

SEROPREVALENCE OF MAEDI-VISNA VIRUS INFECTION AMONG SHEEP, IN BASRAH-IRAQ

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ABSTRACT

Maedi Visna virus (MVV) can infect sheep to cause respiratory findings. The infected sheep carry the virus for their life or may end by death. The study aimed to find the prevalence of MVV in Basrah during the period from October 2023 to March 2024. Serum samples were collected from 400 sheep in four distinct regions, and the clinical findings were recorded. The examination of samples verified the existence of antibodies counter to MVV by indirect enzyme-linked immunosorbent assay (I-ELISA). The study results revealed the prevalence of MVV in sheep (5.5%). There were no significant differences in the prevalence of infection among different regions ($P>0.05$). The antibodies against MVV were reported in 5% males and 5.6% females, with no significant differences in the infection between them. The infection rate of MVV differed significantly according to the age of the animals, where the highest infection rate was reported in animals older than 3 years (10.7%) and those aged 1-3 years (5.3%), while there was no infection reported in animals younger than one year of age ($P\leq 0.05$). The infection rate was significantly different according to body score condition. The highest infected rate was reported in animals with poor body condition (10.8%). The disease was also present in animals with medium-bodied conditions (5.3%). However, the infection was not reported in animals of good body condition. There are significant differences in the rate of infection in relation to body score conditions.

Keywords: Maedi-visna, Sheep, Seroprevalence

INTRODUCTION

Maedi-Visna (MV) virus infection is a severe and chronic or possibly fatal disease in sheep. According to Cutlip *et al.* (1992) and Blacklaws (2012), the most significant symptoms include chronic respiratory illness, arthritis, mastitis, and decreased production. The disease was identified as ovine progressive pneumonia (OPP) in North America, also known as caprine arthritis encephalitis (CAE) in goats. The disease is caused by lentiviruses of small ruminants (SRLV), which belong to retroviridae. Moreover, Leroux *et al.* (1997) and Caroline *et al.* (2010) mentioned that Retroviridae is a heterogeneous virus that will affect sheep and goats. The susceptibility differences occur depending on breeds and genetics (Herrmann-Hoesing, 2008; Heaton *et al.*, 2012). There is no

vaccine and no individual treatment (Bowles *et al.*, 2014).

MVV has an affinity for the immune system and affects the monocyte and macrophage (Gibson *et al.*, 2018). The virus infiltrates the architecture of affected organs like the lung, udder, or synovial joints, then carries viral DNA integrated into the host cell genome and is therefore undetectable to the immune system, which is reported by Rimstad *et al.* (1993); Lerondelle *et al.* (1999), and Arnarson *et al.*, (2017). The development of existing clinical indications takes a somewhat long period, yet diseased sheep remain a persistent source for transmission of viruses (de Boer *et al.*, 1979).

The authors explained the transmission of MVV by the respiratory method over aerosols, as well as by colostrum (Shah *et al.*, 2004; Preziuso *et al.*, 2010; Norouzi, *et al.*, 2015). Other studies reported that Maedi-Visna as a disease causes significant financial harm in sheep farms due to low production rates, and also the need to culling

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and replace animals following chronic mastitis, pneumonia and arthritis (Snowder *et al.*, 1990; Norouzi *et al.*, 2015).

The high occurrence of MV is found in southern Europe, as in Italy and Spain (Lujan *et al.*, 1993). A survey in Italy, encompassing 203 flocks, found that the MV virus infected 71.4% of the sheep (Simard & Morley, 1991). In North America, there are obvious levels of MV infection, called ovine progressive pneumonia (OPP). A serosurvey obtained in the United States disclosed 48% of flocks with MV infection (Sihvonen *et al.*, 1999; Norouzi *et al.*, 2015).

The new study on the prevalence of MVV disease in Iraq was conducted to evaluate the prevalence of MVV in Basrah province in south of Iraq.

