CATTLE IMPORTATION IN RELATION TO OCCURRENCE OF FOOT AND MOUTH DISEASE IN PENINSULAR MALAYSIA

UMMI NOORHAKIMAH BINTI ABDULLAH

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CATTLE IMPORTATION IN RELATION TO OCCURRENCE OF FOOT AND MOUTH DISEASE IN PENINSULAR MALAYSIA

By

UMMI NOORHAKIMAH BINTI ABDULLAH

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

December 2014
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DEDICATION

This thesis is specially dedicated to my parents, Abdullah bin Mukhtar and Saloma binti Hamzah.

To my lovely husband, Hamdan bin Mohamed for the support and endless love

To my children, Hadif Zuhran al Hakim bin Hamdan and Adruja Damia binti Hamdan..

May Allah bless you all..

Thank you so much
Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

CATTLE IMPORTATION IN RELATION TO THE OCCURRENCE OF FOOT AND MOUTH DISEASE IN PENINSULAR MALAYSIA

By

UMMI NOORHAKIMAH ABDULLAH

December 2014

Chair: Assoc. Prof. Latiffah Hassan DVM, PhD

Faculty: Veterinary Medicine

Foot and Mouth Disease (FMD) in Peninsular Malaysia continue to be a challenge for the cattle industry. FMD is a transboundary disease and considered as one of the most contagious disease among domestic and wild cloven-hoofed animals. The disease causes a significant negative economical impact throughout Peninsular Malaysia through production losses and inaccessible export market. Malaysia has been highly dependent on cattle importation to increase the live cattle population and to maintain adequate beef and milk supply. Importation and movement of animals have been constantly linked to FMD outbreaks. This study aimed to find the relation between the importation of live cattle and its contribution to the FMD occurrences in Peninsular Malaysia. The specific objectives of the study were to: describe the cattle importation trends and statistics from year 2000 to 2010 and to suggest its relationship with the local FMD occurrences within the same time frame, describe the import protocol for cattle imposed by the veterinary authority of Malaysia, the Department of Veterinary Services (DVS) so as to achieve a better understanding on the procedure and to identify the presence of gaps or weaknesses that may contribute to the FMD occurrence among local animals and describe the distribution of the government animal quarantine stations (GQS) and temporary animal quarantine stations (TQS) in Malaysia for the year 2012-2013 and to examine the temporary quarantine station’s managers awareness on the requirements and procedures for quarantine stations.

Between 2004 and 2006, the numbers of live cattle imported to Peninsular Malaysia markedly decreased due to the suspension of cattle importation from Thailand by the DVS, Malaysia following several outbreaks of FMD from cattle consignments received in this country. The increase in the volume of cattle imported between
2007 and 2009 appeared to be consistent with the marked increase of FMD outbreaks within the same time frame. The study also found that several consignments between 2009 and 2010 contained cattle that were non-structural protein (NSP) positive indicating subclinical infection or previous exposure to the virus. The findings suggested that importation and animal movements are indeed contributors of FMD outbreaks in the country.

The cattle import protocol has been developed by the DVS according to the Office International Epizootics (OIE) recommendations in the Terrestrial Codes. DVS import protocols are established to complement the efforts of FMD control in the country and also to prepare Malaysia towards achieving FMD free status by year 2016. This study examined relevant official documentations and limited accessible data from various sources in order to describe and highlight potential issues in the import protocols in Malaysia. The study focused on the protocols for cattle imported from Thailand and Australia because these two countries are the largest live cattle exporter to Malaysia. The study found that DVS import protocols contains potential discrepancies from the recommendation by the OIE that could increase the risk of disease importation via cattle consignments. The quarantine period of 10 days recommended at the local quarantine station as opposed to 14 days as recommended by the OIE could result in animals with longer incubation period to be released among the local cattle herds and spread the infection. In addition, the level of compliance to the DVS import protocols among the exporters especially from Thailand was poor. Laboratory serological findings from quarantined cattle discovered evidence that trivalent FMD vaccination as required by the import protocol was not performed. In a consignment of cattle received in 2012, 84% of the cattle within the consignment had less than 50 percent inhibition (PI) for serotype A, 32.3% had less than 50 PI for serotype Asia 1 and 11.7% had less than 50 PI for serotype O. Another consignment had 2.5% cattle with less than 50% PI for serotype O, 84% had less than 50% PI for serotype A and 12% cattle had less than 50% PI for serotype Asia 1. This indicated possibilities that monovalent or bivalent vaccine was used instead of trivalent or the trivalent vaccine used was not potent.

