians are part of the realization of animal health which is included in the one health framework. Through this paper, we propose that the first concrete step that can be taken is to include an OSH course in the veterinary education curriculum. Training also needs to be given to workers who come into contact with animals every day. This is necessary to prevent spillover of disease pathogens.

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