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Perception of Beneficiary Farmers on Newcastle Disease (NCD) Vaccines distributed in Siquijor province by the Department of Agriculture

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Abstract

Newcastle disease (NCD) can infect a wide variety of birds and thus can be prevented through a vaccine. The study was conducted to know the perception of the beneficiary farmers on the Newcastle disease (NCD) vaccine distributed by the Department of Agriculture RFO-7 – Regional Vaccine Production Laboratory (DA7– RVPL) to poultry raisers in Siquijor province during the calendar year 2020. The lists of respondents were acquired from the Office of the Provincial Veterinarian (OPV) and the respective Municipal Agriculture Office (MAO). The scope of the study involves all the 6 municipalities of Siquijor province — Larena, Enrique Villanueva, Maria, Lazi, San Juan, and Siquijor. The 28 respondents chosen by OPV and MAOs completed a questionnaire that focused on basic information about the poultry raiser, their housing management practices, and their health and disease prevention management practices. These respondents are the beneficiaries of the free NCD vaccines from DA – RVPL. Most of the NCD vaccinated birds are gamefowls comprising 72% of the total flocks owned by the respondents followed by native chickens, breeders, and layers. All of the respondents claimed that the NCD vaccine is effective and that no bird mortality was reported by 93% of the respondents after NCD vaccination. Although there are no NCD cases in Siquijor province, there is still a need to improve the awareness of the poultry raisers regarding the said disease such as proper housing management and biosecurity. A combination of proper hygiene and vaccination programs is important to further prevent possible NCD transmissions.

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Introduction

The poultry industry is one of the most important means of livelihood for many Filipinos. The Philippine Statistics Authority reported that for the status of Philippine Agriculture during the first quarter of 2019, there was an increase of 5.41 percent in poultry production. In the total agricultural output, it shared 16.74 percent. However, there are difficulties that can hinder the country from attaining progress for the poultry industry and one of these is the Newcastle disease.

The World Organization for Animal Health (OIE) stated that NCD can be found worldwide and affects birds including domestic poultry. It is very contagious and is often severe. This is caused by a virus in the family of paramyxoviruses. Many outbreaks of this disease have been recorded worldwide and it appears in three major forms: lentogenic or mild, mesogenic or moderate and velogenic or very virulent.

Although the mild strains are very widespread, it causes very few outbreaks. The Food and Agriculture Organization (FAO) indicated that clinical symptoms of NCD include paralysis, twisted neck, egg reduction, and diarrhea. The spread of this disease from bird to bird can happen through inhalation of infective material such as feces or inhalation of excreted droplet particles as well as other environmental factors (Li *et al.*, 2009).

The main purpose of the study is to evaluate the effects of the NCD vaccines distributed by the Department of Agriculture RFO 7 - Regional Vaccine Production Laboratory to poultry raisers in Siquijor province for the year 2020 as a basis for specific intervention of further research and development.

Materials and methods

Selection of the study site

The conduct of the study took place on the selected poultry farms in Siquijor province that were provided with Newcastle disease (ND) vaccines produced by the Regional Vaccine Production Laboratory and were distributed through the Office of the Provincial Veterinarian. The interview sessions transpired using a questionnaire as the method of research and the accuracy of the results was based upon the responses of the respondents.

The research flow

The research flow shown in Fig. 1 started in acquiring the list of possible respondents from the Office of the Provincial Veterinarian. The study focused on the farmers' living conditions, means of livelihood, and current management practices.

Respondents of the Study

The respondents of the study were farmers or farm caretakers who are personally in charge of taking care of the poultry since they can efficiently answer the interview. The Office of the Provincial Veterinarian provided the list of farmers and farm caretakers who have undergone the survey.

Instrument

To accomplish the aim of the study, modified questions were designed. The questions were outlined in a manner that can have as much information that is needed to do a definitive study on the efficacy of the NCD vaccines produced by the Regional Vaccine Production Laboratory of the Department of Agriculture Region 7.

Data gathering procedure

A written and signed authorization letter was given to the Department of Agriculture RFO – 7, Office of the Provincial Agriculturist and Office of the Provincial Veterinarian in Siquijor province before the conduct of the study. After the permission was granted, the interviews followed and were done in a friendly manner and the data gathered were collated, studied, and analyzed.

The data that was collected in the survey were analyzed by descriptive statistics (frequency converted to a percentage) to get the profile of the respondents while the measure of simple percentage was used to compute the extent of the efficacy of the NCD vaccines.