The activities and management of the animal quarantine stations can be a good indicator of the level by which disease can be prevented from entering the country. Eight temporary quarantine station (TQS) were selected and visited with the aim of assessing the awareness of managers and operators on the biosecurity requirements for quarantine station stated in Arahan Prosedur Tetap Veterinar Malaysia (APTVM) Pendaftaran Stesen Kuarantin Haiwan Sementara 2011 (SKH(S)). On average, 11.8% of the managers ignored the importance of biosecurity and operational requirement. On the other hand, 82.5% of them were confident that they had a good level of biosecurity and operational knowledge. A quarter (25%) of the respondents agreed that they did not have a good knowledge on how to manage a TQS. More than 37% did not understand the requirements based on the APTVM SKH(S). In addition, 25% did not have any systematic importation documentation and records while more than 37% were not aware that the
consignment proven to be exposed to FMD could only be released to the DVS-approved destination.

In conclusion, it was suggested that importation and animal movements are major contributors to the FMD outbreaks in the country. Issues and gaps in the import protocols and regulations may result in increase risk of FMD introduction. TQS which was allowed for reasons to improve animal quarantine efficiency may in fact contribute to more damage since the study found that most facilities had poor biosecurity, did not comply with basic infrastructure requirements and station operators/managers have poor level of understanding about basic quarantine station management and operations.
Hubungkait antara pengimportan lembu dan kejadian penyakit kuku dan mulut di Semenanjung Malaysia

Oleh

Ummi Noorhakimah Abdullah

Disember 2014

Pengerusi : Prof. Madya. Latiffah Hassan (DVM, PhD)

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Protokol import lembu telah dibangunkan oleh DVS berdasarkan Kod Terrestrial yang dicadangkan oleh Office International des Epizooties (OIE). Protokol import DVS diwujudkan selaras dengan usaha mengawal penyakit FMD di negara ini dan juga untuk mempersiapkan Malaysia mencapai status bebas penyakit FMD pada tahun 2016. Kajian ini turut meneliti dokumen rasmi yang berkaitan dengan data yang terhad dari pelbagai sumber untuk menerangkan dan mengetengahkan isu-isu yang berkaitan dalam protokol import di Malaysia. Kajian menumpukan pada protokol import untuk lembu yang diimport dari Thailand dan Australia sahaja kerana kedua-dua negara adalah pengeksport lembu hidup terbesar ke Malaysia. Kajian ini mendapati bahawa protokol import mengandungi sedikit percanggahan dengan syor yang dikemukakan oleh OIE yang boleh meningkatkan risiko kemasukan penyakit melalui pengimportan lembu. Tempoh kuarantin 10 hari yang disyorkan di stesen kuarantin tempatan tidak bertepatan dengan tempoh 14 hari seperti yang disyorkan oleh OIE. Ini boleh menyebabkan hampir dengan tempo inkubasi penyakit yang lebih panjang akan dilepaskan dan bercampur dengan kawanan lembu tempatan seterusnya menyebarkan jangkitan. Di samping itu, didapati tahap pematuhan kepada protokol import DVS di kalangan pengeksport terutama dari Thailand adalah rendah. Penemuan makmal serologi terhadap sampel yang diambil daripada lembu yang dikuarantin menunjukkan bahawa kehendak protokol import daripada segi kewajipan melaksanakan pemvaksinan primer menggunakan vaksin FMD trivalen oleh pengeksport tidak dipatuhi sepenuhnya. Dalam satu konsainan lembu yang diterima pada tahun 2012, 84% daripada lembu dalam konsainan itu mempunyai kurang daripada 50 Peratus Perencatan (PI) untuk serotaip O, 32.3% mempunyai kurang daripada 50 PI untuk serotip Asia 1 dan 11.7% mempunyai kurang daripada 50 PI untuk serotip A. Manakala satu konsainan yang lain mempunyai kurang serotaip 2.5% lembu yang mempunyai kurang daripada 50 PI untuk serotip O, 84% kurang daripada 50 PI untuk serotip A dan 12% lembu mempunyai kurang daripada 50 PI untuk serotip Asia 1. Ini menunjukkan kemungkinan vaksin monovalen atau vaksin bivalen yang biasanya digunakan dan bukan vaksin trivalen. Terdapat juga kemungkinan vaksin trivalen digunakan tetapi tidak memberikan tahap perlindungan yang sepatutnya.

