

KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS AFRICAN SWINE  
FEVER (ASF) AMONG PORK CONSUMERS IN MALAYSIA

FYP FPV

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## CERTIFICATION

This is to certify that we have read this research paper entitled **Knowledge, Attitude and Practice toward African Swine Fever among Pork consumers in Malaysia** by Tan Bee Yann, and in our opinion it is satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the course DVT 55204 - Research Project.



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**Thank You**

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## DEDICATIONS

I dedicate my dissertation to my family and friends.

A special thanks to Dr. Intan Noor Aina Binti Kamaruzaman had given ideas for this research project.

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## Table of Contents

<b>1.0 INTRODUCTION .....</b>	<b>1</b>
1.1 Research Problem Statement .....	2
1.2 Research Questions .....	3
1.3 Research Hypothesis .....	3
1.4 Research Objectives .....	3
<b>2.0 LITERATURE REVIEW .....</b>	<b>4</b>
2.1 African Swine Fever (ASF) .....	4
2.2 ASF's Global Economic Impact .....	5
2.3 Prevention and control of ASF .....	5
2.3.1 ASFV Vaccine .....	6
2.3.2 Efficient Disinfection .....	7
2.3.3 High Levels of Biosecurity .....	7
2.4 The importance of public awareness in eradicating infectious diseases .....	8
2.5 Disease eradication and disease-free status .....	8
<b>3.0 MATERIAL AND METHODS .....</b>	<b>10</b>
3.1 Study design and target population .....	10
3.2 Sample size calculation .....	10
3.3 Development of the questionnaire .....	11
3.4 Statistical Analysis of Data .....	12
<b>4.0 RESULT .....</b>	<b>13</b>
4.1 Socio-demographic Characteristics of Respondents .....	13
4.2 Knowledge of African Swine Fever .....	14
4.3 Attitude on African Swine Fever .....	15
4.4 Practices on African Swine Fever .....	17
4.5 Respondent's level of knowledge, attitude, and practice .....	18
4.6 Association between socio-demographic characteristic and total score of KAP .....	19
4.7 Correlation between total knowledge, attitude, and practice scores .....	19
<b>5.0 DISCUSSION .....</b>	<b>21</b>
<b>6.0 CONCLUSION AND RECOMMENDATION .....</b>	<b>25</b>
<b>7.0 REFERENCES .....</b>	<b>26</b>

MALAYSIA

KELANTAN

## List of Tables

Table 4.1: Demographics of the survey respondent (n = 308).....	13
Table 4.2: Responses to knowledge items .....	15
Table 4.3: Response to attitude items .....	16
Table 4.4: Responds to practices items.....	17
Table 4.5: Respondent's level of knowledge, attitude, and practice .....	18
Table 4.6: Association between total score of knowledge, attitude, and practices toward African Swine Fever (ASF) and the socio-demographic characteristic of the respondent in Malaysia.....	19
Table 4.7: Spearman's rho correlation between total knowledge, attitude, and practices scores .....	20

## ABSTRACT

An abstract of the research paper presented to the Faculty of Veterinary Medicine, Universiti Malaysia Kelantan, in partial requirement on the course DVT 55204 - Research Project.

African Swine Fever (ASF) is a viral, infectious and notifiable swine disease with a very high fatality rate. It not only causes a high mortality rate among infected pig, but also causes a high economic impact worldwide and was recently reported in Malaysia. A cross-sectional study was conducted to evaluate the level of knowledge, attitude, and practices toward ASF among pork consumers in Malaysia by using a self-administered questionnaire. A total of 308 pork consumers participated in this study. Person Chi-square analysis and Spearman's rho correlation were used to determine the relationship between socio-demographic characteristics of pork consumers and the level of knowledge, attitude, and practices towards ASF as well as the relationship between the level of knowledge, attitude, and practices, respectively. It was found that the knowledge of the pork consumer was moderate (62.3%, n=192/308), and only 64.3% (n=198/308) of them had heard of ASF. The pork consumers with a good attitude towards ASF was 49.4% (n=152/308). Among the pork consumers, 75.6% (n=233/308) believed that public awareness is crucial in stopping ASF in Malaysia. The analysis reveals an association between the level of knowledge and education level ( $p=0.013$ ) and a positive correlation between total knowledge and attitude score ( $r=0.265$ ). In conclusion, pork consumers who participated in this study demonstrated moderate understanding, a good attitude, and moderate to good practices regarding African Swine Fever. This study's findings will benefit various parties, such as The

Department of Veterinary Services (DVS), in efforts to identify potential interventive actions, such as awareness campaigns on ASF.

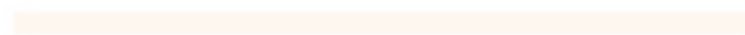
*Keywords: KAP, African Swine Fever, Pork consumer*



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## ABSTRAK

Abstrak daripada kertas penyelidikan dikemukakan kepada Fakulti Perubatan Veterinar, Universiti Malaysia Kelantan untuk memenuhi sebahagian daripada keperluan kursus DVT 55204 - Research Project.