MATERIALS AND METHODS

The blood was withdrawn from the jugular vein, and then serum was prepared, according to Rosenfeld and Dial, (2010). The serum collection included 400 sheep from four distinct regions of Basrah, with the animals ranging from one month to five years. Also, the body condition score and sex were recorded. Use the indirect enzyme-linked immunosorbent assay (I-ELISA) to detect serum antibodies against the maedi-visna virus. The Maedi-visna/CAEV serum verification version, visnas ver 1217EN (IDvet, 310, Rue Louis Pasteur-Grabels-France), is a procedure suggested by Yizengaw *et al.* (2020).

Statistical analysis; by using the Chi-square test.

RESULTS

This study revealed that 22 (5.5%) sheep were positive for the Maedi-Visna virus according to I-ELISA against antibody. The infection rate was higher in the north, at 8%, and lower in the west of Basrah, at 3%. The seropositive result showed no significant differences in MVV infection between different Basrah regions ($P>0.05$) (Table 1).

Table 1: The prevalence of Maedi-Visna (MV) infection in Basrah by I-ELISA.

	No. of tested animals	Positive	%
North	100	8	8%
South	100	6	6%
East	100	5	5%
West	100	3	3%
Total	400	22	5.5%

$X^2=2.501$ and $P>0.05$

The antibodies against the MV virus were reported in 2 out of 40 (5%) males and in 20 out of 360 females (5.6%), and there are no significant differences ($P>0.05$) in the infection between males and females (Table 2).

Table 2: The prevalence of Maedi-visna (MV) infection in Basrah in relation to gender.

	No. of tested animals	Positive	%
Male	40	2	5%
Female	360	20	5.6%
Total	400	22	5.5%

$X^2=2.693$ and $P>0.05$

According to age, the MVV infections were highest in animals older than 3 years, with 15 out of 140 (10.7%) being infected, as well as high in animals aged 1-3 years, where 7 out of 160 (5.3%) were infected. whereas there is no antibody reaction against MVV sheep animals less than one year old 0 out of 100 (0%) (Table 3), which showed significant differences based on the age of animals ($P<0.05$).

Table 3: The prevalence of Maedi-Visna (MV) infection in relation to age.

Age	No. of tested animals	Positive	%
< 1 year	100	0	0%
1-3 years	160	7	4.3%
More than 3 years	140	15	10.7%
Total	400	22	5.5%

$X^2=16.822$ and $P<0.05$

The infection rate with the MV virus is significantly different, according to the reference for body score classification. The highest infection rate was reported in animals with poor body condition: 10.8% (9 out of 83 animals). The disease was present in 13 out of 245 animals with medium body conditions (5.3%). The infection was not reported in 72 animals with good body conditions (90%). There are significant differences in the rate of infection in relation to body score condition ($P<0.05$), as in Table 4.

Table 4: The prevalence of Maedi-Visna (MV) infection according to body score conditions.

Body score	No.	Positive	%
Good	72	0	0%
Medium	245	13	5.3%
Bad	83	9	10.8
Total	400	22	5.5%

$X^2=8.768$ and $P<0.05$

DISCUSSION

The disease Maedi-Visna is distributed worldwide, which has economic importance through infection, deaths, and loss of weight in sheep. The use of I-ELISA to detect MVV antibodies in sheep of Basrah showed a seroprevalance of 5.5 %, which was lower than the prevalence of Maedi-visna antibody in sheep of Ethiopia (11.7%) (Alemnew *et al.*, 2023). This difference may be due to the variance of the climate between Iraq and Ethiopia.

In this study, seropositivity was higher in adult sheep more than 3 years of age (10.7%) than young sheep. This result agreed with Legesse Garedew *et al.* (2010). Moreover, the previous authors mentioned that seropositivity of the same illness will increase with age (Simard and Morley 1991; Aslantas *et al.*, 2002; Muz *et al.*, 2012).