Aktiviti dan pengurusan stesen kuarantin haiwan boleh menjadi indikator yang baik akan tahap sesuatu penyakit yang boleh dihambat daripada memasuki negara ini. Lapan TQS dipilih dan dilawati bertujuan untuk memahami tahap kesedaran pengurus atau pengendali terhadap keperluan biosekuriti bagi stesen kuarantin seperti yang dinyatakan dalam Arahan Prosedur Tetap Veterinar Malaysia (APTVM) Pendaftaran Stesen Kuarantin Haiwan Sementara (SKH(S)). Borang soal selidik turut
digunakan bagi mendapatkan gambaran tahap kepatuhan pengurus TQS terhadap APTVM SKH(S). Secara purata, 11.8% daripada pengurus mengabaikan keperluan dan kepentingan pengurusan operasi dan biosekuiri. Sebaliknya, 82.5% daripada mereka yakin bahawa mereka mempunyai tahap pengetahuan pengurusan operasi dan biosekuiri yang baik. Manakala 5.6% daripada pengurus tersebut tidak pasti jika mereka mempunyai pengetahuan dan pengalaman yang mencukupi untuk mengendalikan TQS. Daripada set soal selidik yang sama, (25%) daripada responden bersetu bahawa mereka tidak mempunyai pengetahuan yang baik tentang pengurusan TQS. Lebih daripada 37% tidak memahami kehendak APTVMSKH(S). Di samping itu, 25% tidak mempunyai dokumentasi dan rekod pengimportan yang sistematik manakala lebih daripada 37% tidak menyedari bahawa konsainan yang terbukti telah terdedah kepada jangkitan FMD hanya boleh dilepaskan ke destinasi yang dibenarkan oleh DVS.

Kesimpulannya, kajian ini menunjukkan bahawa pengimportan dan pergerakan haiwan merupakan penyumbang utama kepada wabak FMD di negara ini. Isu dan jurang dalam protokol import dan peraturan yang boleh mengakibatkan risiko yang lebih tinggi terhadap kemasukan wabak FMD. TQS yang diluluskan atas faktor untuk meningkatkan kecekapan proses kuarantin haiwan mungkin sebenarnya lebih menyumbang kepada kesan buruk. Ini selari dengan hasil kajian mendapati bahawa kebanyakan kemudahan biosekuiri yang terdapat di stesen-stesen tersebut tidak mematuhi syarat-syarat asas infrastruktur seperti yang ditetapkan dalam APTVM SKH(S). Selain itu didapati pengurus stesen mempunyai tahap kefahaman mengenai asas pengurusan dan operasi stesen kuarantin yang rendah.
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I certify that a Thesis Examination Committee has met on 5 December 2014 to conduct the final examination of Ummi Noorhakimah binti Abdullah on her thesis entitled "Cattle Importation in Relation to Occurrence of Foot and Mouth Disease in Peninsular Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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<td>Primary 1</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<td>P2</td>
<td>Primary 2</td>
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<tr>
<td>RNA</td>
<td>Ribonucleic acid</td>
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<tr>
<td>SAT</td>
<td>South African Trait</td>
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<tr>
<td>SEA</td>
<td>Southeast Asia</td>
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<td>SEAFMD</td>
<td>Southeast Asia Foot and Mouth Disease Campaign</td>
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<tr>
<td>SPS</td>
<td>Sanitary and phytosanitary</td>
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<tr>
<td>SQIE</td>
<td>Import Export and Quarantine Service Section</td>
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<td>TAD</td>
<td>Transboundary animal disease</td>
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<tr>
<td>TQS</td>
<td>Temporary quarantine station</td>
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<tr>
<td>WTO</td>
<td>World Trade Organization</td>
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</table>
CHAPTER 1

