AJMAS
https://journal.utripoli.edu.ly/index.php/Alqalam/index eISSN 2707-7179

Review article

Potential Risk of Lumpy Skin Disease Virus on Animal Health and Its Products

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ARTICLE INFO

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Received: *11-11-2023*
Accepted: *07-12-2023*
Published: *11-12-2023*

Keywords. *Meat, Risk Management, Al-Marj, Al-Jabal Al-Akhdar, Epidemiology.*

ABSTRACT

The purpose of this study is to quantify the risk of lumpy skin disease (LSDV) in Libya, with a focus on the cities of Al-Marj and Al-Jabal Al-Akhdar, as well as the effect this illness has on animal products such as gum and meat and its derivatives. Effective and proper risk management is necessary because LSDV poses a serious threat to animals and the dairy and meat products that they produce throughout all of Libya, particularly along the Green Mountain Coast. Neglecting epidemiology has disastrous effects. Following the proper health checks is essential to overcoming this, particularly in light of the unguarded borders and the smuggling of diseased animals. The illness spreads, making it very challenging to eradicate. Livestock travel over long distances and wind-borne disease vectors are two factors in the spread of LSD. As a result, the disease's appearance across the nation escalates into an epidemic. This study was conducted after a qualitative examination of the disease's hazards.

Cite this article. *Gomaa A, Mahmoud R, Saleh A, Abrayk S, Abd Alati M, Hawiyah J. Potential Risk of Lumpy Skin Disease Virus on Animal Health and Its Products. Alq J Med App Sci. 2023;6(2):794-798.* https://doi.org/10.5281/zenodo.10342491

INTRODUCTION

The lumpy skin disease virus (LSDV), a double-stranded DNA virus belonging to the Poxviridae family and genus Capri poxvirus, is the infectious agent that causes the disease. It is mechanically spread by biting insects and affects cows and buffalo, resulting in a decline in animal products including meat and dairy [1]. Animal mobility or the unrestricted movement of stray animals is how the virus is spread. Animals that are infected release viruses into their saliva as well as their nasal and ocular secretions [2].

in saliva for eleven days (after the onset of fever). Skin nodules still contain the virus 33 days after infection. The virus is typically spread by arthropod vectors, such as mosquitoes (Aedes and Culex), ticks (Rhiphicephalusappendiculatus and Ambylommahebraem), and common biting flies (Stomoxys and Biomjie) [3]. The disease spreads more quickly during the monsoon season due to the multiplicity of vectors [3].

LSDV was first identified in Indonesia in 2022 and has since spread to other nations [4]. Following Hurricane Daniel in 2023, which pummeled the coastal cities of Jabal al-Akhdar and the meadows of the city of Marj, there were multiple examples of arthropods capable of motorized transport in Libya. In Indonesia, the hallucinogen LSD was found in 2022. One cow is bitten by numerous pathogenic insects [3,5], which infect it and spread the disease. Culicoides' attempts to spread LSDV between cows were unsuccessful. Allan assessed the contribution of lone insects to the spread of the disease, even though midges were the danger vector group. faunal surroundings. It usually occurs more frequently in warm, humid climates. Additionally, nursing cows and young calves typically have greater. He felt the impact [6]. Thus, improving the priority of monitoring operations was the primary result of our quick assessment. Our results add to the body of knowledge regarding the dangers of LSDV in animal products.

Risk factors

A warm, humid climate that fosters a high density of vector populations is one risk factor linked to the spread of LSD. A variety of blood-feeding arthropod vectors can flourish in the ill-ventilated sheds found in the towns and urban dairies next to the homes of the animal keepers and the open grazing area [7]. Other risk variables that may raise the occurrence of the disease include herd size, vector populations, distance to water bodies, herd migration, movement of diseased animals into disease-free areas, and common pastures. Moreover, the direction and speed of the wind also aid in the spread of the infection [5]. Cattle markets, where farmers buy and sell animals, represent an additional risk concern. In these marketplaces [8].