Penyakit Demam Babi Afrika adalah penyakit babi yang disebabkan oleh virus dan bersifat berjangkit dengan tahap kematian yang sangat tinggi. Ia juga salah satu penyakit yang harus dilaporkan kepada pihak berkuasa jika berlakunya wabak. Ini menyebabkan impak ekonomi yang tinggi di seluruh dunia serta di Malaysia. Sebuah kajian keratan rentas telah dijalankan untuk menilai pengetahuan, sikap and amalan terhadap Penyakit Demam Babi Afrika dalam kalangan pengguna daging babi di Malaysia melalui 'google form'. Beberapa statistik digunakan dalam kajian ini seperti 'Person chi-square' dan 'Spearman's rho correlation' dengan menggunakan IBM SPSS Statistic versi 26.0. 'Person Chi-square' digunakan untuk mengenalpasti hubungan antara pengetahuan, sikap, dan amalan mengenai Penyakit Demam Babi Afrika dengan ciri-ciri sosio-demografi pengguna daging babi di Malaysia. Selain itu, 'Spearman's rho correlation' digunakan untuk menentu hubungan antara skor total pengetahuan, sikap, dan amalan. Sejumlah 308 orang pengguna daging babi telah menyertai dalam kajian ini. Ditemukan bahawa pengetahuan pengguna daging babi adalah sederhana (62.3%, n=192/308), hanya 64.3% (n=198/308) dari mereka yang pernah mendengar mengenai Penyakit Demam Babi Afrika ini. Dari 308 pengguna daging babi, 49.4% (n=152/308) pengguna daging babi memiliki sikap baik terhadap Penyakit Demam Babi Afrika. 75.6% (n=233/308) pengguna daging babi percaya bahawa kesedaran masyarakat memainkan peranan penting dalam menghentikan wabah Penyakit Demam Babi Afrika di Malaysia. Hasil kajian statistik menunjukkan

bahawa terdapat hubungan antara pengetahuan and pendidikan ( $p=0.013$ ), and 'correlation' positif antara jumlah skor pengetahuan dan skor amalan ( $r=0.265$ ). Kesimpulannya, pengguna daging babi yang menyertai dalam kajian ini menunjukkan pemahaman yang sederhana, sikap baik, dan amalan yang sederhana hingga baik mengenai Penyakit Demam Babi Afrika ini. Dengan itu, Jabatan Perkhidmatan Veterinar dan pihak lain boleh menggunakan data yang diperoleh dari kajian ini untuk menentukan keperluan untuk tindakan pencegahan, seperti kempen kesedaran untuk meningkatkan tahap kesedaran masyarakat tentang penyakit Penyakit Demam Babi Afrika.

*Kata kunci: Penyakit Demam Babi Afrika, African Swine Fever, Pengguna daging babi*

## 1.0 INTRODUCTION

Malaysia is a multiracial country with 32.7 million people. Among the 32.7 million people in the population, 11.5 million (35.16%) are pork consumers, consisting of Chinese, Indians, and others (Razak, 2022). Based on Mohamad (2022), in 2019, Malaysia's per capita pork consumption was about 18.3 kg, which decreased to 17.3 kg in 2021. In contrast to chicken and beef consumption, pork consumption in Malaysia has decreased over time. The rise in pork prices is one factor contributing to the drop in pork consumption. The cost for customers to buy pork will rise as long as the price of pork remains high. Aside from that, many small farms are closing due to viability issues and disease outbreaks (Richard Mahapatra *et al.*, 2021). This causes the industry to become destabilised, which is why it needs assistance to protect it, particularly against anything that can cause the industry to collapse, such as an outbreak of disease.

African Swine Fever (ASF) is a transboundary viral hemorrhagic disease that affects pigs of all ages, both domestic and wild. The African Swine Fever Virus (ASFV) causes a critical hemorrhagic disease that affects pigs of all ages, both domestic and wild. According to Ge *et al.* (2018), ASF was first identified in Kenya in 1921, and was introduced into the Republic of Georgia in 2007, then spread into other countries in eastern European countries, including Russia (2007), Ukraine (2012), Belarus (2013), Lithuania (2014), Estonia (2014), Poland (2014), Latvia (2014), Romania (2017), the Czech Republic (2017), and Hungary (2018). Thus, it swiftly spread to sections of the Asian region over the past three years (Khoo *et al.*, 2021). In February 2021, it was confirmed that the first AFS outbreak in Malaysia occurred in Sabah, where 53 wild boar and over 1,100 domestic pigs died and were euthanized (OIE,

2021). This was due to the disease's ability to transmit and spread rapidly, resulting in significant socio-economic consequences (Dixon *et al.*, 2020). ASF is preventable by increasing public awareness; nonetheless, misconceptions and misunderstandings among pork consumers in Malaysia make its control, prevention, and subsequent eradication difficult. Understanding pork consumers' knowledge, attitudes, and practice of pork consumers regarding ASF will aid in developing a strategy for its prevention. Unfortunately, in Malaysia, limited research has been conducted to determine the perception towards ASF among pork consumers. Therefore, this study aimed to evaluate pork consumers' knowledge, attitude, and practice towards ASF.

