

REPORT

KNOWLEDGE, ATTITUDE, AND PRACTICE SURVEY ON AVIAN INFLUENZA IN HIGH RISK COMMUNITIES IN CIBINONG

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2009

LEGISLATION

Study Title: **Knowledge, Attitude, and Practice Survey on Avian Influenza in High Risk Communities in Cibinong.**

Approved By:

The image shows the CIVAS logo, which consists of the word "CIVAS" in a bold, sans-serif font. To the left of the text is a circular emblem containing a stylized caduceus (a staff with two snakes and wings). Below the main text, in a smaller font, is the full name "Center for Indonesian Veterinary Analytical Studies". Overlaid on the right side of the logo is a handwritten signature in black ink.

Albertus T. Muljono, DVM
CIVAS Executive Director

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INTRODUCTION

Background

Avian Influenza (AI) first emerged in Indonesia in 2003. Until today various control efforts conducted by many parties has not yet succeeded. This was reflected in the numerous cases reported in poultry and human. Until September 8, 2008 numbers of AI cases in human were 137 cases with 112 fatalities (KOMNAS FBPI, 2008).

To control and prevent AI the government has carried out many efforts. One national strategy for AI control is improving public awareness and knowledge about AI. Several programs related to that strategy were development of public communication (communication), education (information) and training (education) on disease prevention. The aim of public awareness improvement is so people are ready to face AI outbreaks and are prepared against the possibility of an influenza pandemic (Kementerian Negara PPN/Bappenas, 2005). Public education and socialization have been carried out until the lowest community level, but evaluation of public knowledge, attitude and practice on AI.

The knowledge, attitude and practice (KAP) study is a study done on a certain population to gather information concerning what was known, believed and done related to certain issues (WHO, 2008). The KAP study can be used for (1) to gather information about what was known, thought and done by respondents; (2) to identify the differences in knowledge, believe or habitual pattern that can facilitate the understanding and action or obstacles of a program; (3) to identify the general information and general attitude owned by public; (4) to study the communication process and important information sources; (5) to identify the needs, problems and obstacles in education programs and the solution to resolve those issues. These results can be used to evaluate the success of an awareness program.

This study was carried out on three AI high risk communities in Cibinong region, Bogor district. The groups were small scale and backyard farmers, the poultry collecting facility (PCF) and/or poultry slaughtering facility (PSF) community and consumers of poultry products. Cibinong region is the government center of

Bogor district. This region has high density of human population and poultry farms. Cibirong is also a poultry business center that is endemic for AI.

Objective

The objectives of this study are:

1. To identify the social-demography distribution of high risk communities in Cibirong.
2. To estimate the knowledge level high risk communities in Cibirong.
3. To describe the attitude of high risk communities in Cibirong.
4. To study the behavior of small scale or backyard farmers and PCF/PSFs in Cibirong related to AI
5. To study the association between AI knowledge level, attitude and behavior in high risk communities in Cibirong.

Output

Expected outputs from this study were the data about KAP level which related with AI in high risk groups of people in Cibirong, Bogor District.

1. Data on the social-demography of high risk communities in Cibirong.
2. The knowledge level of high risk communities in Cibirong.
3. The attitude of high risk communities in Cibirong.
4. AI related practices in small scale or backyard farms and PCF/PSFs in Cibirong.
5. The association between AI knowledge level, attitude and behavior in high risk communities in Cibirong.

Benefit

Data regarding the social-demography distribution, knowledge level, attitude, and practice of high risk communities and the association between knowledge, attitude, and practice is expected to help the government, particularly the

government of Bogor district, and other related parties in planning and developing AI public awareness programs in the future.

METHOD

Time and Location

The study was conducted from October to December 2008 in three sub-districts in Cibinong region, Bogor District. The subdistricts were Cibinong, Tajur Halang and Bojong Gede. These locations were determined based on the presence of PCF/PSFs, small-scale or backyard farm and consumers of poultry products.

Population Target

The population target of this study was AI high risk groups, which include small-scale and backyard farmers, the poultry collecting facility (PCF) and/or poultry slaughtering facility (PSF) community and consumers of poultry products.

Sample

The total number of samples collected was 162 respondents, consisting of 61 PCF/PSF respondents, 51 small-scale or backyard farm respondents and 50 consumer respondents. The minimum target for each community group was 60 for PCF/PSFs and 50 from farmers and consumers. The total respondent from PCF/PSFs were more than the other groups because this unit is considered to be strategic and plays a major role in the spreading of HPAI virus. A study carried out by CIVAS (2007) found that 84.2% of poultry collected facilities tested were positive for AI. Therefore, special attention should be given to communities involved in this business unit.

The samples size calculation was conducted using Episcopo Win 2.0 programs with an estimated prevalence of 80% and 95% confidence level. The samples were taken using convenient random sampling.

Sample Definition

- All high risk communities are every person or group whose daily life is closely related to PCF/PSF business, small scale poultry farms, backyard farms, or are consumers of poultry products.
- A small-scale farm is a farm unit with a poultry population less than 5000 birds.
- A backyard farm is a household poultry unit. For this study, respondents were selected from farms with a population of over 10 poultry.
- Poultry Collecting Facilities/Poultry Slaughtering Facilities (PCF/PSF) is a business unit that temporarily holds and distributes live poultry and/or are poultry slaughtering facilities inside or outside the market area.
- Consumers of poultry products are people who buy and consume poultry products.

Data Collection

Data were collected through survey. Surveys were carried out by enumerators by interviewing and assessing each respondent based on a structured questionnaire (Annex 1, 2, 3).

Questionnaire and Assessment

The questionnaire consisted of 4 sections. The first section contained questions related to social-demographic aspects of the respondent such as gender, age, education, and other specific questions for each respondent group. The second, third, and fourth section were aimed to assess the knowledge level, attitude, and practice of respondents. These sections contain questions, statements and practice criteria related to avian influenza on disease agent, host, clinical symptoms, transmission, prevention and control.

Specifically, the second section contained closed questions on AI knowledge. There were two types of closed questions, one type is when the question is answered by yes, no, or do not know and the other type is when the question has several answering options and the respondent could provide more than one answer.

Each respondent group received 10 questions on knowledge and the knowledge level is assessed by scoring. Each right answer is given a score of one (1), a wrong answer or a do not know answer is given a score of zero (0). By calculating the number of questions given and possible maximum and minimum scores, the knowledge level is divided into the following 3 categories.

Table 1. Scoring of Knowledge Level

| Category | Score | Note |
|-----------------|------------|------------------------|
| Good | ≥ 11 | Max score is 41 |
| Moderate | $8 - < 11$ | |
| Poor | $0 - < 8$ | |

The third section was designed to assess the attitude of respondents. In this section, respondents were faced with several statements and asked to express opinions, to agree, disagree or do not know. The number of statements given for the farmer group was 14, PCF/PSF group 15, and consumer group 16. Some of the statements provided were positive and some negative. An agreement on a positive statement was given a score of one (1) and zero (0) if the respondent did not know or disagreed, while for a negative statement a score of one (1) was given if the respondent disagreed and zero (0) was given if the respondent did not know or agreed. The attitude of respondents was divided into the following 3 categories.

Table 2. Scoring of Attitude

| Category | Score | Note |
|-----------------|------------|------------------------------------------------------------------|
| Agree | ≥ 12 | Max score is 14 (farmer), 15 (PCF/PSF), and 16 (consumer) |
| Neutral | $8 - < 12$ | |
| Disagree | $0 - < 8$ | |

The fourth section was designed to assess AI related practices done by respondents. In this section, enumerators were given several criteria for the assessment of respondent's management practices. Practice assessment was only conducted on farmer and PCF/PSF groups. The given options were 'yes' and 'no'.

The fulfillment of one criterion was rewarded with one point. The practice of respondents was divided into the following 3 categories.

Table 3. Scoring of Practice

| Category | Score | Note |
|-----------------|-------------|-------------------------------------------------------------------|
| Good | ≥ 17 | Max score for PCF/PSF is 31 Max score for Farmer is 30 |
| Moderate | $10 - < 17$ | |
| Poor | $0 - < 10$ | |

Data Analysis

Data were analyzed with descriptive statistic, such as frequency and percentage. The correlation between knowledge level, attitude, and practice was analyzed with Spearman's rho.

RESULTS AND DISCUSSION

1. Respondent Social-Demography

1.1 Distribution of Respondents

The total number of respondents in this study was 162 respondents, with 51 farmers (31.65%), 61 PCF/PSF respondents (37.65%) and 50 consumers (30.87%) (Table 4).

Table 4. Distribution of Respondents based on Respondent Category

| No | Category | Total (people) | % |
|--------------|----------|----------------|------------|
| 1 | Farmer | 51 | 31.48 |
| 2 | PCF/PSF | 61 | 37.65 |
| 3 | Consumer | 50 | 30.87 |
| Total | | 162 | 100 |

1.1.1 Gender Distribution

Based on the gender distribution, most respondents from the farmer group and PCF/PSF group were dominated by male, while respondents in the consumer group were dominated by female as shown in Figure 1 below.

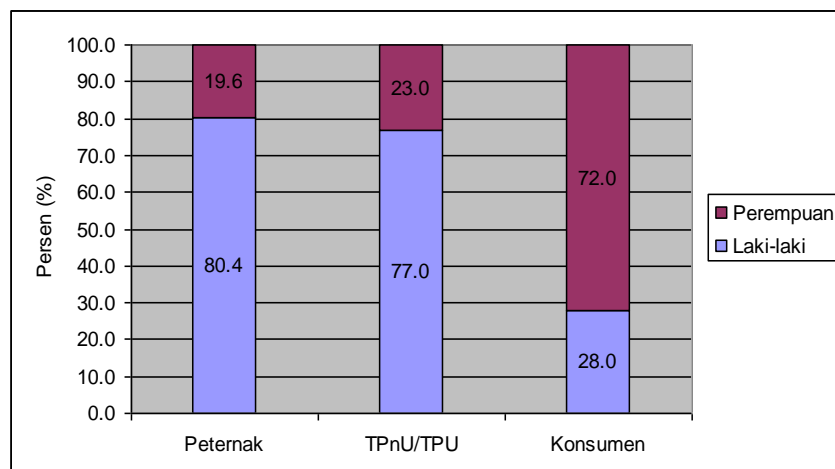


Figure 1. Gender Distribution of Respondents

As much as 80.4% of respondents from the farmer group and 77.0% of respondents from the PCF/PSF group are male, while 72.0% of respondents from the consumer group are female. This indicates that human resources at farms and PCF/PSF are still dominated by men.