Hazard identification

Cattle grazing on public pastures in Libya and the Mediterranean region have been reported to have skin nodule disease, which typically affects dairy cows and beef cattle. Many nations are attempting to set up quarantine protocols and the Al-Hussainat Protocol Institution in this area. and limitations placed on travel within the country, extermination of pests, and cleaning and disinfection of contaminated buildings. Animals with diarrhea should be treated with antibiotics for any bacterial infections that may arise later; sick animals may occasionally be taken out of care. The skin nodule virus has few diagnostic tools, which restricts the use of serological surveys [9]. Unfortunately, there isn't a reliable and sensitive enough ELISA test for cutaneous nodule virus. Although it requires more time and personnel, virus/serum neutralization testing is a dependable technique. As such, the assays are not appropriate for screening big numbers. Furthermore, since the cutaneous nodule virus is mostly found in intracellular antigen levels in vaccinated animals or animals with mild clinical signs, serological testing might not be a useful diagnostic technique. Depending on the existence and distribution of insects that spread the illness, 5 to 45 percent of cases of streptococcal skin disease are caused by these insects [10]. The breed of infected cows; Public health and nutritional quality of animals. The disease typically affects between 10 and 40 percent of people.

Epidemiology

Seasonal outbreaks can happen in a variety of impacted regions, as was the case with Hurricane Daniel, which hit the Libyan coast of Jabal Al Akhdar. Disease vectors are present in every season. Large-scale LSD outbreaks affecting numerous locations are frequently caused by the existence of naive (i.e., non-immune) livestock, the availability of active blood-feeding vectors, and the smuggling of cross-border animals(11). The introduction of diseased animals into the herd typically results in infection. The fatality rate is typically less than 12 percent, whereas the incidence rates vary from 5 to 50 percent. It is dependent upon several variables, such as the animal's age and breed, immune condition, and sensitivity of the host(12). Compared to native African and Asian cattle breeds, European cattle breeds with high milk output are generally much more prone to infection. High-yielding cows are typically more afflicted and more vulnerable to the illness. To prevent the illness from spreading, it should Since these animals can spread the virus through blood-feeding vectors, it is necessary to take into account the possibility that it is present in an infected herd of infected animals that do not exhibit any obvious clinical signs. There is a significant risk of infection when moving unvaccinated or under-vaccinated livestock from infected areas, particularly because the nation's borders are currently not sufficiently secured, which has led to the smuggling of numerous unhygienic cows, and there is no health control or examination at the borders, particularly those with numerous African nations like Niger, Chad, and Sudan, where the disease known as Lumpy skin disease is endemic and widespread throughout the continent, except Algeria, Morocco, Tunisia, and Libya. Since 2013, the legal or unauthorized movement of livestock between farms, regions, or even nations have frequently been linked to the initial case of LSD(13). Essentially, livestock the virus may be able to travel great distances through movements. The maximum flight distance of insects (less than 30 km).

Risk assessment

The entry assessment, facility assessment, consequences assessment, and risk assessment are the four parts of the risk assessment. In an entry assessment, the steps required to introduce a risk or risk pathogens into a new environment are described, and the probability associated with those steps is estimated. When it comes to LSDV, this could entail outlining the procedures for entering Libya (the Jabal Akhdar Coast) and calculating the Possibility of these actions taking place. In exposure assessment, the exposure pathways that animals follow after being let in are described, and the associated probability is estimated. An animal carrying LSDV or an infected fly may enter through a method described by exposure assessment in the case of LSDV. Analyzing the effects of pathogens or entry is part of the consequence assessment process. Direct effects include things like losses in dairy and meat production, while indirect effects include things like related medical expenses. The beef and livestock industries would suffer greatly if LSD were to be introduced [14].

Release (entry) assessment

Because their livestock production is insufficient in comparison to their consumption and production, the majority of developing countries rely on imported livestock [15]. It is possible to introduce lumpy skin disease into nations that import livestock. This is accomplished, particularly in importing nations, by false negative test results or lax quarantine regulations. In the case of Libya, the disease was brought in by the smuggling of diseased animals. Therefore, there is a greater chance that the disease will enter and spread if there are any flaws or negligence in the testing or quarantine procedures. Additionally, the people who live in the rural areas of Libya, particularly in the Jabal Akhdar areas, lack knowledge about the risks associated with diseases, and they transport their products and animals from one area to another without having their health examined or having their certificates [16]. It is determined that lumpy skin disease can be introduced and spread easily in animals and herds, even during an outbreak, based on the identification of the previously mentioned risks.

Exposure assessment

Despite the existence of numerous infectious diseases in neighboring countries, the state of Libya has disregarded health inspection and ongoing monitoring procedures before importing animals or restricting smuggling operations. Both direct contact with infected animals and vector insects can spread the infection to other animals [17].

