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AWARENESS OF OPERATORS ON THE REQUIREMENTS AND PROCEDURES FOR ANIMAL QUARANTINE AND THE DISTRIBUTION OF TEMPORARY ANIMAL QUARANTINE STATIONS IN PENINSULAR MALAYSIA

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Abstract. Temporary quarantine stations (TQS) are transitory premises that have been approved to facilitate the quarantine of imported live animals in Malaysia. These stations must abide to the standard operating procedures (SOP) for animal quarantine as outlined by the veterinary authority in Malaysia. However, the level of awareness for the quarantine procedures among the TQS operators and managers has not been assessed. This study was conducted to describe the distribution of the TQS in 2012-2013 and the level of awareness among its operators on the quarantine procedures and the fundamental requirements for quarantine establishments. Eight TQS from 25 were selected and operators or managers were interviewed using a questionnaire and the facility was visited. The study found that majority (82.5%) of the TQS operators were aware of the quarantine procedures but the auditors from the veterinary authority revealed vice versa.

Keywords: temporary animal quarantine stations, awareness, quarantine procedures, Peninsular Malaysia

INTRODUCTION

The animal quarantine station is the first point of entry for imported live animals and serves as an important barrier for the country against transboundary diseases that could be introduced via imported animal consignments. An animal quarantine station also potentially harbours various pathogens that could be transmitted from one consignment to another. Therefore, adherence to the quarantine procedures is important to minimise the risk of disease dissemination. Temporary quarantine stations (TQS) are transitory premises that have been approved to facilitate the quarantine of imported live animals. This premises supports the government quarantine station which has limited holding capacity of live animals especially

during the festive seasons. TQS was initially suggested and approved because of the limited capacity to quarantine live animals at the government quarantine stations. TQS is perceived to facilitate the quarantine process and prevent smuggling of animals into the country. These stations must abide to the quarantine procedures outlined by the veterinary authority.

Malaysia has been dependent on FMD endemic countries such as Thailand to import live cattle. Countries such as Australia that is FMD free have been the major exporter of live cattle to Malaysia but in recent years offered higher prices for cattle therefore making it less affordable for Malaysians. Importing live cattle from FMD-endemic countries increases the risk of introducing the disease to the local animal population if quarantine procedures are not abided to. Therefore this study was conducted to examine the temporary quarantine stations operators' awareness on cattle quarantine procedures and the fundamental requirements for quarantine establishments. This paper also describes the TQS distribution in the peninsula between 2012 and 2013.

MATERIALS AND METHODS

A cross-sectional study was designed where 8 of 25 TQS that were accessible in Peninsular Malaysia and operating at the time of the study was selected and visited by the researcher. Two sets of questionnaires were developed to address the objectives of the study: a standard

questionnaire to assess the quarantine station managers/operators knowledge on essential quarantine procedures and a set of questionnaire to assess the perception of the veterinary officers involved in auditing on the level of quarantine awareness among the TQS operators. This questionnaire seeks their opinion on the compliance of the operators to the existing rules and regulations set by the Department of Veterinary Services Malaysia (DVS). The items in questionnaires used Likert scale measurement; 1 indicate highly disagree, 2 as disagree, 3 as neutral, 4 as agree and 5 as highly agree.

The locations of TQS that existed at the point of the study (2012-2013) were describe based on updated records from the Quarantine Services and Import and Export Section (SQIE), DVS and were plotted by using Google Map.

Data analysis

The data were entered and managed in Excel and analysed using descriptive statistics.

RESULTS

Figure 1 shows the distribution of the approved TQS. The concentration of TQS is higher in the northern part of peninsula, especially in Perlis (n=10) and Kelantan (n=6) states as these are the two most important entry points into Malaysia for consignments from Thailand and other countries from the north



Figure 1 Distribution of approved temporary quarantine stations in Peninsular Malaysia (Portal Rasmi Jabatan Perkhidmatan Veterinar 2014)

Table 1. Availability of good biosecurity elements in selected TQS during on-site visit

	Biosecurity elements	TQS A	TQS B	TQS C	TQS D	TQS E	TQS F	TQS G	TQS H
a)	Signboard of 'Kuarantin Sementara Jabatan Perkhidmatan Veterinar'	✓	✓	✓	✓	✓	✓	✓	✓
b)	Vehicle dip facility	✓		✓	✓		✓		
c)	Waste management system	✓		✓					
d)	Location of the TQS is isolated from the housing community	✓		✓					
e)	Sanitary conditions inside the TQS premise	✓							
f)	Strong building structure	✓		✓					