1.1.2 Age Distribution

Age distribution of respondents from all of the groups is mostly in the range of 21 to 50 years of age (Figure 2).

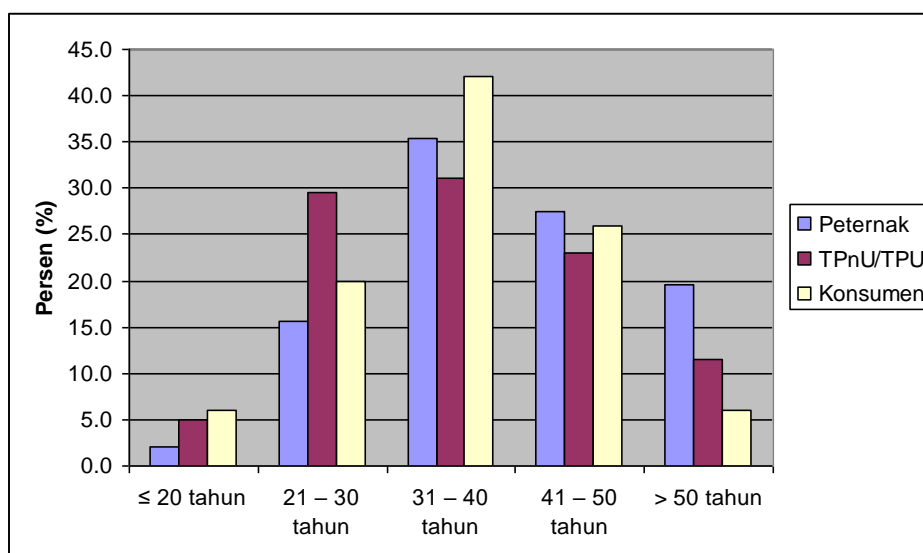


Figure 2. Age Distribution of Respondents

Most respondents were in the age group of 31 to 40 years, which is 35.3% from the farmer group, 31.1% from the PCF/PSF group, and 42% from the consumers group.

1.1.3 Education Level

The education level of most respondents was elementary, junior high or senior high school or its equivalent. Only a small proportion of respondents did not attend school or is a university graduate or postgraduate (Figure 3).

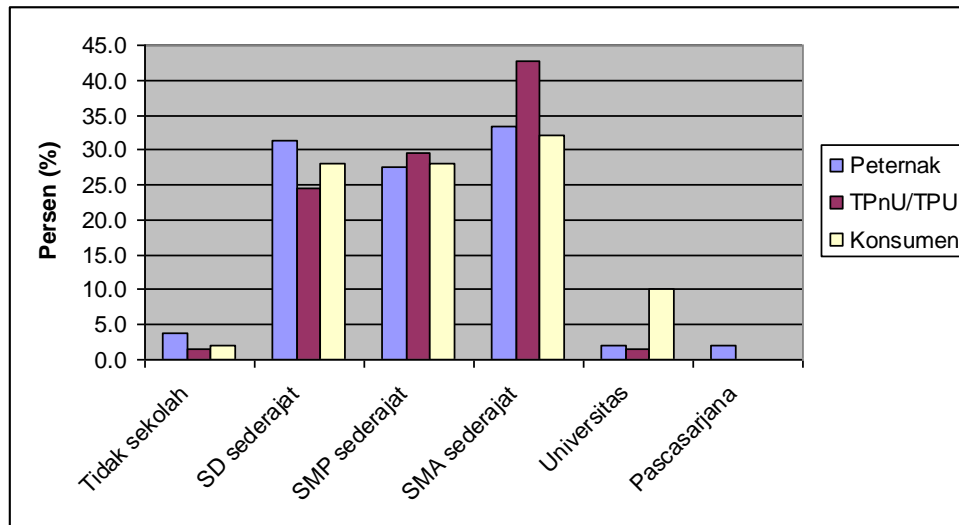


Figure 3. Education Level of Respondents

In the farmer group, 3.9% of respondents did not attend school, 31.4% have elementary school education, 27.5% have junior high school education, 33.3% have high school education, 2% were university graduates, and 2% have post-graduate education. In the PCF/PSF group, 1.6% did not attend school, 24.6% have elementary school education, 29.5% have junior high school education, 42.6% have high school education and 1.6% were university graduates. In the consumer group, 2% did not attend school, 28% have elementary school education, 28% have junior high school education, 32% have high school education and 10% were university graduates.

1.2 Farmer Group

1.2.1 Farming Experience

All farmer respondents were asked about their experience in poultry farming. A majority of respondents had between 1 - 5 years of experience (34%), others have less than 1 year of experience (20%), 6 - 10 years (20%), and more than 15 years (18%) (Figure 4).

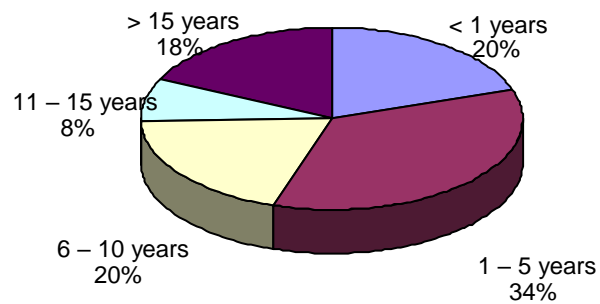


Figure 4. Farming Experience of Respondents

1.2.2 Number of Workers in Farm

Related to the number of workers in farms, most respondents had only 1 to 2 workers (86%). Meanwhile only 12% of respondents have 3 to 4 workers and 2% had more than 9 workers (Figure. 5).

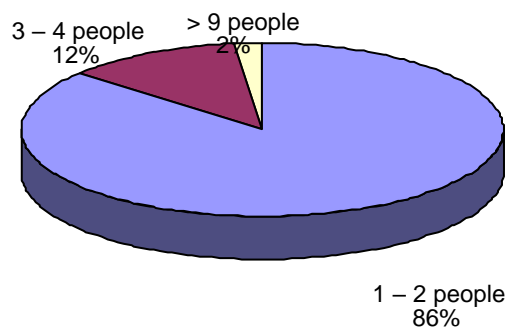


Figure 5. Number of Workers in Farm

The results above show that most of respondents work in small scale farm.

1.2.3 Poultry Population

Cibinong region has a high diversity of small-scale farms. Most farmer respondents (47 people) have a chicken farm. Twenty respondents were from a small scale farms with less than 50 chickens, while 26 respondents work in commercial farms with a population of over 1000 birds. Only one respondent owns 51-300 chickens (Table 5).

Table 5. Poultry Population

| Poultry Type | 0 – 50 | 51 – 300 | 301 - 1000 | 1001 - 3000 | >3000 | Total |
|--------------|--------|----------|------------|-------------|-------|-------|
| Chicken | 20 | 1 | 0 | 13 | 13 | 47 |
| Duck | 5 | 1 | 1 | 0 | 0 | 7 |
| Muscovy Duck | 5 | 0 | 0 | 0 | 0 | 5 |
| Other Birds | 0 | 1 | 0 | 0 | 0 | 1 |
| Total | 30 | 3 | 1 | 13 | 13 | 60 |

Besides chicken, there were 7 respondents who also had ducks, 5 respondents who had Muscovy ducks and 1 respondent had more than 50 pet birds. Two respondents that had duck even had a population of 50 -1000 ducks.

From all of respondents in the farmer group, 5 respondents practiced mix-farming. The mixed poultry were chicken with duck or Muscovy duck or both. The population for each species was less than 50. All 5 respondents were backyard framers.

1.3 PCF/PSF

1.3.1 Working Experience

Respondent distribution based on working experience in PCF/PSF was generally in the range of less than 1 year to up to 10 years (Fig. 6).

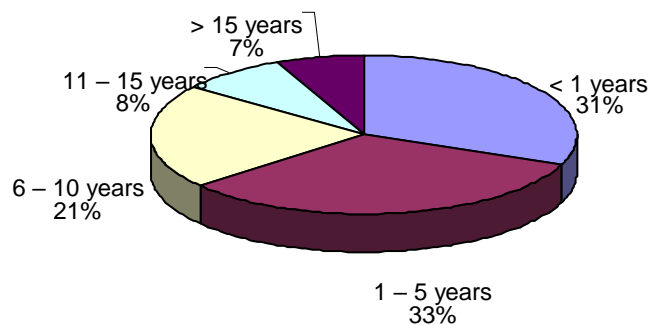


Figure 6. Working Experience in PCF/PSF

Most of respondents were divided into 3 major groups; less than 1 year of experience (31%), 1-5 years (33%), and 6-10 years (21%). Only a small proportion of respondents have 11-15 years experience (8%) and above 15 years (7%).

1.3.2 Number of Employees in PCF/PSF

Most respondents of PCF/PSF have between 1 - 2 employees (70%) Meanwhile other respondents have 3 to 4 employees (5%), 5 - 6 employees (7%), and 7 to 8 employees (18%) as shown in Figure 7.

