

MAKITA: An Awareness on Visual Impairments

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ABSTRACT

Vision is essential to a human's daily life. Learning some eye conditions can help individuals take care of their eyes and prevent developing severe eye problems. The purpose of this study is to increase the awareness level of Filipinos on visual impairments. The researcher also aimed to produce engaging educational materials in the form of infographic posters and motion graphics video which are published on a website. To determine the effectiveness, a sample of 15 respondents aged between 13 years old to 60 years old were gathered to assess multimedia outputs and marketing materials. Results showed that all outputs produced by the researcher were effective and outstanding. The three multimedia outputs were informative and visually appealing. The two marketing materials were interesting for participants. To conclude, the study has acquired a positive impact among target participants.

Keywords: *Awareness, visual impairments, eye conditions*

INTRODUCTION

Among the five senses of our body, vision is the most dominant of all because it takes an important part in every aspect of life. The world is built on the ability to see. Every characteristic in building modern living like the towns, cities, economy, educational system, sports, and media are established around the sight. Hence, vision is useful to human's daily activities and allows people to thrive in all phases of life (WHO, 2019).

Since birth, vision is crucial to child development. For cognitive and social development, infants must be able to visually recognize and respond to their parents, family members, and guardians. As they become toddlers, vision is important for the growth of motor skills, coordination, and balance. Later in life, vision enables access to educational materials, participation in the workforce, and building a sense of identity. Moreover, vision helps maintain ourselves physically and mentally healthy (WHO, 2019).

Eye conditions are commonly widespread, and cases are still high as reports show. The International Agency for the Prevention of Blindness reported that in the Philippines, there is an estimated 12 million people with vision loss, and of these, 500,000 people were blind. As stated by WHO (2019), everyone will develop at least one eye disorder if they live long enough.

Visual impairment, also known as vision impairment or vision disability, refers to when you lose part or all of your ability to see. It can still persist even with the use of eyeglasses or contact lenses, medication, and surgery (Disabled World, 2021). According to the World Health Organization (2019), at least 2.2 billion people worldwide have a vision impairment, with one billion of them having a vision impairment that could have been prevented or treated.

Amidst the growing population of Filipinos suffering from poor vision, eye care remains the least priority in public health. Though there are non-profit organizations, like EyeCare WeCare, that provides free eye examinations, medications, surgeries, and glasses in Philippines, the limited knowledge of Filipinos affects the increase of chronic eye conditions (The Manila Times, 2018). In the Philippines, the most common eye problems are blindness, refractive errors, glaucoma, and cataract. There is an estimated number of 332,150 people who are blind on both eyes, 109,609 having cataracts, 83,037 people due to errors of refraction (EOR), and 46,501 due to glaucoma (DOH, 2017).

The importance of early prevention and treatment can avoid the development of vision impairment and blindness. When the visual system or one of its functions has been affected, it is expected to cause an eye problem, however not all do. Dry eyes, for example, are caused by a lack of tear production, which can cause irritation and blurred vision (WHO, 2019).

With that, having awareness about these eye conditions is important. As there are few optometrists in the Philippines, there are also few educational materials on eye health. According to the Integrated Philippine Association of Optometrists (IPAO), Inc. (2011), about 4,000 licensed optometrists are estimated in the country. Producing information materials on eye health can help increase a person's knowledge. As Garduno, et al. (2019) stated, informational materials are one of the techniques in disseminating important information in a timely and interesting manner to those who may benefit most from it.

Both teenagers and parents should be aware of the signs and how to prevent or manage them (Essilor, n. d.). Parents, as primary caregivers, should understand various eye problems in children. By reason, this knowledge is important since early detection and intervention can be effective when done at a young age (Ebeigbe and Emedike, 2016). For teenagers, experiencing vision problems can be difficult for them because it can affect their school performance and can even lead to anxiety and stress (Essilor, n. d.)

Review of Literature

Definition of normal vision

According to Dr. McKinney (2020), the 20/20 vision is a term that means normal vision. When standing 20 feet away, it is the average distance that people can see on an eye chart. The eye chart measures the visual acuity that tells the clarity or sharpness of vision. The top number is the distance in feet, while the bottom number represents distance at which a person with normal vision can read the same line. Therefore, if a person has 20/30 vision, it means that it is worse than the average. A vision of 20/20, however, does not indicate that a person has a perfect vision. A person's vision can be 20/15, which is clearer than average. Eyeglasses and contact lenses aim to make the person's vision 20/20.