During the visit, a list of important biosecurity elements was assessed as shown in Table 1. Firstly, the signboard indicating that it is a TQS '*Kuarantin Sementara Jabatan Perkhidmatan Veterinar*', is compulsory to be displayed at the TQS and must be visible throughout the quarantine process and removed when the managers are no longer actively importing cattle. This signboard helps DVS in differentiating the approved from the non-approved premises. Secondly, the vehicle dip facility at the main entrance of TQS must be available. Four out of 8 TQS (50%) did not have operational vehicle dipping facility. Thirdly, good waste management system is monitored regularly by DVS because based on the SQIE official record; most of the TQS are located near to residential areas. Only 2 out of 8 TQS (25%) have good waste management system as indicated by sewage treatment pond(s). Others appear not to have any type of acceptable sewage management system. It was observed that

the sewage from the premises drained into poorly managed and maintained ponds. As a result, the sewage spilled out to the surrounding areas and produced foul smell that attracted flies. Out of 8, only 2 TQS (25%) were located away from residential areas. Seven out of 8 TQS (87.5%) were observed to have poor sanitary conditions with heavy loads of faecal material on the floor. According to the managers, cleaning activity is only conducted before a new cattle consignment arrives for quarantine. No cleaning activity is conducted during and throughout the quarantine period.

Finally, only 3 out of 8 TQS were properly built with good physical structures using strong wood or iron frames. All the sampled TQS were previously holding yards of feed-lot premises. Hence, the owner or the managers rarely maintained the building to save costs. No auditing is required or performed by the veterinary authority for feed-lot premises.

Level of awareness and knowledge on the requirements and procedures for quarantine stations among the TQS managers

Table 2 shows the results of the questionnaire used during the onsite visits to selected TQS. The purpose of the questionnaire was to assess the awareness of managers and operators on the biosecurity requirements of quarantine stations.

On average, 11.88% of the managers were ignorant on the elements of biosecurity and operational management required for a quarantine station. A small percentage (5.63%) were unsure but most (82.5%) appeared to be confident in their knowledge on the matter. A quarter (25%) of the respondents agreed that they did not have good knowledge on how to manage a TQS. More than 37% did not understand the requirements based on expand 2011. A quarter of respondents did not have any systematic documentation and records of consignments and activities at the quarantine station including blood results and FMD cases on the premises. More than 37% were not sure or were not aware that consignments exposed to FMD infection can only be released to designated areas approved by the DVS.

Table 3 shows the findings from the questionnaire given to the auditors to seek their opinion on the level of biosecurity and managerial knowledge among the TQS managers. The questionnaire was created to study the relationship between the TQS

and local FMD outbreaks and also to obtain information regarding the perception of the auditors on the TQS biosecurity management and level of awareness and understanding among the station managers/operators. The questionnaire consisted of 3 different parts; first was basic perception of the auditors to TQS. It covered the aspect of how far the auditors knew the managers' understanding to the APTVM SKH(S) regulations. The second part was to seek the opinions of the auditors on specific biosecurity and infrastructure requirements of the TQS based on their evaluation. The third part covered the observation of the auditors on the management of imported animals and the availability of the necessary records kept by the managers.

The first part of the questionnaire showed that 74% of the auditors disagreed or were unsure as to whether the managers really understood the APTVM SKH(S) 2011 rules and regulations. Only 26% agreed that the managers understood the APTVM SKH(S) 2011. The second part tested the opinion of the auditors on the suitability of the TQS infrastructure based on the biosecurity needs. More than 80% of the auditors disagreed or were unsure that the infrastructures of the TQS were suitable. On the aspect of managing imported animal, majority (80%) of auditors disagreed or were unsure that managers have good management records or if records were available. In addition, majority (60-80%) of auditors were not sure or disagreed that managers have

Table 2: Level of awareness on quarantine station requirements and procedures for quarantine stations among the TQS managers