Results

As shown in Table 1, there are a total of 28 respondents representing the whole Siquijor province. These respondents are almost always the beneficiaries of the NCD vaccines that are distributed for free by the Department of Agriculture through the OPV and MAOs. The NCD vaccination program is requested by the poultry raiser and performed with the help of their respective poultry technicians. A total of 2,556 birds comprising layers (35 heads), breeders (171 heads), gamefowls (1,870 heads), and native chickens (480 heads) have undergone NCD vaccination based on the declaration of these respondents. It can be observed in the table that most types of birds in which the vaccines are being used were gamefowls.

Table 1. Number of Respondents and Population of Poultry per Municipality Distributed with NCD Vaccines from Department of Agriculture.

Municipality	No. of Respondents	Layers	Breeders	Gamefowls	Native	Total Population of Birds
Larena	2	-	-	50	-	50
Siquijor	7	5	8	227	-	240
E. Villanueva	4	-	100	150	330	580
Maria	5	-	-	710	-	710
Lazi	3	-	-	400	150	550
San Juan	7	30	63	333	-	426
Total	28	35	171	1,870	480	2,556

Basic information of the poultry raiser

The basic information of the 28 respondents such as gender, age, the primary source of income, the total number of years in raising poultry, population/number of poultry raised, and his/her reasons for raising poultry are presented in Table 2.

Discussion

Basic information of the poultry raiser

Gender defines how men and women interact in a setting as to what is considered to be appropriate for him or her to do which leads to the determination of their respective development opportunities and limitations (Gujit, 1994). Ownership of poultry is not the same for men and women in this case based on Table 2. It is important to know who does what and support them for their improvement.

The majority of the respondents were male comprising 86% of the total population while females comprised only fourteen percent (14%) which indicated that men are more likely to spend more time raising poultry.

Respondents aged 31 to 40 as well as ages 41 to 50 were most active in poultry raising which comprised thirty-two percent (32%) and twenty-nine percent (29%), respectively. These findings implicated that most middle-aged men are engaged in poultry raising. Based on Table 1, fifty percent (50%) of the respondents depended on either poultry raising, livestock raising and/or farming. Meanwhile, the other eighteen percent (18%) of respondents earned money through their businesses such as sari-sari stores and farm incomes. Respondents who are receiving their salaries for working in private companies and public service comprised thirty-two percent (32%) of the respondents. Fifty-four percent (54%) of the respondents considered poultry raising as a source of income while the remaining forty-six percent (46%) considered it as a hobby. However, those that are making it as a source of income also admitted that it is also their hobby at the same time. Although this indicated that they are also earning money through their hobby, still the findings showed that not only they are considering it as a hobby, but they also viewed it as means to make a living.

Some of them still would rather consider poultry exclusively for amusement only.It takes years to establish poultry raising due to its high demand for attention which is why most of the respondents have

been doing this activity for more than 3 years. Though it entails hard work, it is worth it because the poultry industry occupies a vital role in providing animal proteins (egg and meat) to humans, manure for crops, additional income, and employment (Eduvie, 2002; Nnadi and George, 2010). According to Ronquillo *et al.* (2015), gamefowls are natural carriers of NCD virus. Thus, it is essential for gamefowls to be vaccinated against NCD because as natural carriers, they tend to be infected without showing symptoms of the disease. Results in this study revealed that the majority of the flocks that have undergone NCD vaccinations are game fowls (73%).

Housing management

Traditional housing is constructed in different dimensions and shapes with the use of light building materials such as scrap iron roof, posts, or scrap wire netting walls (Ahlers *et al.*, 2009). Conventional Housing depends on natural airflow for ventilation and consists of commercial wire cages or concrete sheds with wire sides to prevent predators and wild birds from entering (Daghir, 2001). The majority of the respondents applied traditional housing of eighty-two percent (82%) compared to conventional housing of fourteen percent (14%). This is due to the fact that they are doing backyard poultry farming which uses light building materials such as wood, bamboo and nets for their poultry houses.

Separate units of life stages were done by sixty-four (64%) of the respondents. Table 3 also shows that sixty-one percent (61%) of the respondents provided partitions. It is very essential to have partitions and separate units of life stages for efficient management of flocks which further helps in farm disinfection of the different poultry groups in intervals (Sharif *et al.*, 2014).

Table 2. Basic Information of the Respondents.