INTRODUCTION

1.1 Background

Foot and mouth disease (FMD) is endemic in Peninsular Malaysia whilst East Malaysia is declared free FMD without vaccination (OIE 2014). The main economic implication of the occurrence of FMD to a country is the limited livestock trade opportunities whereby FMD-endemic countries have restricted access to the animal products trade markets (Paton et al. 2009). FMD is a highly contagious viral disease and is considered as one of the most serious transboundary animal diseases (TAD) (FAO 2014). TAD is defined as those diseases that have significant economic, trade and/or food security importance for many countries which can spread internationally via various routes (Otte et al. 2004). FMD has occurred in almost two thirds of the OIE member countries causing significant economic loss (Rweyemamu et al. 2008). Since FMD is a transboundary animal disease, cooperation between neighbouring countries at the local, national and regional level is needed (Sumption 2007). In Malaysia, the cattle industry only contributes to 20.7% of Malaysia’s self-sufficiency for beef which is far less than the amount required by the local population (DVS 2009a). Local fresh meat supply in Malaysia could not meet the local consumer demand, thus Malaysia remains a major livestock importer in the region (Wongsathapornchai et al. 2008). In a recent paper by Ramanoon et al (2013), FMD in Malaysia affects many species including cattle (86%) buffalo (7.3%), sheep (2.8%), goats (2.8%) and pigs (0.8%) and is widely distributed throughout the peninsula (Ramanoon et al. 2013). Malaysia is strongly dependent on importation of live cattle to improve the cattle industry because of the inability to sustain the breeding and rearing activities (DVS 2011).

The Malaysia-Thailand-Myanmar (MTM) zone was established in 2003 following the decision by the South-East Asia FMD Campaign in 2001 to establish an FMD free zone within South East Asia based on favourable geographic features and strong political support from the proposed member countries (Cocks et al. 2012). The MTM zone consists of the southern division of Myanmar, regions eight and nine of Thailand and the whole Peninsular Malaysia. However since its conceptualization, FMD remained to occur on regular basis (Hueston at al. 2011). Importation of livestock has been identified as an important risk factor for the emergence of several diseases in previous studies (Gleeson 2002) in Malaysia and elsewhere. The risk of FMD through importation may be reduced by decreasing the risk source such as importing livestock from areas that are FMD-free or that have low prevalence of FMD (Wongsathapornchai et al. 2008). Unfortunately for South East Asia, the pattern of livestock movement from the northern to the southern parts is dictated by the gradient of price and supply and demand.
Rationale of the current study

There are limited scientific publications on FMD epidemiology in South East Asia. When available, most came from studies conducted in Thailand but none have thoroughly examined the role of importation on FMD epidemiology in the region. FMD is endemic in Peninsula Malaysia and the extent of endemicity appears to have increased over the last decade. It has often been suspected that animal movement and importation are the major contributors of local FMD outbreaks, unfortunately the work that examined this risk is lacking. This study suggests animal importation (including quarantine procedures and processes) as a hazard for animal health in Malaysia.

The specific objectives of the study were:

1. To describe the cattle importation trends and statistics from year 2000 to 2010 and to suggest its relationship with the local FMD occurrences within the same time frame
2. To describe the import protocol for cattle imposed by the veterinary authority of Malaysia, the Department of Veterinary Services (DVS) so as to achieve a better understanding on the procedure and to identify the presence of gaps or weaknesses that may contribute to the FMD occurrence among local animals.
3. To describe the distribution of the government animal quarantine stations (GQS) and temporary animal quarantine stations (TQS) in Malaysia for the year 2012-2013 and to examine the temporary quarantine station’s managers awareness on the requirements and procedures for quarantine stations.

The information gained from this study will assist in the understanding of possible risks caused by the live cattle importation to the FMD occurrence which, in turn, will help in tightening the system and reducing wherever possible the possibility of importing disease along with new animal consignments.
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