List of the questions	Scale (%)		
	Disagree	Unsure	Agree
a. TQS is registered with DVS	0/8 (0%)	0/8 (0%)	8/8 (100%)
b. Have good knowledge on TQS management	2/8 (25%)	0/8 (0%)	6/8 (75%)
c. Will give full cooperation during DVS TQS annual auditing	0/8 (0%)	0/8 (0%)	8/8 (100%)
d. TQS establishment supports our cattle industry growth	0/8 (0%)	2/8 (25%)	6/8 (75%)
e. Procedures implemented in TQS is same with GQS expand	0/8 (0%)	1/8 (12.5%)	7/8 (87.5%)
. Understands the procedures in <i>translate in English</i>	3/8 (37.5%)	0/8 (0%)	5/8 (62.5%)
f. Have systematic cattle importation records	2/8 (25%)	0/8 (0%)	6/8 (75%)
. Have cattle importation records for every imported cattle consignment: original copy of veterinary health certificate from the exporting countries, FMD vaccination record and original copy of DVS import permit	1/8 (12.5%)	0/8 (0%)	7/8 (87.5%)
g. Keep all blood sampling tests records	2/8 (25%)	0/8 (0%)	6/8 (75%)
. Any FMD occurrence in the premise is recorded	2/8 (25%)	1/8 (12.5%)	5/8 (62.5%)
. Every fatal case due to FMD is recorded	2/8 (25%)	1/8 (12.5%)	5/8 (62.5%)
h. All records mentioned in g) to k) are readily accessible when requested	2/8 (25%)	0/8 (0%)	6/8 (75%)
i. Operators -understands the clinical signs of FMD	0/8 (0%)	0/8 (0%)	8/8 (100%)
. veterinary officer will be informed as soon as possible if any FMD clinical signs are observed in the particular consignment	0/8 (0%)	0/8 (0%)	8/8 (100%)
j. The quarantine period will be prolonged whenever clinical signs of FMD are found in the consignment	0/8 (0%)	2/8 (25%)	6/8 (75%)
k. On the day of arrival, cattle with FMD clinical signs will be isolated	0/8 (0%)	0/8 (0%)	8/8 (100%)
. Consignment proven to be exposed to FMD infection will only be released to designated location approved by DVS	2/8 (25%)	1/8 (12.5%)	5/8 (62.5%)
. DVS is always informed of every cattle importation activity	0/8 (0%)	0/8 (0%)	8/8 (100%)
l. All imported cattle will be quarantined for 10 days according to the DVS import protocol	0/8 (0%)	0/8 (0%)	8/8 (100%)
m. Each imported cattle consignment is regularly by the State DVS officers	1/8 (12.5%)	1/8 (12.5%)	6/8 (75%)
Average percentage	11.875%	5.625%	82.5%

Table 3. Level of awareness on the quarantine station requirements and procedures among the TQS managers from the veterinary authority auditors' perspectives

Question list	Scale (%)		
	Disagree	Unsure	Agree
a) Basic operational management observation and perception of TQS			
i. All TQS are registered and licensed under DVS	0/6 (0%)	3/6 (50%)	3/6 (50%)
ii. TQS manager and staff have good understanding on how to run a cattle quarantine station	2/6 (33.3%)	4/6 (66.7%)	0/6 (0%)
iii. Managers of TQS give full cooperation during inspection	0/6 (0%)	3/6 (50%)	3/6 (50%)
iv. TQS practices the same procedure to examine imported animals from FMD as do the GQS	0/6 (0%)	4/6 (66.7%)	2/6 (33.3%)
v. TQS help the cattle industry in improving the cattle population numbers	0/6 (0%)	3/6 (50%)	3/6 (50%)
. TQS managers and staff obey the procedures required in <i>APTVM SKH(S)</i>	3/6 (50%)	3/6 (50%)	0/6 (0%)
vi. TQS managers are highly knowledgeable in cattle quarantine procedures	2/6 (33.3%)	4/6 (66.7%)	0/6 (0%)
Average percentage	17%	57%	26%
b) Biosecurity and infrastructure evaluation			
i. TQS have one entrance to its premise	2/6 (33.3%)	2/6 (33.3%)	2/6 (33.3%)
ii. Building design and layout is suitable for a quarantine station	0/6 (0%)	0/6 (0%)	6/6 (100%)
. Vehicle dip (properly built and disinfectant regularly added on) is available	2/6 (33.3%)	4/6 (67.7%)	0/6 (0%)
iii. Foot dips (properly built, with regular usage of disinfectant) is available	2/6 (33.3%)	4/6 (67.7%)	0/6 (0%)
. Feeding store room is clean, no disease vector like mice, cockroaches, and locked	3/6 (50%)	3/6 (50%)	0/6 (0%)
iv. Waste management (proper drainage, isolated waste pond) system is available	3/6 (50%)	3/6 (50%)	0/6 (0%)
v. Dead animals disposal management (proper place and not attracting flies, far from the quarantine buildings) is available	1/6 (16.7%)	4/6 (67.7%)	1/6 (16.7%)
. Quarantine station with a Generally acceptable in term of hygiene and cleanliness	1/6 (16.7%)	5/6 (83.3%)	0/6 (0%)
. The location of TQS is strategic and helps in preventing disease spread	2/6 (33.3%)	4/6 (67.7%)	0/6 (0%)
Average percentage	30%	54%	16%