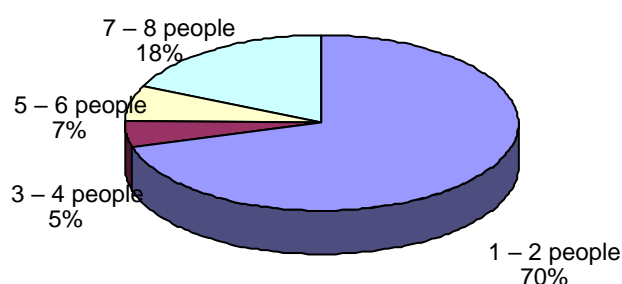


Figure 7. Number of Employees in PCF/PSF

The high percentage of respondents with only 1 - 2 indicates that most PCF/PSFs were small-scale units.

1.3.3 PCF/PSF Capacity

More than half of respondents (59%) had a capacity of less than 200 birds. Other respondents had a capacity of 200 - 500 (20%) and 500 - 1000 (18%). Only 3% of respondents had a capacity of 1000 - 2000 poultry (Figure 8).

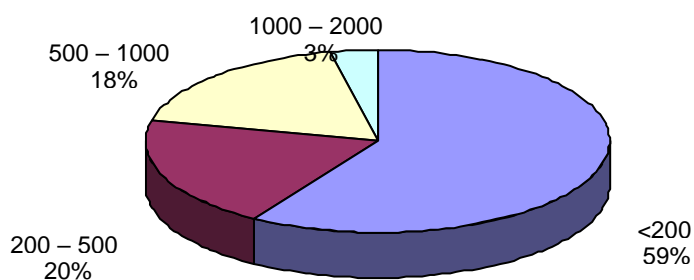


Figure 8. PCF/PSF Capacity

1.3.4 Average Slaughter in PSF

All PCF/PSF respondents in this study were both poultry collecting facilities and slaughtering facilities. Most respondents have a slaughtering capacity of less than 200 birds per day (Figure 9).

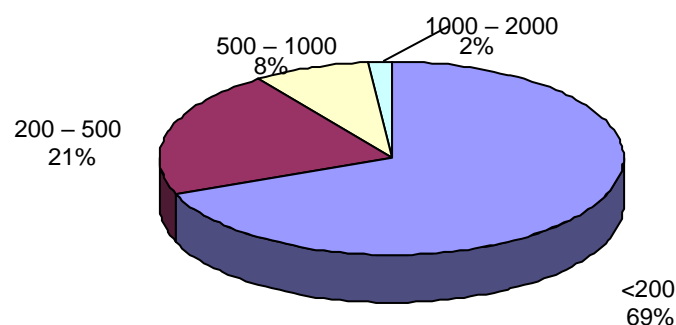


Figure 9. Slaughtering Average per Day in PSF

As much as 69% of respondents had a slaughtering capacity of less than <200 poultry per day, while others had a capacity of 200 to 500 birds per day (21%) and 500 to 1000 birds per day (8%). Only a small portion of respondents had a capacity of 1000-2000 poultry per day (2%).

1.4 Consumer

1.4.1 Occupation

Most consumer respondents were housewives (56%). Only a small proportion of respondents work as employees (18%) and housemaids (2%), while the remaining 24% had a variety of professions (Figure 10).

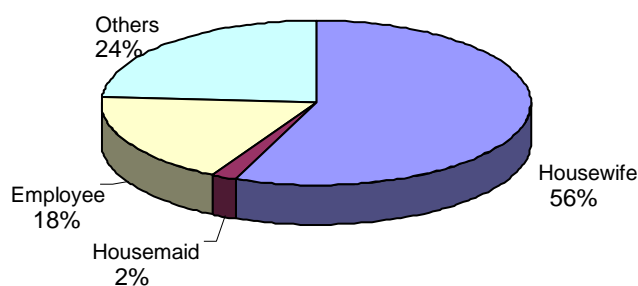


Figure 10. Consumer Occupation

The results indicate that housewives are the largest component of the consumer group and could be an important factor that determines the success of Avian Influenza prevention and control campaigns in the community.

1.4.2 Poultry Meat Consumption

Most respondents had an average consumption of less than 2.5 kg a week, with the intensity of the purchase of between once every 1 - 3 days. Most respondents also usually buy poultry from traditional markets or door-to-door vendors (Table 6).

Table 6. Poultry Meat Consumption

| Category | Number of Respondents | Percentage (%) |
|------------------------------------|-----------------------|----------------|
| Weekly Consumption | | |
| < 1 kg | 14 | 28 |
| 1 - 2,5 kg | 18 | 36 |
| >2,5 - 5 kg | 8 | 16 |
| >5 - 7,5 kg | 9 | 18 |
| >7,5 kg | 1 | 2 |
| Shopping Frequency | | |
| Every day | 16 | 32 |
| Once every 2-3 days | 15 | 30 |
| Once every 4-5 days | 1 | 2 |
| Once a week | 11 | 22 |
| Other | 7 | 14 |
| Source | | |
| Door-to-door vendor | 15 | 30 |
| Traditional market | 22 | 44 |
| Supermarket | 1 | 2 |
| Traditional poultry slaughterhouse | 8 | 16 |
| Other | 5 | 10 |

Based on the average consumption of poultry meat per week, more than half of respondents consumed < 1 kg - 2.5 kg (64%), while others consumed > 2.5 to 5 kg (16%) and > 5 to 7.5kg (18%). Only one respondent consumed > 7.5 kg / week (2%). In general, respondents purchase poultry meat every 1 to 3 days (62%). Only a few respondents purchased meat every 4 to 5 days (2%), although there were still 11 respondents (22%) that purchased meat once in a week and other 7 respondents (14%) did not purchase poultry meat at regular intervals. This shows the high purchasing activities of poultry products by consumers in Cibinong region.

Regarding the source of poultry, most consumers buy poultry at traditional markets (43%) and door-to-door vendors (29%). Only a small proportion of respondents bought poultry from slaughterhouses (16%) or supermarkets (2%). This shows that traditional markets and door-to-door vendors are an important part in the distribution of poultry products to a majority of consumers in Cibinong region.

1.4.3 Poultry Eggs Consumption

A majority of consumer respondents had an average egg consumption of less than 2.5 kg a week, with daily purchasing frequency. Consumers generally bought eggs at local shops (warung) (Table 7).

Table 7. Poultry Egg Consumption

| Category | Number of Respondents | Percentage (%) |
|---------------------------|-----------------------|----------------|
| Weekly Consumption | | |
| < 1 kg | 11 | 22 |
| 1 - 2,5 kg | 22 | 44 |
| >2,5 - 5 kg | 8 | 16 |
| >5 – 7,5 kg | 6 | 12 |
| >7,5 kg | 3 | 6 |
| Shopping Frequency | | |
| Every day | 22 | 44 |
| Once in 2-3 days | 14 | 28 |
| Once in 4-5 days | 1 | 2 |
| Once a week | 12 | 24 |
| Other | 1 | 2 |

| Category | Number of Respondents | Percentage (%) |
|---------------------|-----------------------|----------------|
| Source | | |
| Door-to-door vendor | 1 | 2 |
| Local shop (warung) | 40 | 80 |
| Traditional market | 4 | 8 |
| Supermarket | 1 | 2 |
| Farm | 1 | 2 |
| Other | 3 | 6 |

Nearly half of respondents had an average consumption of 1 - 2.5 kg a week (44%), while other respondents consumed <1 kg a week (22%), 2.5 to 5 kg a week (16%), 5 to 7.5 kg a week (12%), and only 6% consumed >7.5 kg a week. Generally respondents buy eggs every day (44%) or once every 2 - 3 days (28%). Only a small proportion of consumers bought eggs once every 4 to 5 days (2%), but there were also many respondents that bought eggs once a week (24%).

As much as 80% of respondents often buy eggs at the local shop. Only few respondents bought eggs in the traditional markets (8%), and very few bought from door-to-door vendors (2%), supermarkets (2%) or directly from the farm (2%).

2. Knowledge

2.1 Overview on Respondent AI Knowledge Level

The knowledge level of all study groups is shown in Table 8.

Table 8. Knowledge Level of Farmer, PCF/PSF, and Consumer Respondents

| Knowledge Level | Farmer | | PCF/PSF | | Consumer | |
|-----------------|-----------|------------|-----------|------------|-----------|--------------|
| | n | % | n | % | n | % |
| Good | 27 | 52.94 | 16 | 26.23 | 29 | 58.00 |
| Moderate | 5 | 9.81 | 22 | 36.07 | 10 | 20.00 |
| Poor | 19 | 37.25 | 23 | 37.70 | 11 | 22% |
| Total | 51 | 100 | 61 | 100 | 50 | 100 |

The table above shows that among all three high risk groups surveyed, the consumer group has the best knowledge level. This group has the highest proportion of respondents with good knowledge levels (58%) and the lowest proportion of respondents with poor knowledge levels (22%). The farmer and PCF/PSF group have similar proportions of respondents with poor knowledge levels, around 37%, but the farmer group has a greater proportion of respondents with good knowledge level compared to PCF/PSF.

This shows that in consumers in Cibinong region have better knowledge on AI compared to farmers and people working in PCF/PSFs. This should be of concern farmers and the PCF/PSF community has the intense interaction with live poultry and poultry products in their daily life. Swayne (2006) states that workers in poultry operations that usually have contact with live poultry, sick poultry or dead poultry have high risks for AI infection.

The risk of AI infection in humans is strongly related to the frequency of AI cases in the poultry population (Mills, et. al., 2006), hence controlling AI disease in poultry is essential to prevent AI in humans. Therefore, the knowledge and understanding of poultry producers (farmer) and distributors (PCF/PSF) is very important for the prevention and control of this disease.

2.2 Respondent Knowledge on AI

Almost all respondents surveyed said they knew about the AI/bird flu. As many as 98% of farmer respondents, 96.7% PCF/PSF respondents and 98% of consumer respondents said they knew about the Avian Influenza / bird flu (Figure 11).