Profile	Respondents	Percentage (%)
Gender		
Male	24	86
Female	4	14
Age		
<20	0	0
21-30	3	11
31-40	9	32
41-50	8	29
51-60	5	18
Source of Income		
Business	5	18
Profession	9	32
Poultry Raising/Livestock Raising/Farming	14	50
Years in Poultry		
1 to 2	1	4
3 to 5	10	36
6 to 10	7	25
>10	10	36
Population/Number of Poultry Raised		
Layers	35	1
Breeders	171	7
Gamefowls	1870	73
Native	480	19
Reasons for Poultry Raising		
Source of Income	15	54
Hobby	13	46

More than half of the population of fifty-four percent (54%) claimed that standard housing specifications were applied. Following standard housing specifications is a necessity because poor ventilation and poor housing are also responsible for the spread of NCD in poultry flocks (Khawaja *et al.*, 2005; Coutts, 1987). Feed and water deprivation can cause stress to birds which is why it is very vital that balanced feed and good quality drinking water should be provided to prevent NCD outbreaks (Sharif *et al.*, 2014). Results showed that feeders and waterers were available in the poultry houses of all the respondents.

Fifty-seven percent (57%) of them considered their house as fixtures that are present near their poultry houses since most of them are having backyard poultry farms.

Health and disease prevention management disease

In Table 4, sixty-eight percent (68%) of the respondents practiced disinfection of equipment and facilities while eighty-nine percent (89%) of the respondents did not practice biosecurity such as the presence of foot baths. According to Sharif *et al.,* (2014), proper fumigation of trucks that carry feed and feed bags should be done before entering the poultry farm. However, all the respondents claimed that they do not conduct fumigation of trucks that enter their premises and eighty-two percent (82%) of them do not restrict visitors from entering.

Table 3. Housing Management of the Respondents in Poultry Raising.

PROFILE	RESPONDENTS	PERCENTAGE (%)
Type of Housing		
Conventional	4	14
Traditional	23	82
Others	1	4
Presence of Separate Units for Each Life Stages		
Yes	18	64
No	10	36
Presence of Partitions		
Yes	17	61
No	11	39
Standard Housing Specifications		
Yes	15	54
No	13	46
Provision of Feeders and Waterers		
Yes	28	100
No	0	0
Presence of Other Fixtures		
Yes	16	57
No	12	43

The spreading of NCD is contributed by insufficient biosecurity (Okwor and Eze, 2010). Viral and bacterial diseases can be prevented through strict poultry farm biosecurity such as regular monitoring of persons or even other animals that go in and out of the farm (Sharif *et al.*, 2014). Maintenance of good sanitation and sewerage system can greatly contribute to NCD prevention as well. Newcastle disease outbreak was the result of interaction between healthy birds with unvaccinated, migratory birds (Khan *et al.*, 2000; Mustafa and Ali, 2005; Vyslouzil and Dohnal, 1988). New birds should be vaccinated while being quarantined from the old birds for one week because NCD spreading normally happens in some areas through newly introduced birds (Tu et.al., 1998). In Table 4, it is shown that seventy-nine (79%) of the respondents do not directly mix old and new birds. Eighty-nine percent (89%) of the respondents did not directly use the utensils of unhealthy flocks to healthy ones.

Table 4. Health and Disease Prevention Management Disease.

Profile	Respondents	Percentage (%)
Disinfection of Equipment and Facilities		
Yes	19	68
No	9	32
Presence of Biosecurity		
Yes	3	11
No	25	89
Fumigation of Trucks		
Yes	0	0
No	28	100
Direct Usage of Utensils from Sick to Healthy Birds		
Yes	3	11
No	25	89
Direct Mixing of Old and New Birds		
Yes	6	21
No	22	79
Regulation and Monitoring of Visitors		
Yes	5	18
No	23	82
Presence of Medication Program		
Yes	18	64
No	10	36
NCD Vaccination Program		
Yes	28	100
No	0	0
Antibacterial Flushing		
Yes	10	36
No	18	64
Presence of Clinical Symptoms after NCD Vaccination		
Yes	11	39
No	17	61
Population of Birds that Acquired Clinical Symptoms after NCD Vaccination		
0%	25	89
1-19%	3	11
20-39%	0	0
40-59%	0	0
60-79%	0	0
80-99%	0	0
100%	0	0
Reported Mortality of Birds due to NCD Vaccine		
Yes	2	7
No	26	93
Estimated Bird Mortality after NCD Vaccination		
0%	26	93
1-19%	1	4
20-39%	0	0
40-59%	1	4
60-79%	0	0
80-99%	0	0
100%	0	0
Is NCD Vaccine from DA effective?		
Yes	28	100
No	0	0
Rate of Effectivity of NCD Vaccine from DA	(1=not effective;5=very effective)	
1	0	0
2	0	0
3	2	7
4	10	36
5	15	54