### **1.1 Research Problem Statement**

Since the outbreak of ASF in Malaysia, the public, especially pork consumers, has been complaining about the shortage of pork in the market as well as an increase in pork prices on social media. It is believed to be due to a lack of knowledge regarding the disease and being unaware of the situation. The public should be aware that the recent outbreak of ASF has brought a negative impact on the pig industry in Malaysia. Public awareness, especially among pork consumers, will assist in the control and preventive efforts. For example, proper disposal of the pork-containing product and avoid brings pork-related products from affected countries. As a result, this study is being carried out to determine the level of knowledge, attitude, and practice regarding ASF among pork consumers in Malaysia, which will assist in raising awareness of ASF in the country.

## **1.2 Research Questions**

- 1.2.1 What is the level of knowledge among pork consumers about African Swine Fever?
- 1.2.2 What is the level of attitude of pork consumers toward African Swine Fever?
- 1.2.3 What is the level of practices among the pork consumer toward African Swine Fever?

## **1.3 Research Hypothesis**

- 1.3.1 Pork consumers have a moderate level of knowledge of African Swine Fever.
- 1.3.2 Pork consumers have a poor level of attitudes towards African Swine Fever.
- 1.3.3 Pork consumers have a poor level of practices in preventing and controlling African Swine Fever.

## **1.4 Research Objectives**

- 1.4.1 To determine the level of knowledge on African Swine Fever among pork consumers in Malaysia.
- 1.4.2 To determine the level of attitude toward African Swine Fever among pork consumers in Malaysia.
- 1.4.3 To determine the level of practice on African Swine Fever among pork consumers in Malaysia.

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## 2.0 LITERATURE REVIEW

### 2.1 African Swine Fever (ASF)

In the 1900s, African Swine Fever (ASF) was first diagnosed in East Africa. African Swine Fever Virus (ASFV) of the Asfviridae was the causal agent of African Swine Fever. ASFV is a complex, double-stranded, big (170–193 kbp), and enveloped DNA virus (Khoo *et al.*, 2021). It can cause a highly contagious sickness with a fatality rate of one hundred per cent in all age groups of feral pigs and domestic pigs. This disease is transmitted through direct contact with diseased pigs, indirect contact via contaminated fomites, feed, and pork products, and tick bites by *Ornithodoros* spp. In natural infections, the incubation time spans from 4 to 19 days, and the clinical manifestations depend on the virus's virulence, exposure dose, and route of infection (OIE, 2021). Typically, it causes fever, gastrointestinal disorders, and respiratory illness, resulting in death (Penrith, 2009). The most practical method for detecting and identifying ASFV is polymerase chain reaction (PCR). In addition to a polymerase chain reaction (PCR), the enzyme-linked immunosorbent test (ELISA) is suggested for herd disease screening. Unlike classical swine fever (CSF), there is no viable vaccination or medication for controlling the spread of ASF.

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## 2.2 ASF's Global Economic Impact

The impact of ASF on the pig industries of the infected countries is enormous. For example, from 2007 to 2017, Russia suffered huge losses due to ASF, with more than 1,000 outbreaks leading to the deaths of an estimated 800,000 pigs across the country. This caused pig production in Russia to decrease by almost half, from 1,119 metric tonnes in 2007 to 608 metric tonnes in 2017 (Kovarev, 2018). In addition, in August 2018, ASF was detected in China, spreading all over the mainland. According to official statistics, 13,355 pigs had died due to ASF infection, and 1,204,281 pigs had been culled to stop the spread of the virus (You, S. *et al.*, 2021). The ASF and China outbreaks have resulted in economic losses for the industry and a significant disruption in the livestock supply chain and meat consumption structure (You, S. *et al.*, 2021). In February 2021, Sabah was confirmed with the first outbreak of AFS in Malaysia with 53 wild boars; over 1,100 domestic pigs died and were killed (OIE, 2021). Recently in April 2022, other outbreaks of ASF happened in Melaka, Perak, and Pahang. Governments have undertaken massive eradication measures such as mass culling activities, quarantine, and closure of the pig farms, which caused heavy losses for the industry. This also causes a rise in the price of pork and subsequently causes an increased price of meals in the hawker centre and the restaurant, which causes consumers to suffer from high living costs.

## 2.3 Prevention and control of ASF

According to the World Organization for Animal Health (WOAH) and the Department of Veterinary Services (DVS), ASF is one of Malaysia's reportable and notifiable diseases. Although ASF causes fatal diseases in wild boars and domestic pigs, it has no zoonotic potential, and humans are not susceptible to it. ASF virus is transmitted directly during contact between infected and susceptible pigs, by



consumption of the meat from infected pigs, by the bites of infected ticks (*Ornithodoros* spp.), and by contact with contaminated material or objects (bedding, feed, equipment, clothes and footwear, vehicles) contaminated by virus-containing matter such as blood, faeces, urine or saliva from infected pigs (Penrith, 2009). Culling was the principal approach for controlling the outbreak and establishing trade restrictions on unaffected nations (Tucker *et al.*, 2021). Farm-level biosecurity and proper husbandry practices are the only means of preventing and controlling ASF (Chenais *et al.*, 2017).