Six eye conditions

Hereditary eye diseases: Color blindness

In the article of Andrew A. Dahl published in MedicineNet in 2020, color blindness is the inability to distinguish various shades of colors, particularly green and red. It is most commonly inherited and affects about eight percent of males and less than one percent of women.

There are types of color blindness—red-green color blindness, blue-yellow color blindness, and complete color blindness. Red-green color blindness is the most common form of color deficiency. A person with red-green color blindness can be either protanomaly, protanopia, deuteranomaly, or deuteranopia. Protanomaly is a reduced sensitivity to red light due to defective red cones. Protanopia is the complete absence of red cones. Deuteranomaly is a reduced sensitivity to green light due to defective green cones. Deuteranopia is the complete absence of green cones (Roque, 2021).

There are times that symptoms are so mild that a person may not notice it. People with serious cases may have symptoms like wobbly eyes and light sensitivity. Unfortunately, there is no cure for color blindness but there are devices that can assist the person. There are special glasses made for color blind people.

Congenital eye diseases
Cataract

According to Amanda Delgado (2017), a cataract is an eye condition that forms a cloudy area in the lens of the eye. In an article published by the Dean McGee Eye Institute, cataracts are typically associated with older adults, however, these can arise at any age, including infancy and youth. Early detection and treatment of cataracts are crucial to restore normal visual development.

Like any other eye conditions, causes of cataracts may vary but these include overproduction of oxidants, smoking, ultraviolet radiation, long-term use of steroids and other medications, diabetes, trauma, and radiation therapy (Delgado, 2017).

The different types of cataracts are nuclear cataracts, cortical cataracts, posterior capsular cataracts, secondary cataracts, traumatic cataracts, and radiation cataracts. The most recommended treatment for cataracts is surgery, but if the patient is unwilling, the doctor may suggest different ways to help manage other symptoms (Delgado, 2017).

Glaucoma

According to Whitney Seltman (2020), glaucoma is an eye condition that damages the optic nerve. Glaucoma is a leading cause of blindness for people over 60 years old (Boyd, 2021). Children rarely inherit this kind of condition. It is usually diagnosed within the first year of a child's life as glaucoma is caused by incorrect development of the eye's drainage system before birth (Glaucoma Research Foundation, 2020).

There are two major types of glaucoma—primary open-angle glaucoma and angle-closure glaucoma. Primary open-angle glaucoma is the most common type of glaucoma. It is a slow process in which the eye does not drain fluid as well as it should. As a result, eye pressure rises, causing optic nerve injury. This type is painless at first and does not cause vision abnormalities. Angle-closure glaucoma occurs when the iris is very close to the drainage angle in a person's eye (Boyd, 2021).

The symptoms of childhood glaucoma include enlargement of eyes, cloudiness of the cornea, and light sensitivity (or photosensitivity). It can be treated through medication and surgery for uncomplicated cases. Medical treatments may include the use of topical eye drops and oral medications. These help increase or decrease the production of eye's fluid. The surgery may either be filtering surgery or laser surgery (Glaucoma Research Foundation, 2020). Although children with glaucoma cannot restore their vision, it is possible to optimize each child's remaining vision. Parents should encourage their child's self-care (Glaucoma Research Foundation, 2020).

Refractive errors

Refractive errors are vision problems that make it hard to see clearly. The four types of refractive errors include myopia (nearsightedness), hyperopia (farsightedness), astigmatism, and presbyopia. Its most common symptom is blurry vision. Double vision, fuzzy vision, glares near bright lights, squinting, headaches, eye strain, and difficulty focusing when reading are some of the other symptoms. Refractive errors can be corrected through eyeglasses, contact lenses, or surgery (NIH, 2020).

This study concentrates on myopia because it is the most common ocular disorder worldwide. It is the leading cause of visual impairment in children, and its prevalence is increasing rapidly (Mehta and Wen, 2019).