This is a good practice because physical vectors such as farm utensils and animals (e.g. rats, rodents, and reptiles) can spread NCD. Utensils of flocks such as egg crates, brooders, and feeders of unhealthy flocks that are potentially affected with NCD should be properly washed first with disinfectants before using for healthy birds (Sharif *et al.*, 2014).

Only sixty-four percent (64%) of the respondents had a medication program, however, all of them applied for NCD vaccination program with the help of the DA through the efforts of OPV and MAOs. Because of this, ninety-three percent (93%) of them reported that they have not experienced the mortality of their birds. Those who reported bird mortality stated that there

was a high possibility that their birds have died after NCD vaccination due to the presence of pre-existing diseases and not because of the vaccine itself.

Clinical symptoms such as lameness and liquid nasal discharge were observed by thirty-nine percent (39%) of the respondents on their poultry flocks. The clinical symptoms observed are usually respiratory diseases that are why the vaccination program that some of them follow includes NCD, fowl pox, and gomburu. As for antibacterial flushing, only thirty-six percent (36%) performed it. Birds become susceptible to secondary bacterial infections during the course of NCD that is why the use of antibiotic treatment as a supporting medicine may prevent this from happening (Sharif *et al.*, 2014).

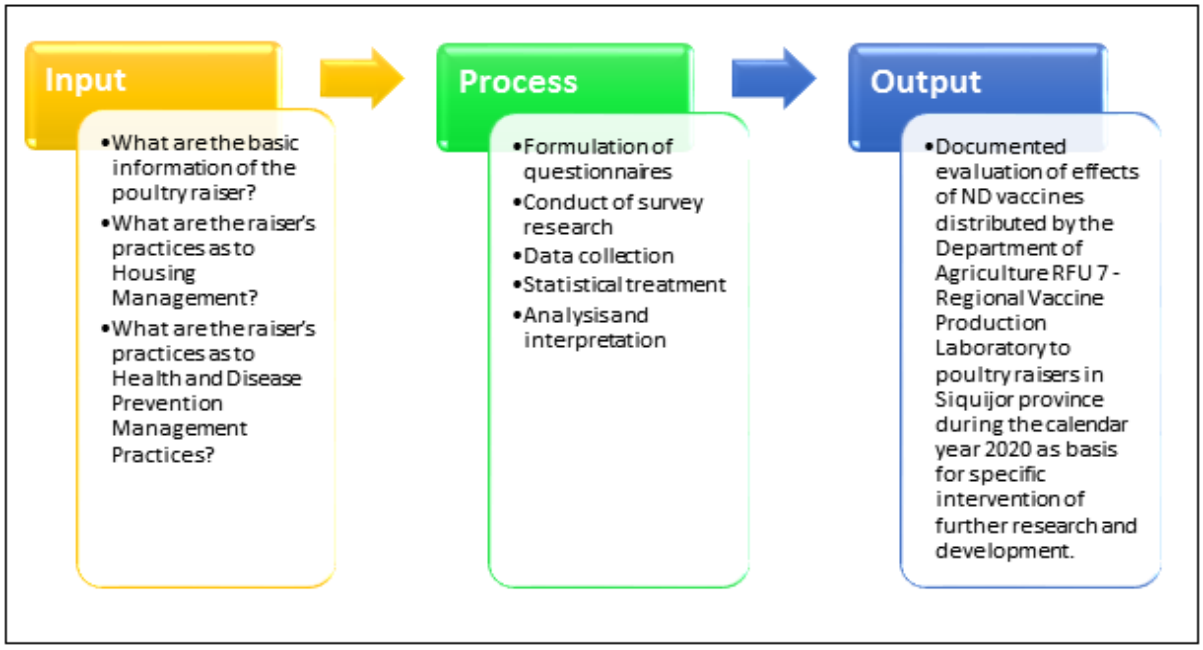

Fig. 1. The flow of the Study.

The NCD vaccine provided by DA was proven to be effective by all the respondents (100%). In terms of its effectiveness, fifty-four percent (54%) rated 5 (very effective) while the remaining population rated either 3 or 4 since according to them, it is in their own personal belief that nothing is perfect though they have experienced how effective it is in preventing NCD.