### **2.3.1 ASFV Vaccine**

Vaccination is one of the best measures to control viral diseases in livestock. Since the development of the ASF vaccine in the 1960s, researchers have explored and tested different types of vaccines, including inactivated vaccines (Blome, 2014). Unfortunately, most of the efforts to develop ASF vaccines were unsuccessful, and inactivated vaccines have been proven ineffective as they do not induce cellular immunity (Liu *et al.*, 2021). A recent gene-deleted live attenuated vaccine (LAV) has demonstrated considerable promising outcome. However, there is no appropriate cell line for passage to promote the creation of ASF LAVs. In addition, the differential labelling technique to differentiate ASFV infection from vaccinated animals (DIVA) and the safety concerns must be addressed. These are the primary factors limiting the development of ASF LAVs now (Liu *et al.*, 2021).



### **2.3.2 Efficient Disinfection**

Disinfection is wiping out infectious organisms by using chemical or physical agents. Routine disinfection needs to be done in areas where the pig farm is in contact with the outside world, such as sales barns, stockyards, staff entrances, and so on (Liu *et al.*, 2021). Proper operation of footbaths and wheel baths needs to be practiced to achieve ideal disinfection effects. For example, disinfectants should be refilled every 2–3 days and sheltered from the rain. Furthermore, manure and mud or debris on the boots should be thoroughly washed away before soaking them in the disinfectant, and the soaking duration needs to be ensured. The recommended disinfectants are calcium oxide, Iodine-based disinfectant, sodium hydroxide and phenolic compound.

### **2.3.3 High Levels of Biosecurity**

Strict inspection and quarantine of pig by-products must be carried out by the Customs Department to prevent international passengers from bringing in any pork products. Leftover food on international flights should be appropriately disposed of. Once the farm is confirmed to be affected by ASF, a 3 km protection zone and a 10 km surveillance zone should be implemented around the infected farms (Guinat *et al.*, 2017). The affected pig should be depopulated, incinerated, deeply buried, or composted, and the farm, as well as all the equipment, need to be disinfected, cleaned, and dried for at least 40 days.

## **2.4 The importance of public awareness in eradicating infectious diseases**

Barnes *et al.* (2020) identified that improved public awareness was essential for managing ASF in the community. Thus, it is necessary to increase awareness regarding ASF in the community. This not only helps the consumers understand the disease and its effects on the community, such as the increase in pork prices and decreased supply of pork, but it also plays a vital role in preventing and controlling disease outbreaks. There are many ways to increase public awareness of ASF. For example, organising a campaign, advertising on television and in newspapers, and sharing infographics on social media. These strategies necessitate collaboration between the government and stakeholders. Much effort should be put into increasing public awareness, especially among pork consumers such as hawkers and restaurant owners.

## **2.5 Disease eradication and disease-free status**

According to FAO (1999), in the absence of vaccination, the only available option to eradicate ASF is stamping out by slaughtering and disposing of all infected and potentially infected pigs. This method has successfully eradicated ASF and other severe transboundary diseases such as foot and mouth disease and rinderpest. Stamping out tends to be a resource-intensive method of disease eradication in the short term, but it has proven to be the most cost-effective method and allows countries to declare disease-free in the shortest time.

The main elements of the stamping-out policy of ASF, which proposed by FAO (1999), are:

1. Zoning of the country into infected, surveillance zone and free zones.

2. Quarantine to contain the disease, such as restricting pig-movement and prohibiting selling potentially infected pig products.
3. Enhanced epidemiological surveillance of ASF
4. Immediate slaughter of infected and potentially infected in-contact pigs
5. Safe burial or burning of carcasses and other infected materials
6. Cleansing and disinfection of infected premises
7. Keeping infected premises/villages without pigs for a safe period.

The listed procedure must be applied long enough to eradicate the disease and should be accompanied by extensive public-awareness campaigns.

To demonstrate disease freedom, several pieces of evidence need to provide to gain international acceptance of regained national ASF freedom, such as the country has an effective national veterinary service able to prevent re-entry of ASF, detect outbreaks and take prompt action against them. Also, have an effective disease-surveillance system with regular searches for ASF by field, laboratory and abattoir veterinary services. In addition, all ASF-suspected cases are thoroughly investigated, with documentation including the final diagnosis of the disease incident, and comprehensive random, stratified serological surveys have been carried out with negative results. Lastly, the wild pig population must have been examined for evidence of ASF infection (FAO, 1999).

### 3.0 MATERIAL AND METHODS

#### 3.1 Study design and target population

This cross-sectional study was conducted among pork consumers, including hawkers, butchers, meat sellers, and restaurant owners in Malaysia. The study lasted 19 days, from November 2 to November 20, 2022.