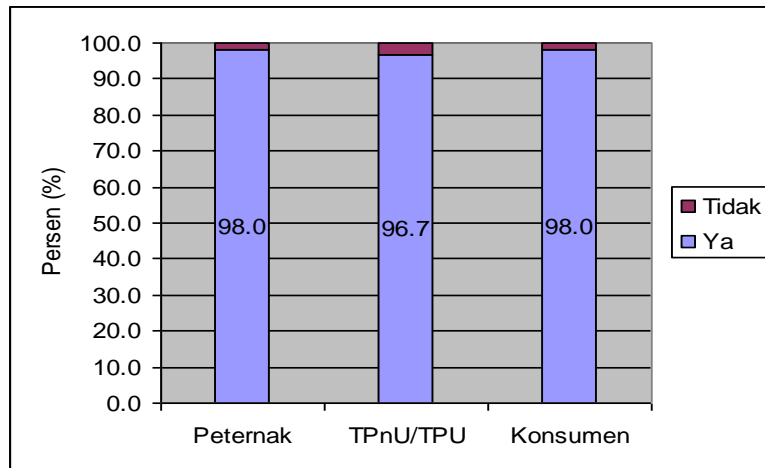
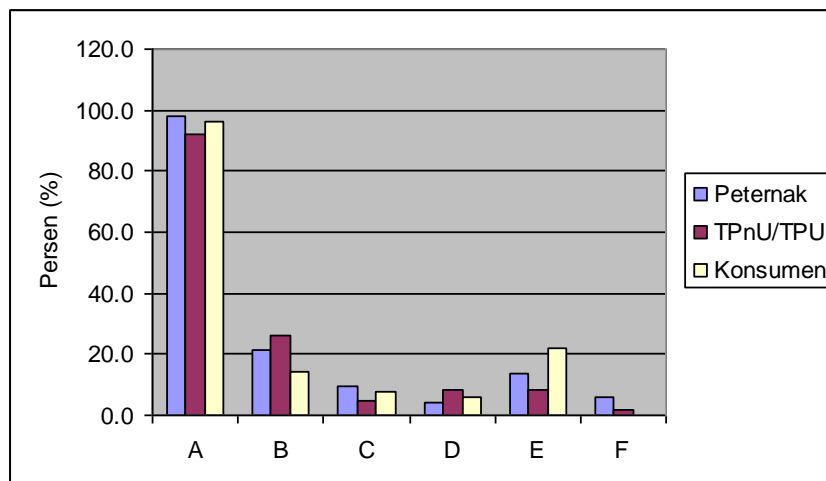


Figure 11. Status on AI Knowledge

This indicates that the AI / bird flu is not something new to the farmers, the PCF/PSF community and even consumers.

2.2.1 Source of Information on AI

Most respondents in all three groups (> 80%) said they obtained AI information from the electronic media. In addition 20% of farmer and PCFs/PCF respondents also acquired the information from printed media. In the consumer group, 20% of respondents stated to have received AI information through extension classes from the local government service office (Fig. 12). In this section, respondents could give more than one answer.



Note:

| | |
|---|-------------------------------------------|
| A | Electronic Media |
| B | Printed Media |
| C | Brochure, poster, leaflet, booklet |
| D | Friends, relatives, neighbor |
| E | Extension class from local service office |
| F | Special training |

Figure 12. Source of Information on AI

The picture above shows that dissemination of AI related information through the electronic media is the most effective approach so far (> 90%). Dissemination through printed media and extension classes from the local service office managed

to reach only a small portion of respondents, therefore more effective approaches should be developed.

2.2.3 Knowledge on Causing Agent

In general, more than 50% of respondents in all three groups said the causing agent of AI is a virus, while the remaining 41.2% farmer respondents, 45.9% PCF/PSF respondents, and 32% consumer respondents gave incorrect answers (Fig. 13).

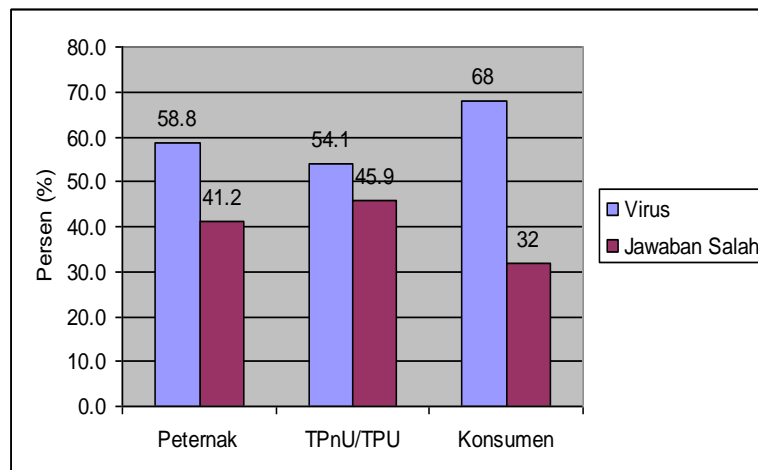


Figure 13. AI Causing Agent

In general, incorrect answers from respondents were bacteria or other microorganisms.

2.2.4 Knowledge on AI Host

Most respondents from all three groups said chicken were the hosts of AI (Figure 14).

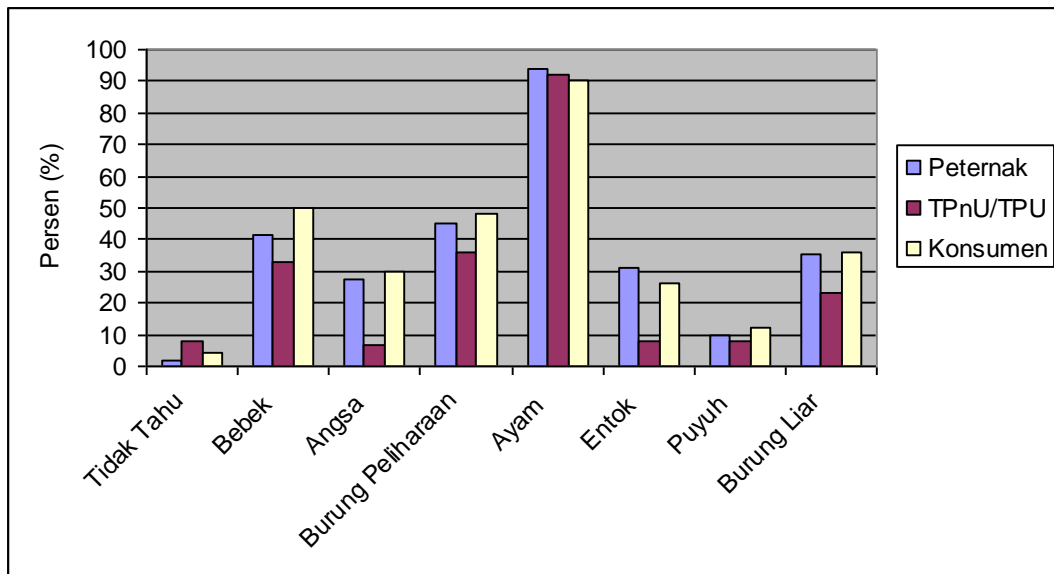


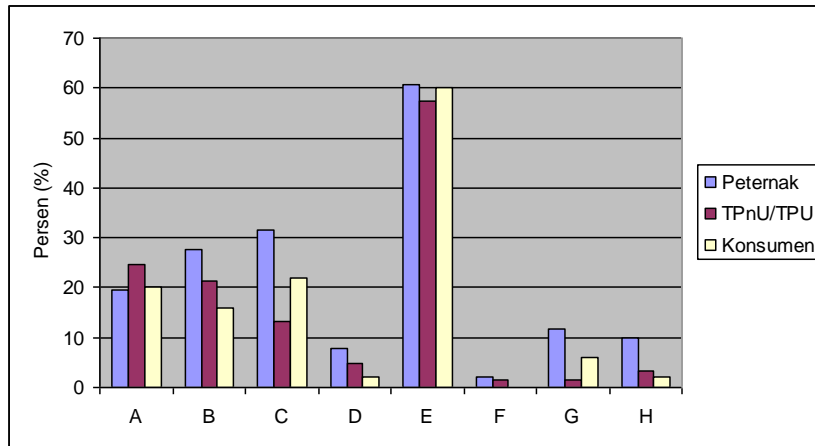
Figure 14. Knowledge on AI Host

In addition some also respondents also named other animals such as ducks, pet birds, wild birds, geese, Muscovy ducks and quails to be hosts of AI. In this section, respondent could give more than one answer.

The figure above shows that almost all respondents from all groups could identify chickens as AI hosts.

2.2.5 Knowledge on Disease Symptoms

More than 50% of respondents in all three groups identified sudden death as a symptom of AI infection in poultry. Other respondents also identified other symptoms such as exudates/discharge from the nose or bluish on the comb (Figure 15). In this section, respondent could give more than one answer.



Description:

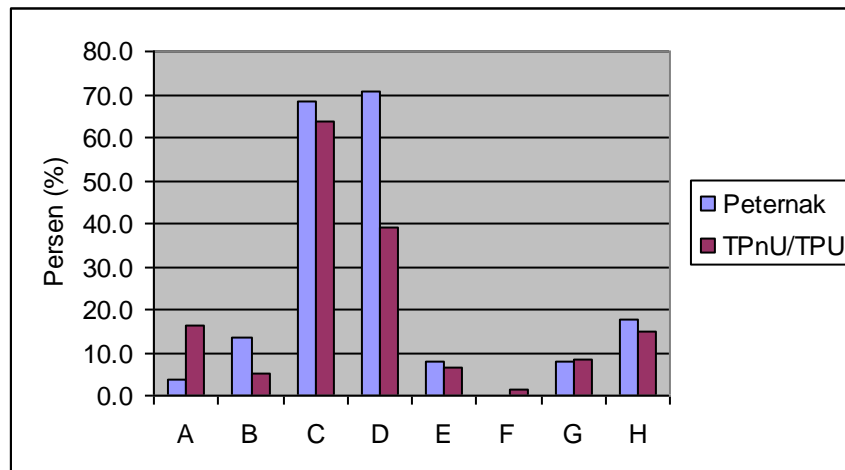
| | |
|---|------------------------------------|
| A | Do not know |
| B | Bluish on the comb |
| C | Exudates/discharge from the nose |
| D | Red spots on the legs |
| E | Sudden death |
| F | Severe bleeding on internal organs |
| G | Fast transmission among poultry |
| H | High mortality in chickens |

Figure 15. Knowledge on AI Disease Symptoms in Poultry

Only a small proportion of respondents (<10%) knew more specific disease symptoms such as fast transmission among poultry, high mortality rate, red spots on the legs, and severe bleeding on internal organs. In fact, nearly 20% of respondents in all three groups did not know AI symptoms in poultry.