Table 3 continues next page

Table 3. (continuation)

Question list	Scale (%)		
	Disagree	Unsure	Agree
c) Management of imported animal			
i. Scale of management and availability of records			
. Entry of imported animals	2/6 (33.3%)	3/6 (50%)	1/6 (16.7%)
. Copy of exporting countries documentation record (health certificate, vaccination, condition upon departure	2/6 (33.3%)	3/6 (50%)	1/6 (16.7%)
. Copy of import permit	2/6 (33.3%)	3/6 (50%)	1/6 (16.7%)
ii. Daily expand record	2/6 (33.3%)	3/6 (50%)	1/6 (16.7%)
. Treatment record (if any)	2/6 (33.3%)	3/6 (50%)	1/6 (16.7%)
. Vaccination (in Malaysia) record	2/6 (33.3%)	3/6 (50%)	1/6 (16.7%)
. Laboratory test record	2/6 (33.3%)	3/6 (50%)	1/6 (16.7%)
. Morbidity and mortality record	2/6 (33.3%)	3/6 (50%)	1/6 (16.7%)
. Movement permit record	2/6 (33.3%)	3/6 (50%)	1/6 (16.7%)
iii. Overall health condition of the animals in the quarantine station is good on arrival	0/6 (0%)	4/6 (63.7%)	2/6 (33.3%)
iv. Managers of expand have a good knowledge on the FMD clinical signs	0/6 (0%)	4/6 (63.7%)	2/6 (33.3%)
v. The TQS has an attending veterinarian that manages the health of the imported animals	0/6 (0%)	5/6 (83.3%)	1/6 (16.7%)
vi. If an animal show signs of FMD, the managers would make sure that the quarantine period is prolonged	1/6 (16.7%)	3/6 (50%)	2/6 (33.3%)
vii. Animals with clinical signs of FMD are treated by a veterinarian	1/6 (16.7%)	3/6 (50%)	2/6 (33.3%)
. Animals with clinical signs for FMD upon arrival will be culled and disposed	1/6 (16.7%)	4/6 (63.7%)	1/6 (16.7%)
. Animals recovered from FMD will be released to its final destination in the peninsula	0/6 (0%)	5/6 (83.3%)	1/6 (16.7%)
. Cattle seropositive for FMD (field infection) will be treated and released to its final destination in the peninsula	0/6 (0%)	5/6 (83.3%)	1/6 (16.7%)
viii. Managers are committed attitude in helping the country to prevent infected animals from entering Malaysia	1/6 (16.7%)	5/6 (83.3%)	0/6 (0%)
Average percentage	20%	60%	20%

knowledge on the clinical signs of FMD, have veterinarians attending the animals and that animals with clinical signs of FMD should be culled and disposed. They were also not sure where the FMD positive (expand or clinical signs) cattle were distributed to.

DISCUSSION

The purpose of many TQS in the two bordering states near entry points is to avoid cattle consignments transported far into the peninsula before the quarantine process starts. The local veterinary authorities have not provided any guidelines or limits to where and how many TQS each state should have. Therefore each state veterinary service could choose to approve the establishment of TQS based on their needs and requirements. There are also TQS located far from the borders into the peninsula as in Perak (n=2) and Johor (n=1), which raises concern over the dissemination of diseases when potentially infected animals travel into the country via various modes of transportation. Even though the animal consignments could be sealed throughout its journey to its destined quarantine facility, the probability of pathogens spreading via faeces and urine cannot be ruled out.