#### 3.2 Sample size calculation

The study population was approximately 11.5 million, including Chinese, Indians, Sabahans, Sarawakians, and others in Malaysia (Razak, 2022). Using the Z formula, the sample size was determined based on the power calculation. It was estimated that a minimum of 385 individuals should be sampled to gain a 95% confidence level, with a maximum allowable difference of 0.05 in detecting the KAP proportions in the population. A sample of 308 individuals from Malaysia was selected by a simple random sampling method. The data was collected via a self-administered online questionnaire using Google Forms. The Google form was blasted on all social media platforms, such as Facebook, WhatsApp, Telegram, and Instagram.

Sample size, n =

$$\frac{N * [z^2(1-p) / e^2]}{[N - 1 + (Z^2 p(1-p) / e^2)]}$$

Where N= Population size, Z= Critical value of normal distribution at the required confidence level, p= Sample proportion, e= Margin of error

### 3.3 Development of the questionnaire

Each respondent was required to complete four sections: socio-demography, knowledge, attitude, and practice (refer to Table 4.1, Table 4.2, Table 4.3 and Table 4.4). The first section concerned knowledge and comprised five questions assessed using a scoring system. Each appropriate answer was given a point, and the points for each question were totalled. The first section comprised socio-demography characteristics of the respondent, which consist of age, gender, ethnicity, and education level. The knowledge section comprised of 5 questions using a dichotomous answer: Yes or No. Each correct answer will be given 1 point, while the incorrect answer will be given 0 points. The level of knowledge is grouped based on the total score in the knowledge section. Respondents with 0 to 6 points will be considered poor, 7 to 12 points as moderate and 13 to 17 as good knowledge level.

The attitude section comprised six questions using a five-point Likert scale. Scores were assigned to each response where strongly disagree = 1, disagree = 2, not sure = 3, agree = 4, strongly agree = 5. with scores of "1 to 5". This section was assessed via the total attitude score, which is the sum of the six attitude questions ranging from 6 to 30. Respondents with 0 to 14 points will be considered poor, 15 to 23 points as moderate and 24 to 30 as good attitude.

The third part concerned practices and comprised five questions, which were also assessed using a scoring system—the scoring as such was: Yes, always = 2, Yes, sometimes = 1, No, never = 0, except for question No 2 and No 4 in this section where the No, never = 2, Yes, sometimes = 1 and Yes, always = 0. A respondent with 0 to 4 points will be considered as poor, 5 to 7 points as moderate, and 8 to 10 as good knowledge level

The questionnaire comprised three languages: English, *Bahasa Malaysia*, and Mandarin.

### **3.4 Statistical Analysis of Data**

The questionnaire data were analyzed using IBM® SPSS® Version 26 (IBM®, USA). The categorical variables were illustrated using descriptive statistics for frequency and percentage, while numerical variables were summarized using mean and standard deviation. Person Chi-square was used to determine the association between the categorical variables. A  $p$ -value of  $\leq 0.05$  was considered significant. Spearman's rho correlations were performed to measure the correlations between total scores of knowledge, attitude and practice. The correlation was significant at a level of  $\leq 0.01$ .

## 4.0 RESULT

A total of 311 individuals participated in this study; however, only 308 individuals were included in the final analysis after excluding those with missing data.

### 4.1 Socio-demographic Characteristics of Respondents

As shown in Table 4.1, 74.4% (n=229/308) of respondents are between the ages of 18 and 30, 19.8% (n=61/308) are between the ages of 31 and 49, and 5.8% (n=18/308) are between the ages of 50 and 70. Most of the respondents were female (69.5%, n=214/308). 59.7% (n=184/308) were Chinese, followed by Indians (22.7%, n=70/308), Sabahans (8.4%, n=26/308), Sarawakians (4.2%, n=13/308), and Others (4.9%, n=15/308). Additionally, 74.4% (n=229/308) of the respondents had a tertiary educational level, followed by a secondary education level (19.2%, n=59/308), a primary education level (3.9%, n=12/308), and no formal education (2.6%, n=8/308).

Table 4.1: Demographics of the survey respondent (n = 308)

Socio-demographic characteristic	Total (n=308)		Mean	Standard Deviation
	n	%		
<b>Age (year)</b>			1.31	0.578
18-30	229	74.4		
31-49	61	19.8		
50-70	18	5.8		
<b>Gender</b>			0.31	0.461
Female	214	69.5		
Male	94	30.5		
<b>Ethnicity</b>			0.72	1.101
Chinese	184	59.7		



Indian	70	22.7		
Sabahan	26	8.4		
Sarawakian	13	4.2		
Others	15	4.9		
<b>Education Level</b>			1.76	0.561
Primary	12	3.9		
Secondary	59	19.2		
Tertiary	229	74.4		
No formal education	8	2.6		