2.2.6 Knowledge on AI Prevention in Poultry

In this study, farmers and PCF/PSF respondents were inquired about AI prevention in poultry. Most farmer and PCF/PSF respondents stated that AI in poultry could be prevented by maintaining poultryhouse and environmental sanitation (68.6% and 63.9%) and regularly vaccinating poultry (70.6% and 39.3%)(Figure 16). In this section, respondent could give more than one answer.



Description:

| | |
|---|---------------------------------------------------------------------------------------|
| A | Do not know |
| B | House poultry |
| C | Maintain poultry house and environmental sanitation |
| D | Vaccinate poultry on a regular basis |
| E | Isolating / separate sick birds |
| F | Not buy poultry from markets |
| G | Burn and / or bury dead birds |
| H | Disinfect houses, equipment, and materials in contact with poultry on a regular basis |

Figure 16. Farmer and PCF/PSF Respondent Knowledge on AI Prevention in Poultry

The figure above shows that farmer respondents have slightly better knowledge proportions compared to PCF/PSF respondents. More than 10% of PCF/PSF respondents did not know how to prevent AI in poultry, while only 1.75% of farmer respondents (1 respondent) did not know. Some farmer respondents (> 10%) even can identify housing poultry or disinfecting poultryhouses, tools, and other materials in contact with poultry on a regular basis as ways to prevent AI infection in poultry.

2.2.7 Knowledge on AI in human

In this study all groups of respondents were asked questions related to AI infection in human. Related to these questions, each respondent could give more

than one answer. In this section, respondent could give more than one answer (Table 9).

Table 9. Knowledge on AI in Human.

| Category | Farmer | | PCF/PSF | | Consumer | |
|---------------------------------------------------------------------------------------------|--------|------|---------|------|----------|-----------|
| | Total | % | Total | % | Total | % |
| Can AI transmitted to human? | | | | | | |
| Yes | 38 | 74.5 | 38 | 62.3 | 46 | 92 |
| Do not know | 13 | 25.5 | 23 | 37.7 | 4 | 8 |
| Observed symptoms on human with suspected for AI infection? | | | | | | |
| Do not know | 4 | 7.8 | 23 | 37.7 | 2 | 4 |
| High fever (>39°C) | 32 | 62.7 | 36 | 59 | 40 | 80 |
| Cough | 10 | 19.6 | 7 | 11.5 | 13 | 26 |
| Dizziness | 6 | 11.8 | 8 | 13.1 | 13 | 26 |
| Nausea, abdominal pain and vomiting | 6 | 11.8 | 3 | 4.9 | 2 | 4 |
| Diarrhea | 0 | 0 | 0 | 0 | 2 | 4 |
| Flu | 11 | 21.6 | 4 | 6.6 | 12 | 24 |
| Sore throat | 2 | 3.9 | 2 | 3.3 | 1 | 2 |
| How AI can be transmitted to humans? | | | | | | |
| Do not know | 1 | 2 | 25 | 41 | 3 | 6 |
| Direct contact with sick or dead birds infected with AI | 32 | 62.7 | 29 | 47.5 | 37 | 74 |
| Consuming poultry products that were not well-cooked | 12 | 23.5 | 10 | 16.4 | 14 | 28 |
| Unhygienic behavior after handling poultry or their products | 12 | 23.5 | 5 | 8.2 | 7 | 14 |
| How to prevent AI infection in human? | | | | | | |
| Do not know | 2 | 3.9 | 23 | 37.7 | 0 | 0 |
| Do not touch or have direct contact with sick / dead birds suspected to be infected with AI | 15 | 29.4 | 14 | 23 | 17 | 34 |
| Always wash hands with soap after contact with poultry and their products | 23 | 45.1 | 15 | 24.6 | 2 | 4 |
| Build the poultryhouses far from home/residence | 10 | 19.6 | 9 | 14.8 | 20 | 40 |
| Regularly cleaning the surroundings | 18 | 35.3 | 19 | 31.1 | 11 | 22 |
| Using special clothes for handling poultry | 1 | 2 | 4 | 6.6 | 21 | 42 |
| Always buy and consume properly cooked | 6 | 11.8 | 4 | 6.6 | 4 | 8 |

| Category | Farmer | | PCF/PSF | | Consumer | |
|----------------------------------------------------------------------|--------|------|---------|------|----------|-----------|
| | Total | % | Total | % | Total | % |
| healthy poultry meat | | | | | | |
| Using personal protective equipment whenever handling poultry | 2 | 3.9 | 5 | 8.2 | 4 | 8 |
| Maintain healthy and hygienic lifestyle | 11 | 21.6 | 17 | 27.9 | 10 | 20 |
| How to cook the chicken / egg? | | | | | | |
| Do not know | - | - | - | - | 0 | 0 |
| Half done | - | - | - | - | 1 | 2 |
| Well done | - | - | - | - | 41 | 82 |
| Cook with a minimum temperature of 80°C for 1 minute | - | - | - | - | 6 | 12 |
| Cook until boiling | - | - | - | - | 21 | 42 |

In general, all respondent groups stated that AI can be transmitted to human (60-90%). Most respondents identified high fever as a symptom of AI infection in human (60-80%). Related to AI transmission to human, most respondents stated that it occurs through direct contact with sick or dead poultry.

Regarding AI prevention in humans, there were many responses. Most of respondents in the farmer group said it could be prevented by washing hands with soap after having contact with poultry or poultry products (45.1%). Some also said the regularly cleaning the surrounding environment (35.3%) or avoiding direct contact with suspected sick/dead birds (29.4%) were ways to prevent AI infection to humans. Meanwhile in the PCF/PSF group, even though most respondents said AI could be prevented by cleaning the surrounding environment at a regular basis (31.1%), as much as 37.7% of respondents also said they do not know how to prevent AI infection to humans. In the consumer group, most respondents said AI could be prevented by using special clothing when handling poultry (42%), building poultryhouses far away from home (40%), and avoid direct contact with suspected sick/dead birds (34%). All respondents in the consumer group knew ways to prevent AI.

Consumer respondents were specifically asked about poultry products should be cooked. Most of respondents replied poultry products should be cooked until done (82%). As much as 42% of consumer respondents said poultry products

should be cooked until boiling and only 12% stated the products should be cooked at a minimum temperature of 80°C for one minute.

3. Attitude

To assess the attitude, respondents were given a series of statements related to AI preventive measures campaigned by the government. The following table shows the attitude of all respondents in all three groups (Table 10).

Table 10. Attitude of Farmer, PCF/PSF, and Consumer Respondents

| Attitude | Farmer | | PCF/PSF | | Consumer | |
|---------------|-----------|------------|-----------|------------|-----------|------------|
| | n | % | n | % | n | % |
| Agree | 42 | 82.35 | 49 | 80.33 | 49 | 98 |
| Medium | 8 | 15.69 | 5 | 8.2 | 1 | 2 |
| Poor | 1 | 1.97 | 7 | 11.47 | 0 | 0 |
| Total | 51 | 100 | 61 | 100 | 50 | 100 |

Table 10 show that over 80% of farmer and PCF/PSF respondents and almost all consumer respondents agree with AI prevention measures campaigned by the government. This indicates that AI education materials had been received well by all high risk groups with the best acceptance in the consumer group.

Only a few respondents disagreed with AI prevention measures campaigned by the government. The highest disagreement was found in the PCF/PSF group (11.47%). The in the farmer group, only 1.97% disagreed while in the consumer group none of the respondents disagreed with AI prevention measures campaigned by the government. Even so, in general all groups received well AI prevention measures promoted by the government with more than 80% of respondents from all groups agreeing.

The national public awareness campaign promoted by the government was “Beware Bird Flu!”. The campaign gives information to the public on effective ways to reduce the risks of being infected by H5N1 viruses. Main messages in this campaign are:

1. **Do not touch birds** that are sick or dead. If so, immediately wash your hands with soap and report the incident to the village chief.

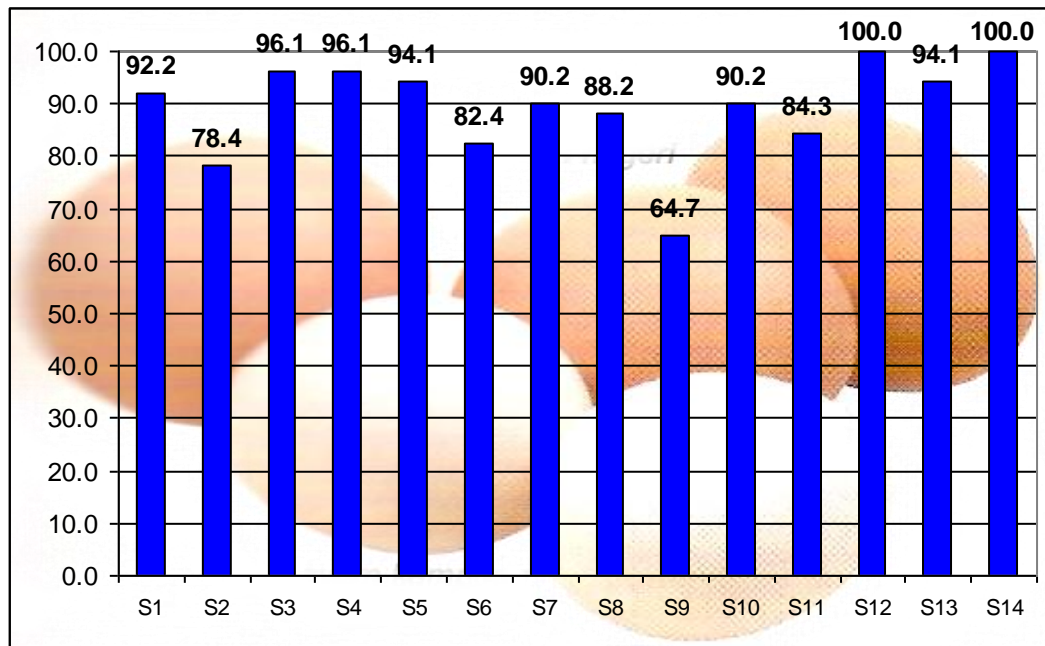
2. **Wash hands** and cooking tools with soap before eating or cooking. Cook chicken meat and eggs thoroughly.
3. **Separate poultry from human.** And also separate new birds from old birds for two weeks.
4. **Check yourself to the community health center** if you suffer from flu like illness and fever after having close contact with poultry.