Lack of knowledge and awareness among traders about FMD and the failure to appreciate that illegal movement of cattle have enormously contributed to the outbreaks of FMD among local animals. By law, traders may be charged for illegal

cattle movements if caught by the *Anti-Smuggling Unit* (UPP). The introduction of TQS is perceived to have reduced the smuggling of cattle to a certain extent, although data has not been properly documented nor reported. Unfortunately these premises are often left to operate with little supervision by the state authorities and with minimum regulatory appraisals. DVS importation protocol imposes 10 clear days of quarantine for cattle consignments originating from Thailand. Every GQS operates based on the same operating procedure; arrival at the quarantine station at Day 1, blood sampling at Day 2 to detect FMD virus antibodies and to further determine whether a positive result is natural or requires vaccination. On Day 2 also, FMD vaccine is given as P2 to boost the P1 injection as requested and assumed to be administered at the pre-exportation station in Thailand. No second blood monitoring of the protection level boost by P2 injection (DVS 2011) is required to be performed at the station. The daily physical examination is continued until Day 11 when the cattle consignment is released if the animal is found to be healthy. The TQS are supposed to follow the same procedures as GQS, however since its establishment in 2009, biosecurity and operational monitoring remains a large issue because of the lack of manpower at the level of veterinary authority. As a result, the operator/managers are very relaxed in their interpretation of rules and regulations leading to poorly managed quarantine stations.

It appeared that only a small proportion (16%) of TQS managers agreed that they may not have good knowledge or were aware of the biosecurity needs and requirements to operate quarantine stations. This showed that some of the TQS managers did not know the existing regulations which they have to follow and implement at their own stations. Ironically, most (82.5%) of the TQS managers believed that they were aware of the regulations and fully implemented them at their stations. However, in this study, the researcher's visits to the TQS sites proved that the reality were contrary to what was recorded in the questionnaires. A large percentage of TQS were poorly managed and did not have the basic requirement necessary for animal quarantine facility operations. This observation is consistent with the opinion and perception of the veterinary auditors interviewed in this study. Most of the auditors (60-80%) were not convinced (unsure and disagree) that the manager/operator had the necessary knowledge on the basic requirements to operate an animal quarantine establishment. And most auditors were not convinced that the operators had adequate knowledge about FMD and its clinical signs.

Assessing the quarantine procedures effectiveness in developing countries is a difficult task due to unavailable or poorly recorded data (Wongsathapornchai *et al.* 2008). According to the OIE, animal quarantine is a crucial process to defend the country from potential harmful biological threats. The level of compliance of the

quarantine stations profoundly depends on the knowledge and understanding of the station managers/operators on the impact from the magnitude of diseases should imported infected animals be introduced to the local animal population. Therefore, their understanding and knowledge on basic regulatory and biosecurity requirements for a quarantine facility is necessary to ensure that quarantine procedures can efficiently minimise disease introduction and spread. According to Thailand DLD Animal Epidemic Act 1956 (amended 2003), any livestock being moved into Thailand expand Zone, must be quarantined at the place of origin for at least 21 days but the effectiveness of Thailand's quarantine procedure was difficult to estimate due to lack of available data (Wongsathapornchai *et al.* 2008).

It is uncertain if the quarantine measures as subscribed by the APTVM SKH(S) 2011 are practiced in TQS as no close monitoring have been performed on these premises since temporary stations were first allowed to operate. The veterinary authority faces lots of challenges such as scarcity of personnel and time to conduct assessment and monitoring of these facilities. As a result, many premises although approved to operate, may not necessarily meet the basic requirements for quarantine operations. In addition, this study could not gain enough cooperation from the operators because most of them lack awareness and basic knowledge on the essentials of biosecurity.

CONCLUSION

Animal quarantine stations serve a vital mode of protection for the country from the introduction of potential animal diseases. The study found that the reported level of biosecurity knowledge and understanding among the operators of TQS contradicts the observation made in this study by authorised auditors. It is suggested that the TQS operators be educated on the basic quarantine facilities requirements before their premises is approved for operation. Regular assessment and monitoring of these facilities are needed to ensure compliance to the procedures. A standard operating procedure must be established by the authorities and followed

by quarantine managers to ensure a high level of compliance to related regulations. The veterinary authority need to look into creating awareness and training the operators so that they are educated on the essentials of good quarantine practices in order to fulfil quarantine measures.

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