#### 4.2 Knowledge of African Swine Fever

Out of the 308 respondents, 198 (64.3%, n=198/308) had heard of African Swine Fever (ASF). When asked about the cause of ASF, 91.6% (n=282/308) of the respondents answered virus, which is the correct answer. There are 40.6% (n=125/308) of respondents believe bacteria cause ASF, while 21.8% (n=67/308) and 37.7% (n=116/308) of the respondents believe fungi and parasites cause ASF, respectively. In the context of clinical signs shown by the infected pig, most of the respondents were able to identify the correct clinical sign, such as high pig mortality (85.7%, n=264/308), diarrhoea (73.7%, n=227/308), dark red or purple ears and snouts (72.7%, n=224/308), vomiting (71.8%, n=221/308), and breathing difficulty (65.6%, n=202/308). Most respondents (89.3%, n=275/308) believed ASF is spread through direct contact with infected pigs or wild boars, followed by indirect contact with contaminated equipment (71.8%, n=221/308) and ticks (46.4%, n=143/308). More than half believe that ASF is zoonotic (53.9%, n=166/308).



Table 4.2: Responses to knowledge items

Knowledge items	Correct (%)	Incorrect (%)
<b>Do you know about African Swine Fever (ASF)?</b>	198 (64.3)	110 (35.7)
<b>African Swine Fever is caused by</b>		
Virus	282 (91.6)	26 (8.4)
Bacteria	183 (59.4)	125 (40.6)
Fungi	241 (78.2)	67 (21.8)
Parasite	192 (62.3)	116 (37.7)
<b>Which of the following is the signs/symptoms of ASF?</b>		
Swollen joint	149 (48.4)	159 (51.6)
Diarrhea	227 (73.7)	81 (26.3)
High pig mortality	264 (85.7)	44 (14.3)
Breathing difficulty	202 (65.6)	106 (34.4)
Dark red or purple ears and snouts	224 (72.7)	84 (27.3)
Vomiting	221 (71.8)	87 (28.2)
<b>ASF is spread by</b>		
Direct contact with infected pig/wild boar	275 (89.3)	33 (10.7)
Indirect contact with contaminated equipment	221 (71.8)	87 (28.2)
Spread by ticks	143 (46.4)	165 (53.6)
Through properly cooked pork	210 (68.2)	98 (31.8)
<b>Can ASF infect human?</b>	142 (46.1)	166 (53.9)

### 4.3 Attitude on African Swine Fever

103 (33.4%, n=103/308) respondents strongly agreed that ASF is one of the causes of the increment in pork prices in Malaysia. Half of the respondents (55.5%, n=171/308) strongly agreed that public awareness played an important role in stopping ASF in Malaysia. In addition, 50.3% (n=155/308) of the respondents believe ASF can affect the quality of pork, and only 41.2% (n=127/308) of respondents are worried about consuming pork when there is an outbreak of ASF in Malaysia. Out of 308

respondents, 207 (67.2%, n=207/308) believed it was essential to report ASF cases to authorities.

Table 4.3: Response to attitude items

Attitude-based items	Scale				
	Strongly disagree n (%)	Disagree n (%)	Not sure n (%)	Agree n (%)	Strongly agree n (%)
<b>ASF is one of the reasons that cause the increment of pork prices in Malaysia.</b>	31 (10.1)	26 (8.4)	67 (21.8)	81 (26.3)	103 (33.4)
<b>Public awareness plays an important role in stopping ASF in Malaysia.</b>	18 (5.8)	6 (1.9)	51 (16.6)	62 (20.1)	171 (55.5)
<b>I will buy pork from reliable sources.</b>	20 (6.5)	11 (3.6)	42 (13.6)	41 (13.3)	194 (63.0)
<b>Since there is news of ASF outbreak in Malaysia, I am worried about eating pork.</b>	30 (9.7)	26 (8.4)	62 (20.1)	63 (20.5)	127 (41.2)
<b>ASF in pig farms has affected the quality of pork.</b>	22 (7.1)	12 (3.9)	61 (19.8)	58 (18.8)	155 (50.3)
<b>It is important to report cases of ASF to authorities.</b>	11 (3.6)	8 (2.6)	33 (10.7)	49 (15.9)	207 (67.2)

#### 4.4 Practices on African Swine Fever

Out of 308 respondents, 147 (47.7%, n=147/308) will report to the authority when there are dead boars around their housing area, and 68 (22.1%, n=68/308) will not. When there is an ASF outbreak, 55.8% (n=172/308) of respondents will not buy pork from the affected country, and 44.8% (n=138/308) will not purchase pork by-products from the affected country. Most respondents (82.5%, n=254/308) disagree with the farmer selling their pigs in the market if there is an outbreak of ASF on the farm. Most respondents (62.0%, n=191/308) will advise others not to buy pork from ASF-affected farms.

Table 4.4: Responds to practices items.