Besides the main messages above, other information was also delivered through the campaign such as clinical signs of bird flu, use gloves and facial masks, do not eat sick or dead birds, do not let children play with birds, burn and bury dead birds, empty poultryhouses/cages for 3 weeks after an outbreak has occurred, house all remaining chickens, and report disease incidences to the local authorities. This campaign was disseminated through ads in the television and radio, outdoor campaigns, leaflets, and other media (Komnas 2009).

3.1 Farmers

In the overall attitude of farmer respondents, more than 30% of respondents agreed with AI prevention measures promoted by the government for this high risk group. But Figure 17 below shows that a third of respondents still disagree with the government's campaign related to farm location.

Farmer Respondents had been asked for their opinions about several statements relating to the prevention, treatment, and eradication of AI diseases in the farm. Most respondents agreed on the positive recommendations, such as keep the poultry in cage, regular cleaning of environmental, washing hands, poultry regular vaccination, carcasses disposal, limiting the poultry traffic and sanitizing every person and equipment in and out of the farm area, reporting poultry deaths that was suspected for AI, acquiring services of poultry health officers, and supporting the counseling programs. Below is a picture of the proportion of respondents' agreement toward these statements (Fig. 17).



Description:

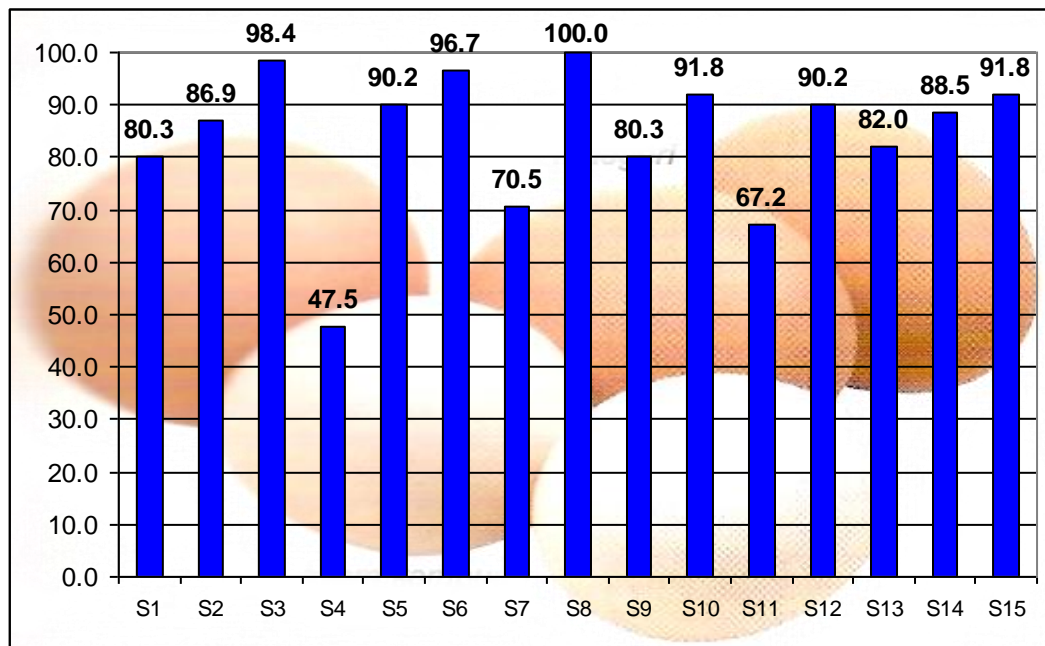
| | | | |
|----|---------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------|
| S1 | Housing poultry is a way to prevent AI from spreading | S8 | Sick chickens should not be sold or slaughtered |
| S2 | Chickens should be separated from other poultry | S9 | The farm should be located far from home |
| S3 | Poultryhouses and the environment should be regularly cleaned | S10 | Human traffic into the farm should be limited |
| S4 | Always wash hands with soap before or after handling birds | S11 | Every person/facility/equipment should be disinfected before entering and exiting the farm |
| S5 | Healthy birds should be vaccinated to create immunity | S12 | Cases of sudden poultry death suspected with AI should be reported to the local authority/village chief/livestock service office |
| S6 | New birds should be separated from old birds | S13 | Vaccination and animal health certificate is a way to control AI |
| S7 | Suddenly dead chickens suspected with AI should be buried or burned | S14 | AI education should be conducted continuously |

Figure 17. Attitude of Farmer Respondents

Only 64.7% of respondents agree that farms should be located far from home, while 35.3% still thinks that farms should be build near the house. This is a risky practice because having farms near houses will increase the possibility of humans being exposed to poultry diseases in the farm.

3.2 PCF/PSF

In the overall attitude, 80% of respondents agreed with AI prevention measures campaigned by the government, but in Figure 18 below there is unevenness in the distribution. Even though more than 80% of respondents agree with most prevention measures promoted by the government, there were two critical measures that had received poor responses.



Description:

| | | | |
|----|----------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------|
| S1 | The facility must be closed from other poultry/wild bird | S9 | Dead chickens should not be thrown into the river |
| S2 | Birds should be bought from sources with animal health certificates | S10 | Facilities should use all in all out system |
| S3 | The poultryhouses and environment must be regularly cleaned | S11 | Chicken manure, feather, and slaughter waste should not be disposed into the public drainage system/river |
| S4 | Human traffic into the facility must be limited | S12 | The health of workers in the facility is important to prevent AI infection to human |
| S5 | The facility must be build far away from residential areas | S13 | Every person/facility/equipment should be disinfected before entering and exiting the facility |
| S6 | Wash hands with soap before and after handling/slaughtering birds | S14 | Animal health certificate is a way to control AI |
| S7 | Unsold/unslaughtered chickens must be separated | S15 | AI education should be conducted continuously |
| S8 | Tools and equipments must always be washed and disinfected after use | | |

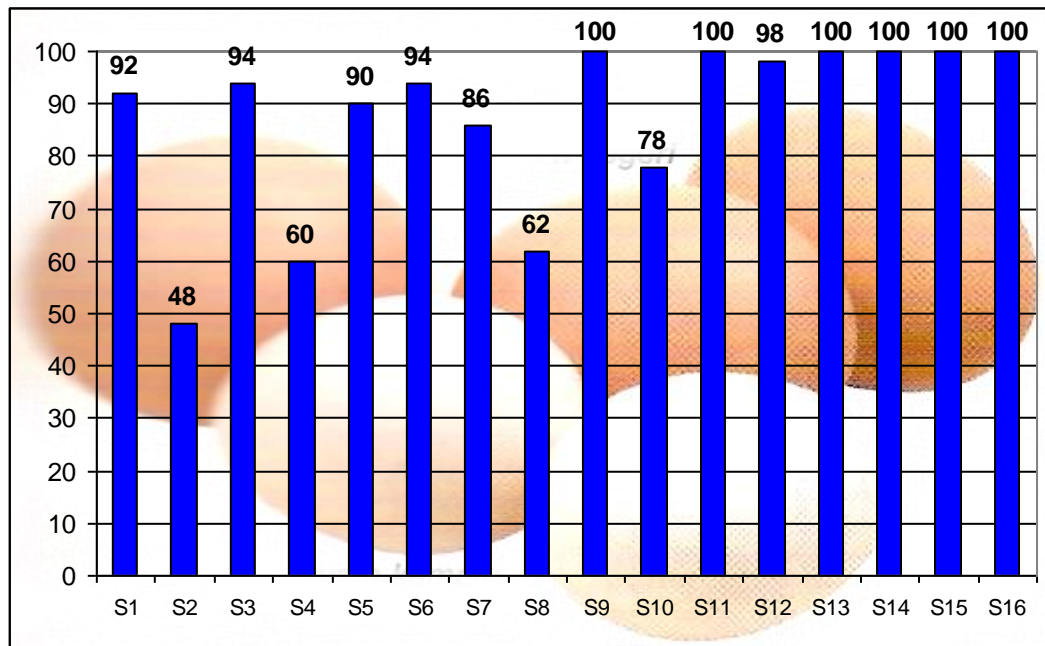
Figure 18. Attitude of PCF/PSF Respondents

Figure 18 shows that less than half of respondents (47.5%) believe that human traffic into the facility should be limited. As in slaughterhouses, the PCF/PSF are should be closed for consumers and non-employees. Inside a PCF/PSF there are many live chickens and the slaughtering of chickens. Live chickens could be a source of disease and the slaughtering process results in wastes that could potentially carry the disease. Allowing people to freely enter the facility will increase the risk of being exposed to disease agents within the chicken. A study done by CIVAS (2007) in Jakarta found that 84.2% of poultry collecting facilities studied were AI positive. Therefore, limiting human traffic into the facility is very important to reduce the risk being exposed to AI viruses.