Aside from high feed cost, there were other common problems that the respondents have encountered in poultry raising such as a sudden change in weather conditions especially that we are in a tropical region. Because of the poultry flock's high sensitivity to change in temperature, extreme weather conditions have been proven to be harmful to them (Nienabar and Hahn, 2007; Nardone *et al.*, 2010; McSweeney *et al.*, 2010; Renaideau, 2012). This study had similar results to the one conducted by Orsi *et al.* (2010) wherein they have done verification of non-virulent NCD in commercial flocks of Brazil. Even though Brazil is identified as an NCD-free country with strict biosecurity measures in the poultry industry (Orsi *et al.*, 2010b), there is still a risk of virus reintroduction. Their study also indicated the NCD vaccinated and unvaccinated regions of Brazil. The same risk factors were also assessed such as the farm location, water supply sanitation, security level, and prohibition of wild and free-range birds from housing (Bojesen *et al.*, 2003; Gibbens *et al.*, 2001; Tablante *et al.*, 2002). According to them, the incidence and rate of recurrence of gaps in security and hygiene instead of the implemented levels of hygiene and biosecurity contribute to the risk of NCD (*East et al.*, 2006). Although NCD cases were reported in their study, it is understandable since their scope is the whole country

of Brazil whereas this study comprised a single province. However, the recommendations of both studies were the same which highlighted that biosecurity measures accompanied by vaccination programs as proposed by the International Animal Health Code were essential for the conservation of the NCD-free status for the poultry industry. The study conducted by Tablante (2002) assessed chicken husbandry including NCD in rural areas of Chibuto, Mozambique. Their study has similar results with this study too in terms of poultry husbandry. Both studies showed that a greater percentage of farmers provide feeds and water for their chickens, own chicken houses, clean the chicken houses, and vaccinate their chickens against NCD. Both studies also show that although most of the farmers knew the clinical signs of NCD, they are not familiar with that NCD can spread through contact with other birds such as pigeons and ducks which do not appear to be ill but are able to transmit NCD to healthy chickens. This is why they also stated that it is important for farmers to be aware of the risk of NCD transmissions between species of birds to minimize the occurrence of such disease. Another study by Bagnol (2007) conducted in Chibuto, Mozambique also showed similar results with this study wherein all the respondents reported that the NCD vaccines they were using were effective in protecting their chickens. Both studies suggest the importance of the farmers' involvement as well as the commitment of the poultry technicians in having medium to long-term NCD vaccination programs. On the contrary to this study, other villages in areas of Africa such as Ethiopia and Burkina Faso have high mortality rates because of the different risk factors such as parasitism, predation, inadequate housing, and lack of feed and water (Dessie and Ogle, 2001; Kondombo *et al.*, 2003). In addition to this, they used pepper in drinking water even if they knew that these substances were inefficient compared to having proper NCD vaccines due to the occurrence of high mortality despite these practices.

Conclusion

Newcastle disease (NCD) is not prevalent in the province of Siquijor because of the vaccine's success especially that it is free of charge. An extension campaign is still necessary even if it is free in order to assure the poultry raisers that it is safe as well as to teach them about its proper administration. They must also be aware of preventing NCD through introducing to them an affordable, safe, and efficient vaccine that is available and suitable in their local conditions. Not all poultry raisers easily participated in NCD vaccination program because they tend to communicate more with people that are knowledgeable enough who can understand and devote time with them which is why there is a need to extend more help to increase NCD awareness and guide them constantly as to what they should do. Even if all feeders and waterers are available in their respective poultry houses, there is still a need to improve the housing management such as provision of separate units for each life stages and partitions. In addition to this, deworming programs should also be assessed as well as the vitamin supplements of the flocks. Hygiene and vaccination awareness campaigns are recommended to improve the management practices of poultry raisers since these are the general approaches that are always important to control NCD when birds are kept within a fenced yard or house. More importantly, continuous promotion of the NCD vaccination program should be done by the Department of Agriculture and other stakeholders in order to realize the country's self-sufficiency in poultry industry. Enough support for the Regional Vaccine Production Laboratory in the conduct of research and development should be done to reduce cost and perform other advancements.

It is also recommended that the number of respondents be increased for the sake of having statistically sound judgment as well as to better perform the appropriate statistical analysis in this type of survey.

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