The present study shows a change in the presence of antibodies of Maedi-Visna according to the four regions of distance from 3% to 8%. Similar results were reported in Ethiopia, Turkey, and Iran (Getnet *et al.*, 2010; Ak *et al.*, 2011; Norouzi *et al.*, 2015). This regional change in spreading MVV might be due to the importation or introduction of new animals from previously infected regions, and also because of the poor management and bio-security practices (Ayelet *et al.*, 2001; Getnet *et al.*, 2010).

In our study, we looked at how different risk factors affect Maedi-Visna infection in sheep, including whether the infection varies by sex. We found no significant differences, meaning that MVV affects both male and female sheep in the same way ($X^2=2.693$ and $P \geq 0.05$), as shown by several previous studies (Zewdu Seyoum *et al.*, 2011; Tsegaw and Ademe, 2011; Tefra and Mulate, 2016). However, we did find that sheep older than three years old had a higher rate of infection, and the differences in infection rates by age were significant ($X^2=16.822$ and $P \leq 0.05$). The age group important in MVV infection was well-known in Canada (Arsenault *et al.*, 2003). In this study, we found significant differences in MVV infection rates based on body score ($X^2=8.768$ and $P \leq 0.05$). Similar findings were reported in other studies (Zewdu Seyoum *et al.*, 2011; Tefera and Mulate, 2016), which could be influenced by how the animals were managed, the number of samples taken, and how the animals were prepared for sampling based on their body condition.

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CONCLUSION

Maedi-visna virus infection spread in sheep south of Iraq, and the early infected animals have been mostly seropositive, especially those of reduced body score condition.

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الانتشار المصلي لمرض فيروس ميديا فيسنا بين الأغنام في البصرة-العراق

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يصيب فيروس ميديا فيزنا (Maedi-visna) الأغنام مسبباً أعراضاً تنفسية. تحمل الأغنام المصابة الفيروس طوال حياتها، أو قد تنفق بسببه. هدفت الدراسة إلى معرفة معدل انتشار فيروس التهاب الكبد الوبائي في البصرة خلال الفترة من أكتوبر ٢٠٢٣ إلى مارس ٢٠٢٤. تم تجميع عينات مصل الدم من ٤٠٠ رأس من الأغنام، وهي مقسمة بالتساوي لأربع مناطق مختلفة من البصرة، كما تم تسجيل العمر ودرجة الحالة الجسدية والجنس لهذه الأغنام، وقد أثبت فحص عينات مصل الدم وجود أجسام مضادة لفيروس الميديا فيزنا بواسطة اختبار الممتز المناعي المرتبط بالإنزيم الغير مباشر (I-ELISA). أظهرت نتائج الدراسة انتشار فيروس الميديا فيزنا في الأغنام بنسبة ٥,٥% . إذ لا توجد فروق ذات دلالة إحصائية في انتشار العدوى بين المناطق المختلفة ($P>0.05$). وتم كشف الأجسام المضادة لفيروس الميديا فيزنا في اثنين من أصل ٤٠ وبنسبة ٥% للذكور وفي ٢٠ من أصل ٣٦٠ للإناث ٥,٦% ولم تكن هناك فروق ذات دلالة إحصائية للإصابة بين الذكور والإناث. وكان معدل الإصابة بفيروس الميديا فيزنا مختلفاً بشكل كبير وفقاً لعمر الحيوانات، حيث تم كشف أعلى معدل للإصابة في الحيوانات التي يزيد عمرها عن ثلاث سنوات بواقع ١٥ من ١٤٠ وبنسبة ١٠,٧% تليها الفئة العمرية ١-٣ سنوات حيث كان سبعة من أصل ١٦٠ مصابين بنسبة ٥,٣% في ، بينما لم يتم كشف أي إصابة في ١٠٠ حيوان كانت بعمر أقل من سنة واحدة ($P\leq 0.05$). وكانت شدة الإصابة مرتفعة معنوياً وبشكل واضح لصالح سوء درجة حالة الجسم للأغنام.

الكلمات المفتاحية: ميديا فيزنا ، الأغنام، الانتشار المصلي.