Besides limiting human traffic, Figure 18 also shows that only 67.2% of respondents think that chicken manure, feather, and slaughter waste should not be disposed into the public drainage system or the river. This means that one third of respondents (32.8%) allow the disposal of chicken manure, feather, and slaughter waste into public drainage systems or the river. According to INFOSAN (2005) AI viruses are excreted through the feces and could be found in all parts of an infected bird. A study done by Stallknecht *et al.* (1990) also found that AI viruses could persist in water between 9 - 100 days depending on water pH, temperature, and salinity. Therefore, the practice of disposing PCF/PSF waste into the drainage system and rivers has very high risk of spreading AI viruses through the water.

3.3 Consumer

Figure 19 below shows the distribution of consumer attitude. Even though the overall attitude of respondents was almost 100% agree, the figure below indicates that there are several points with low percentages that needs further concern.



Description:

| | | | |
|----|------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------|
| S1 | Avian Influenza is very dangerous | S9 | Chicken meat/egg should be cooked thoroughly |
| S2 | Do not buy live birds at markets | S10 | Poultry products should be cooked at a minimum temperature of 80°C for 1 minute |
| S3 | Birds should be housed and placed away from residential areas (at least 25 meters) | S11 | Raw poultry products should be separated from other food/ingredients |
| S4 | Children should not play and pet birds | S12 | Equipment used to handle poultry must always be washed before and after it is used |
| S5 | Children should not touch or play with sick/dead birds | S13 | Always wash hands with soap before and after handling raw poultry products |
| S6 | Chicken meat and eggs are cheap and important sources of animal protein | S14 | People with flu-like symptoms after having contact with poultry should be brought to the doctor/community health center |
| S7 | Sick chickens should not be consumed | S15 | Cases of sudden poultry death suspected with AI should be reported to the local authority/village chief/livestock service office |
| S8 | Fresh chicken meat and egg could be a source of AI virus | S16 | AI education should be conducted continuously |

Figure 19. Attitude of Consumer Respondent

Only half of respondents (48%) believe that people should not buy live birds from markets. This indicates that the tendency of people to buy live poultry in markets is still high. The National Committee for Avian Influenza Control and Pandemic Influenza Preparedness (KOMNAS FBPI) in collaboration with the United States Department of Agriculture (USDA) and CIVAS had identified markets to be a critical point in the spreading of Avian Influenza (KOMNAS FBPI 2008). Poultry sold in markets even though look apparently healthy are not guaranteed to be free from

AI. Spickles *et al.* (2008) found that virus shedding through feces and the respiratory tract could occur before chickens develop clinical signs. Therefore purchasing live poultry in markets is at risk of Avian Influenza infection.

The percentage distribution of consumer attitude also shows that consumers have different believe when it comes to children and poultry. About 40% of respondents do not mind of children play and pet poultry while 60% of respondents think that children should not play and pet poultry. Even so, 90% of respondents agree that children should not touch or play with sick/dead poultry. Children, along with pregnant women, old people, and people with immunosuppressive diseases, are more vulnerable to disease compared to other people; therefore they should be avoided from risky practices that could increase the possibility of disease infection.

Related to poultry products, 60% of respondents believe that fresh poultry meat and eggs could become a source of AI viruses. Avian Influenza is not a foodborne disease, but contact with body fluids from sick animals (through direct handling of raw meat) and feces contaminating egg shells could transmit the disease (Spickler *et al.* 2008). Therefore, maintaining sanitation and personal hygiene while handling and processing poultry products is very important. Regardless whether raw meat and eggs are considered as a source of disease or not, consumers are very aware with cleanliness because 100% of respondents agree that raw poultry products should be separated from other food and hands should always be washed with soap before and after handling poultry products.

4. Practice

Practice was only assessed in the farmer and PCF/PSF group with both have production units. Results of the practice assessment in farmer and PCF/PSF respondents are shown in Table 11 below.

Table 11. Practice Assessment of Farmer and PCF/PSF Respondents

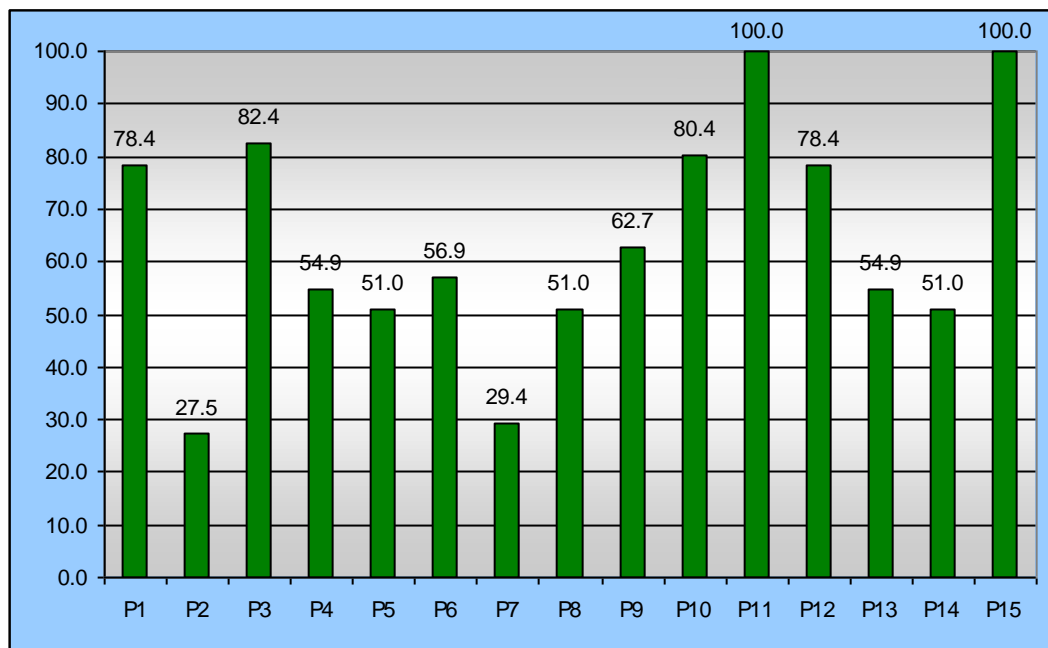
| Practice | Farmer | | PCF/PSF | |
|-----------------|--------|-------|---------|--------------|
| | N | % | n | % |
| Good | 33 | 64.71 | 27 | 44.26 |
| Moderate | 12 | 23.53 | 27 | 44.26 |

| Practice | Farmer | | PCF/PSF | |
|--------------|-----------|------------|-----------|--------------|
| | N | % | n | % |
| Bad | 6 | 11.76 | 7 | 11.48 |
| Total | 51 | 100 | 61 | 100 |

Overall, the proportion respondents with good practices is slightly higher in the farmer group (64.71%) compared to the PCF/PSF group (44.26%). However, the proportion of respondents with bad practices is almost similar in both groups (Table 11).

4.1 Farmer

There were several criteria met by most respondents in the farmer group, which were the housing of poultry (78.4%), separation of chickens from other poultry (82.4%), separation of new poultry from the old ones (62.7%), separation of sick birds from healthy birds (80.4%), and the provision of clean water (78.4%). In fact, all respondents buried/burned dead bird carcasses and were cooperative with services conducted by animal health officers. Figure 20 below shows all criteria assessed in detail.



Description:

| | | | |
|----|------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------|
| P1 | Poultry are housed (not free ranged/let loose in a limited area) | P9 | New birds are separated from old birds at least for 2 weeks |
| P2 | The poultryhouse is separated and located far away from home (minimum 25 m) | P10 | Sick birds are separated from healthy birds |
| P3 | Chickens are separated from other poultry (separated with clear partitions) | P11 | Dead chicken carcasses are disposed by burying/ burning |
| P4 | The poultryhouses and the environment is clean and the cleanliness is always maintained (regular cleaning) | P12 | Adequate clean water supply |
| P5 | Equipment in direct contact with poultry are clean and the cleanliness is always maintained (regularly cleaning) | P13 | Has a good drainage system |
| P6 | Farmers always wash their hand using sanitizers / soap before and after handling poultry | P14 | Has a good waste management system |
| P7 | Human and equipment traffic in the farm area is limited and disinfection is always preformed | P15 | Open and cooperative with livestock service officers |
| P8 | AI vaccination is done regularly according to the program | | |

Figure 20. Practice of Farmer Respondents

The figure above shows that some criteria were met by only half of respondents, such as regular cleaning of poultryhouses, the farm environment, and equipment, the act of always washing hands using sanitizers/soap before and after handling poultry, regular AI vaccination, good drainage system, and good waste management system.

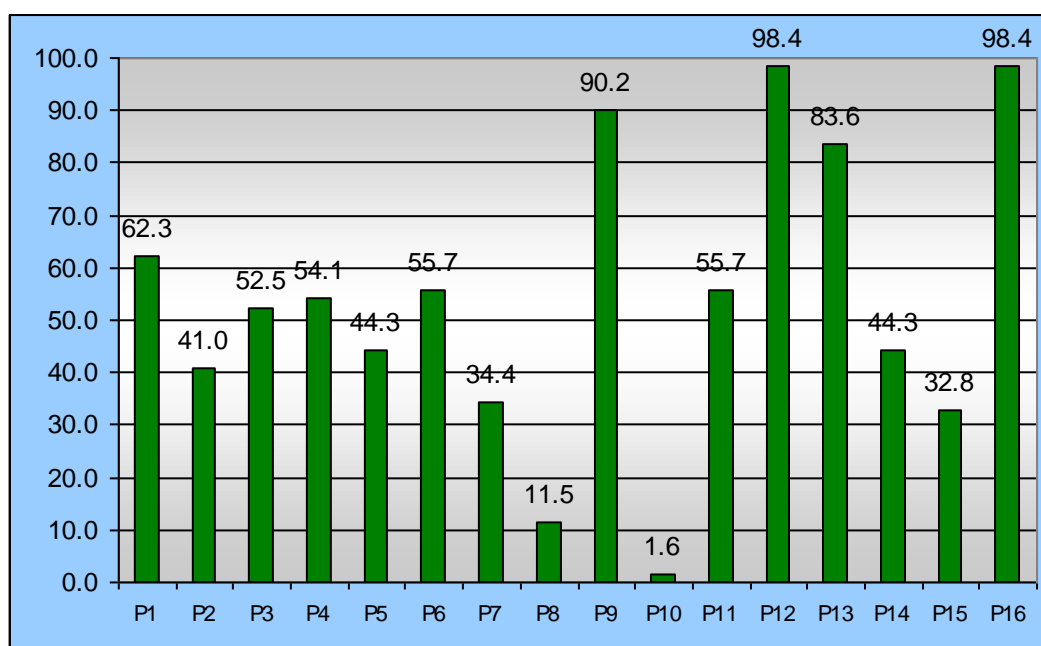
Beside that, only a small proportion of farmer respondents have poultryhouses located farm away from housing and limit human and equipment traffic in the farm. From all respondents, only 27.5% build their poultryhouses far from home, while the rest have their poultryhouses build near the houses of humans. No matter what, having a poultry farm near human housing will increase the risk of AI transmission to humans. Therefore it is important for the government to regulate the placing and spatial planning of farms and residential housing.