<b>Practice Items</b>	<b>Yes, always n (%)</b>	<b>Yes, sometimes n (%)</b>	<b>No, Never n (%)</b>
<b>Will you report to the authority if you find dead wild boar around your housing area?</b>	147 (47.7)	93 (30.2)	68 (22.1)
<b>If there is an outbreak of ASF in Malaysia, will you still purchase pork from the market?</b>	35 (11.4)	101 (32.8)	172 (55.8)
<b>I will not purchase pork by-products such as Bacon, Sausage, and Luncheon meat from a country that had ASF outbreak.</b>	138 (44.8)	88 (28.6)	82 (26.6)
<b>If you detected any pig farms that have ASF, will you agreed for them</b>	22 (7.1)	32 (10.4)	254 (82.5)

**to sell their pigs in the market?**

<b>Will you advise others not to buy pork from farms affected by ASF?</b>	191 (62.0)	76 (24.7)	41 (13.3)
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**4.5 Respondent’s level of knowledge, attitude, and practice**

Based on Table 4.5, 62.3% (n=192/308) of the respondents show moderate knowledge, and 26.3% (n=81/308) and 11.4% (n=35/308) of respondents show good and poor knowledge levels, respectively. Additionally, out of 308 respondents, 152 respondents (49.5%, n=152/308) showed a good attitude toward ASF, while 96 respondents (31.2%, n=96/308) and 60 respondents (19.4%, n=60/308) showed a moderate and poor attitude toward ASF, respectively. While for practice, 45.5% (n=140/308) and 45.1% (n=139/308) of respondents show good and moderate practice towards ASF, respectively, only 9.4% (n=29/308) of respondents show poor practice towards ASF.

Table 4.5: Respondent’s level of knowledge, attitude, and practice

Variable	Level	Score	Frequency (%)
<b>Knowledge</b>			
	Poor	0-6	35 (11.4)
	Moderate	7-12	192 (62.3)
	Good	13-17	81 (26.3)
<b>Attitude</b>			
	Poor	0-14	60 (19.4)
	Moderate	15-23	96 (31.2)
	Good	24-30	152 (49.4)

**Practice**

Poor	0-4	29 (9.4)
Moderate	5-7	140 (45.5)
Good	8-10	139 (45.1)

**4.6 Association between socio-demographic characteristic and total score of KAP**

From Table 4.6, an apparent trend was noticed among different age groups and educational levels. For the level of education, a pattern was seen where the higher the education level, the better the knowledge of ASF. In addition, the age group also significantly influences the level of knowledge about ASF.

Table 4.6: Association between total score of knowledge, attitude, and practices toward African Swine Fever (ASF) and the socio-demographic characteristic of the respondent in Malaysia.

Socio-demographic characteristic	Chi-square value(df)		
	Knowledge	Attitude	Practice
Age	12.746 (4)*	6.256 (4)	8.952 (4)
Gender	0.778 (2)	1.829 (2)	5.029 (2)
Ethnicity	11.698 (8)	12.608 (8)	12.662 (8)
Education Level	16.242 (6)*	7.273 (6)	33.766 (6)*

Level of significant,  $\alpha=0.05$ , \* $p$ -value is significant.

**4.7 Correlation between total knowledge, attitude, and practice scores**

Based on Spearman's rho correlation test, the correlation between total knowledge, total attitude, and total practice score was done. Table 4.7 shows a significant positive correlation between total knowledge and attitude score ( $r=0.265$ ). In addition, the

attitude score also showed a significant positive correlation with the practice score ( $r=0.225$ ). However, there is no correlation between knowledge and practice.

Table 4.7: Spearman's rho correlation between total knowledge, attitude, and practices scores

<b>Spearman's rho</b>	<b>TKS</b>	<b>TAS</b>	<b>TPS</b>
<b>Correlations</b>			
<b>TKS</b>	1.000	0.265*	-0.014
<b>TAS</b>	0.265*	1.000	0.225*
<b>TPS</b>	-0.014	0.225*	1.000

TKS: Total knowledge score, TAS: Total attitude score, TPS: Total practices score

## 5.0 DISCUSSION

This study investigated pork consumers' knowledge, attitudes, and practice (KAP) regarding ASF. The data on knowledge indicate that 62.3% (n=192/308) of pork consumers had moderate awareness about ASF, scoring between 7 and 12 points in the knowledge section, which includes the etiological agent, transmission of the virus, signs and symptoms of ASF. Nearly half of the pork consumers (46.1%, n=142/308) identified the condition as non-zoonotic but the remainder (53.9%, n=166/308) believed it is a zoonotic disease. They may not have as much access to sources of information like television or newspapers, which results in their having a modest degree of knowledge.