Consequences assessment

An outbreak of lumpy skin disease can have several effects, including a negative influence on livestock productivity, the availability of meat and dairy products, and the general development of livestock, as well as a disruption of trade with the exporting country. Animal health and animal products may be significantly impacted by the disease's effects. The illness can endanger wildlife and is uncontrollable, which makes it a serious threat. The disease in cattle is said to lower milk and meat productivity. The illness will probably become endemic with time. intended to influence prices and compensate impacted parties, with an emphasis on emergency immunization. Because of their clever and disgusting fun, these animal accessories can be used in countries where the disease has spread to some extent. Along with nations that rely on the lucrative export of dairy and meat products, smuggling(18).

Risk assessment

It is predicated on evaluations of exposure, entry, and outcomes. As we previously discussed, the data show that the lumpy skin epidemic cannot be ignored. As a result, procedures must be followed if health inspection is ineffective, as it was in the state of Libya, or if the disease poses a potential threat to animal health in importing countries or countries that are exposed to smuggling. Risk management to bring the risk down to a manageable level [19].

Risk management

The following actions must be taken by the veterinary authority to strictly limit the risk of disease: Put stringent measures in place for quarantining animals that are imported [11]. Stopping the smuggling of diseased animals, particularly to countries bordering Libya as much as possible, areas with few restrictions on movement should be developed, and animal markets should be outlawed. Clinical surveillance, particularly in high-risk areas where the infection initially manifested. to control disease risk factors, the public health and animal health sectors should work together effectively [20].

Risk communication

This procedure requires exchanging information regarding the risks associated with the disease and proposed countermeasures between importing and exporting countries, or countries where the disease first appeared, such as Libya. There is a transparent, interactive, and open exchange of views on this topic. Risk officials can conduct practical consultations in exporting and importing countries and communicate with competent international bodies such as OIe [21].

CONCLUSION

Livestock in Libya is seriously threatened by this disease, particularly in the Jabal Akhdar region. To effectively manage the risks of this disease, the appropriate precautions must be taken. This rapid response assessment suggested a low risk of LSDV penetration through wind-borne spread as well as in long-term puddles left by Hurricane Daniel, assuming that a large number of insects are needed to infect cattle. There is currently the most information available

on the Neethling vaccine. The effectiveness of this vaccination in all herds, it seems to be about 75% successful in preventing LSDV disease.

About a month after injection, this vaccine offers full protection; however, there is evidence that it continues to work in some individuals even two weeks later. Mild side effects from this immunization could resemble the numerous tiny lumps on the skin that result from LSD lesions. Before livestock is impacted, the practice of smuggling from endemic countries needs to be immediately stopped Dairy and meat are in low supply, which has an impact on their costs. In endemic areas, prompt surveillance measurements, precise diagnosis, and an annual vaccination strategy with a homologous strain of LSDV are necessary.

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المخاطر المحتملة لفيروس مرض الجلد العقدي على صحة الحيوان ومنتجاته

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المستخلص

الغرض من هذه الدراسة هو قياس مخاطر مرض الجلد العقدي (LSDV) في ليبيا، مع التركيز على مدينتي المرج والجبل الأخضر، وكذلك تأثير هذا المرض على المنتجات الحيوانية مثل كالصمغ واللحوم ومشتقاتها. تعد الإدارة الفعالة والسليمة للمخاطر ضرورية لأن فيروس LSDV يشكل تهديدًا خطيرًا للحيوانات ومنتجات الألبان واللحوم التي تنتجها في جميع أنحاء ليبيا، وخاصة على طول ساحل الجبل الأخضر. إهمال علم الأوبئة له آثار كارثية. يعد اتباع الفحوصات الصحية المناسبة أمرًا ضروريًا للتغلب على هذه المشكلة، خاصة في ضوء الحدود غير الخاضعة للحراسة وتهريب الحيوانات المريضة. ينتشر المرض، مما يجعل القضاء عليه أمرًا صعبًا للغاية. يعد سفر الماشية لمسافات طويلة ونواقل الأمراض التي تنقلها الرياح عاملين في انتشار عقار إل إس دي. ونتيجة لذلك، تصاعد ظهور المرض في جميع أنحاء البلاد إلى وباء. أجريت هذه الدراسة بعد إجراء فحص نوعي لمخاطر المرض.

الكلمات الدالة. اللحوم، إدارة المخاطر، المرج، الجبل الأخضر، علم الأوبئة.