Regarding human and equipment traffic in the farm, only 29.4% of farmers were found to limit the traffic while other respondents had no limitations on human or equipment entering or exiting the farm area. According to Shulaw & Bowman (2001), human and equipment could introduce and spread disease into a farm, therefore controlling human and equipment traffic is very important.

Therefore it could be concluded that the overall practice of farmer respondents is quite good, except for farm location and limiting and disinfecting human and equipment traffic.

4.2 PCF/PSF

Practices done by PCF/PSF respondents were also assessed by enumerators. Some criteria were met by most of the respondents such as implementation of the all in all out system or separation of new birds from old birds (90.2%), disposal of dead chicken by burying / burning (98.4%), having clean water supply (83.6%), and open and cooperative with government service officers (98.4%). Below is practices done by PCF/PSF respondents (Figure 21).



Description:

| | | | |
|----|---------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------|
| P1 | The PCF/PSF area is enclosed with clear boundaries / fenced | P9 | PCF/PSF implement all in-all out system or do not mix new birds with old birds in a same cage |
| P2 | The PCF/PSF area is separated and located far from houses / residential (minimum 25 m) | P10 | Employees wear special working clothes provided by the facility |
| P3 | There are special cages to keep the chicken with adequate capacity | P11 | Sick birds are separated and placed in special/ isolation cages |
| P4 | The facility and its surrounding environment is clean and always cleaned regularly | P12 | Dead birds are disposed by burying / burning |
| P5 | Equipments in direct contact with poultry/poultry products are clean and always cleaned regularly | P13 | Adequate clean water supply |

| | | | |
|----|---------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------------------|
| P6 | PSF has hand-washing facilities equipped with clean water and soap | P14 | Has a good drainage system |
| P7 | PCF/PSF employees always wash their hands with sanitizers / soap before and after handling poultry/poultry products | P15 | Has a good waste management system |
| P8 | Human and equipment traffic in and out of farm area is limited and disinfection is always performed | P16 | Open and cooperative with livestock services officer |

Figure 21. Practice of PCF/PSF Respondents

Figure 21 shows that many criteria were only met by half of respondents, such as enclosing the PCF/PSF area, special cages with adequate capacity, cleanliness of the facility and its surrounding, and separation of sick birds into special/isolation cages. Also there were several criteria only met by half of respondents, which were location of PCF/PSF far from residential housing (41%), equipment cleanliness (44.3%), always washing hands before and after handling poultry/poultry products (34.4%), limiting of human and equipment traffic (11.5%), use of special working clothes (1.6%), good drainage system (44.3%), and good waste management system (32.8%).

In the respondent social-demography, all PCF/PSF respondents were known to be collecting and slaughtering facilities, but the percentage of respondents that care about equipment cleanliness and personal hygiene of the employees is very small. This is very concerning because everyday the respondents slaughter and provide fresh chicken carcasses to consumers. Unhygienic conditions during the preparation of chicken carcasses could contaminate the carcasses with all sorts of disease present in animals they slaughter and the environment. Also, only one facility provides special working clothes for its employees.

5. Correlation between Knowledge, Attitude and Practice

A test was conducted in this study to analyze the correlation between respondent knowledge, attitude, and practice. The analysis was conducted based on the score of each respondent. It could be a positive or negative correlation depending on the correlation coefficient value. If the correlation coefficient value is positive, then it is a positive correlation and visa versa. The strength of the correlation is interpreted as weak if the correlation coefficient is 0.00 - <0.30,

moderate if the correlation coefficient is ≥ 0.30 - < 0.70 , and strong if the correlation coefficient is ≥ 0.70 – 1.00 (Cruise Scientific 2009).

Below is the correlation between the knowledge, attitude, and practice of farmer respondents (Table 12), PCF/PSF respondents (Table 13), and consumer respondents (Table 14).

Table 12. Correlation between Knowledge, Attitude, and Practice of Farmer Respondents

| | | Knowledge | Attitude | Practice |
|------------------|--------------------|-------------|--------------|--------------|
| Knowledge | Correlation Coeff. | 1.000 | .256 | .226 |
| | Sig. (2-tailed) | . | .070 | .110 |
| Attitude | Correlation Coeff. | .256 | 1.000 | .344* |
| | Sig. (2-tailed) | .070 | . | .013 |
| Practice | Correlation Coeff. | .226 | .344* | 1.000 |
| | Sig. (2-tailed) | .110 | .013 | . |

*Significant at 0.05 (2-tailed)

Table 12 shows a significant correlation between attitude-practice at 95% confidence level ($p < 0.05$), while a significant correlation was not found between knowledge-attitude and knowledge-practice. The correlation between attitude and practice is positive with moderate strength (0.344).

Table 13. Correlation between Knowledge, Attitude, and Practice of PCF/PSF Respondents

| | | Knowledge | Attitude | Practice |
|-----------|--------------------|-----------|----------|----------|
| Knowledge | Correlation Coeff. | 1.000 | .306* | .192 |
| | Sig. (2-tailed) | . | .016 | .138 |
| Attitude | Correlation Coeff. | .306* | 1.000 | .322* |
| | Sig. (2-tailed) | .016 | . | .011 |
| Practice | Correlation Coeff. | .192 | .322* | 1.000 |
| | Sig. (2-tailed) | .138 | .011 | . |

* Significant at 0.05 (2-tailed)

Analysis of the knowledge, attitude, and practice of PCF/PSF respondents found a significant correlation between knowledge-attitude and attitude-practice at 95% confidence level ($p < 0.05$), while a significant correlation was not found between knowledge-practice (Table 13). Positive correlations with moderate strength were found between knowledge-attitude (0.306) and attitude-practice (0.322).

Table 14. Correlation between Knowledge and Attitude of Consumer Respondents

| | | Knowledge | Attitude |
|------------------|--------------------|-----------|----------|
| Knowledge | Correlation Coeff. | 1.000 | .144 |
| | Sig. (2-tailed) | . | .318 |
| Attitude | Correlation Coeff. | .144 | 1.000 |
| | Sig. (2-tailed) | .318 | . |

* Significant at 0.05 (2-tailed)

Table 14 shows the correlation analysis result between the knowledge and attitude of consumer respondents. Consumer practice was not assessed in this study; hence the correlation could not be analyzed. The analysis did not find any significant correlation between consumer knowledge and attitude.

Analysis of all high risk groups indicates the presence of moderate positive correlations between knowledge-attitude (PCF/PSF) and attitude-practice (farmer and PCF/PSF). A positive correlation means that the increase of one variable will be followed by the increase of the other variable, but the correlation strength indicates that there are other factors influencing the variables such as social-economy factors of the respondents (Maton *et al.* 2007, Leslie *et al.* 2008, Giuseppe *et al.* 2008).

CONCLUSION

Results of this study show that the farmer and PCF/PSF respondent group was dominated by men while the consumer respondent group was dominated by women with most respondents being housewives. The education level of a majority of respondents in all groups was elementary school, junior high school, or high school. Almost all respondents involved in the study claimed to know about AI and the obtained most of AI-related information from the electronic media.

Regarding knowledge, the consumer groups has the highest percentage of respondents with good knowledge levels (58%), followed by the farmer group with 52.94% and PCF/PSF group with only 26.23%. However, the percentage of respondents with poor knowledge level in both farmer and PCF/PSF group is almost the same (37%). Therefore so it can be concluded that improving knowledge in farmers and moreover in the PCF/PSF community is critical, especially if associated with the high risk of direct contact with poultry.

In general, the attitude of the respondents in all three groups is good. The highest percentage of agreement in the consumer groups (92%), followed by the farmer group (84.31%) and PCF/PSF group (80.33%). But in the PCF/PSF group 11.47% of respondents had an attitude of disagreement, while almost none was present in the other two groups. This indicates the need to increase public awareness associated with AI control policy especially in the PCF/PSF community.

Practice assessment was conducting in farms and PCF/PSF units. Overall the percentage of bad practices in both groups was almost equal (11%), but the farmer group has a higher percentage of respondents with good practices (64.71%) compared to the PCF/PSF groups (44.26%). This indicates the need of good practice development in poultry units in order to control AI, especially in PCF/PSFs.

Correlation analysis in general found a moderate positive correlation between knowledge level-attitude and attitude-practice in farmer and PCF/PSF groups. This means that improvement in knowledge could positively influence attitude and practice in the end. Even so there are still other factors such as social economy factors that must be considered.

RECOMMENDATION

This study recommends:

1. To increase the knowledge of AI high risk communities, especially the PCF/PSF community because this group overall has deficiencies in their knowledge, attitude, and practice.
2. Further study is recommended to specifically identify other factors that influence practice conducted by AI high risk communities in Indonesia besides knowledge level and attitude

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