Concerning attitude toward ASF control, 152 (49.4%, n=152/308) pork consumers appeared to have a good attitude, scoring between 24 and 30 points in the attitude component. This may be due to their awareness of the disease's detrimental effects on the sector and national economy. Most pork consumers agreed that ASF is one of the factors contributing to the price increase of pork in Malaysia. One of the potential explanations for this is that they are aware of an outbreak of ASF in Malaysia, which leads them to believe that the rising price of pork is caused by a disease outbreak that is affecting the quality of pigs. In addition, most pork consumers are concerned about eating pork due to the spread of illness via consuming pork, as 53.9% (n=166/308) of the pork consumers believed ASF is a zoonotic disease. A possible reason for this could be because they are concerned about the potential health effects of ASF. Another important finding was that 75.6% (n=233/308) of pork consumers in Malaysia agreed that public awareness plays a crucial role in preventing the spread of



ASF. Public educational programs are included in ASF's contingency plan (FAO, 2009). Increasing public knowledge can aid in spotting the ASF incursion before the illness's massive spread, as well as ensuring compliance with management methods and encouraging pork consumers' involvement in animal disease prevention. For example, Hasanov et al. (2018) showed that household awareness campaigns were effective in increasing rabies knowledge and were a cost-effective strategy to boost vaccination coverage of domestic dogs by reminding dog owners with a high knowledge to vaccinate their dogs.

This study's pork consumers demonstrate a moderate (45.5%, n=140/308) to good (45.1%, n=139/308) level of practice, scoring 5 to 7 and 8 to 10 points, respectively. 47.7% (n=147/308) of them will always notify authorities if they discover a dead wild boar in their neighborhood, whereas 22.1% (n=68/308) choose not to notify authorities. They were either unaware of the significance of the activity or did not perceive it as a potential risk or cause of infectious disease. Since the ASF outbreak in Malaysia was reported, 190 (62%, n=190/308) pork customers have expressed concern about eating pork. This could be because consumers are unable to distinguish between infected and uninfected pork, which causes people to be concerned about eating pork even though veterinary and medical authorities have stated that it is safe to ingest infected pigs because the disease is not a zoonotic one.

In this study, several statistical analyses were conducted. The Pearson Chi-square test was applied to determine the relationship between knowledge, attitude, and practices regarding African swine fever (ASF) and the socio-demographic characteristics of pork consumers in Malaysia (Table 4.6). The analysis proves a correlation between education level and knowledge level ( $p= 0.013$ ). In the study that was carried out by



Suet *et al.* (2022) to evaluate the knowledge, attitudes, and practices of Malaysians regarding COVID-19, it was discovered that there is a positive association between the educational level and the level of knowledge ( $r=0.023$ ). Variations in pork consumer knowledge may be attributable to differences in educational level. This rationale could be because those with a higher education level, such as those with tertiary education, are more aware of the disease through daily news or social media, and therefore have a greater understanding. Another significant result indicates a correlation between knowledge level and age group ( $p= 0.013$ ). In this case, the correlation demonstrates that a person's level of knowledge increases in proportion to their age, meaning that the older they are, the more information they have acquired. The pork consumers in this study were largely adults in the age range of 18 to 30 years old. It's possible that they are too occupied with their regular tasks to pay attention to the information provided by other sources, such as newspapers. On the other hand, the elderly might have more leisure because they have retired or for other reasons; as a result, they have more time to devote to reading newspapers and listening to radio broadcasts.

This study used Spearman's rho correlation to determine the relationship between total scores on knowledge, attitude, and practices (Table 4.7). According to the findings of a study that was carried out by Rahmah *et al.* (2021) to assess the knowledge, attitude, and practice toward probiotics for the digestive system among health science students, there is a correlation that is statistically significant between the variables of knowledge and attitude ( $r =0.238$ ), as well as between attitude and practices ( $r =0.275$ ). It was similarly found in the current study that there was a positive association ( $r =0.265$ ) between the overall knowledge score and the attitude score. From this, we can conclude that customers' attitudes toward ASF are influenced by

their level of information and comprehension about the disease. Likewise, there was also a positive association between the total attitude score and the total practices score ( $r = 0.225$ ). This indicates that a certain amount of attitude toward ASF may prevent negative practices toward ASF, such as failing to notify authorities when dead wild boars are discovered in residential areas.

## 6.0 CONCLUSION AND RECOMMENDATION

Most pork consumers in Malaysia showed moderate knowledge, a good attitude, and moderate to good practices towards African Swine Fever. This study offers the opportunity to determine how well pork customers perceive ASF. However, there remains a knowledge gap among pork consumers; additional efforts should be made to educate the public about ASF. Continuous education and awareness programs are required to increase pork consumers' awareness in Malaysia.

As a recommendation, the questionnaire should gather information on sources of ASF-related information, such as television, radio, newspapers, and the internet. This will enable the author to shed light on the significance of social media in improving knowledge and awareness of ASF and compare the efficacy of various information sources. This also helps figure out the most efficient methods for promoting and boosting public awareness of the ASF in Malaysia. Second is the participants' bias, which means that they might not say what they think or do research when answering questions about their knowledge to give accurate answers. Lastly, the questionnaire should include more components such as occupational background and have a larger target population for better analysis result in assessing the knowledge, attitude, and practices among pork consumers towards ASF in Malaysia.

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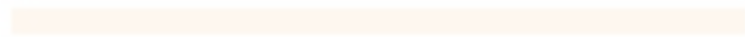
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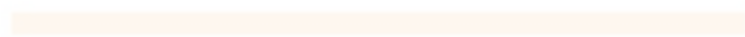
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