According to Annie Stuart (2020), the myopia epidemic has been nearly hard to ignore. In 2010, the condition afflicted 28 percent of the world's population. It is expected to reach about 50 percent by 2050.

Dr. Tan said that ophthalmologists have not fully understood the reason with its growth, but they thought it could be related to lack of time spent outdoors. There are no proven studies that outdoor activities can decrease the progress of myopia. Going outdoors, however, can help the eyes see the horizon and distance, not just accommodative targets. Dr. Congdon also added that another possible solution is to bring light indoors. Lastly, taking breaks when reading or playing computer games. Dr. Miller promotes the 20-20-20 tip, which is to take 20 seconds to look 20 feet away every 20 minutes of work (Stuart, 2020).

Amblyopia

In the published article of the National Eye Institute in 2019, amblyopia is the most common cause of vision loss in kids. Based on the news article written by Krista Cabello in 2016, DOH reported that about one-fourth of students in grade school had amblyopia. According to the blog of Dr. Julie Steinhauer that was published in Vision for Life in 2019, however, amblyopia affects individuals of all ages.

Amblyopia, also called lazy eye, is a vision development disorder in just one eye during childhood. It develops when the brain and the eye do not work well together. The brain cannot recognize sight from one eye which makes it rely more on the other, stronger eye.

There are different types of amblyopia—deprivation amblyopia, anisometropic amblyopia, strabismic amblyopia, and mixed amblyopia (Zagui, 2019). The symptoms of amblyopia can be hard to notice but parents may tell signs that their child is struggling to see clearly like squinting, shutting one eye, and tilting their head. Kids, however, need to get a vision screening at least once between ages three to five.

The causes of amblyopia may vary but some eye conditions like refractive errors, strabismus, and cataract can lead to amblyopia. Amblyopia is an easily treatable disorder in children provided parents are aware of the importance of early diagnosis and treatment (Baskeikh, et al., 2021).

Strabismus

In an article published in the Optometrists Network in 2020, strabismus is the misalignment of the eyes. In other words, one eye is looking straight at the object, however, the other eye is looking at a different direction. In the Philippines, it is commonly known in the local language as banlag or duling (Reyna, 2016). The types of strabismus are esotropia (inward turning), exotropia (outward turning), hyperopia (upward turning), and hypotropia (downward turning).

Strabismus often develops in infants (12 to 24 months old) and young children. It can be caused by amblyopia, poor development of eye coordination, severe farsightedness, and more. Strabismus can be treated when diagnosed early though.

Low vision

Low vision is the loss of sight that cannot be corrected with glasses, contacts, or surgery. This type of vision loss is not called complete blindness, because there is remaining sight and can be improved with the use of visual aids (Cleveland Clinic, 2020). Low vision or visual impairment is classified into mild vision loss (20/30 to 20/60), moderate low vision (20/70 to 20/160), severe low vision (20/200 or worse), profound low vision (20/500 to 20/1000), near-total low vision (less than 20/1000), or total blindness.

Eye diseases or conditions can cause visual impairment like macular degeneration, cataracts, glaucoma, amblyopia, and more. Through low-vision rehabilitation, which is a specialty of some optometrists, is the way to treat a patient. Each type of low-vision problem requires a

different therapeutic approach. Patients with visual impairments are examined and rehabilitated by them.

Problems on eye health
Lack of eye care services

In 2017, the Department of Health (DOH) established the Prevention of Blindness Program. Their main goal is to reduce the prevalence of avoidable blindness in the Philippines through the provision of quality eye care. The Department of Health, local health units, partners, and stakeholders have pledged to strengthen partnerships among and with stakeholders to eliminate avoidable blindness in the Philippines, empower communities to take proactive roles in the promotion of eye health and blindness prevention, provide general access to high-quality eye care, and endeavor to improve poverty alleviation by preserving and restoring sight to impoverished Filipinos.

As the world's population keeps on growing, however, the demand for eye care is expected to rise in the Philippines by the year 2023. It is estimated that there are over 2.2 million eye care consultations at the end of 2023. Since ageing and unhealthy lifestyle are also surging, the need for eye care services should be improved. Philippines is known to be part of the top countries using gadgets for an average of ten hours and two minutes. This action has harmful effects on the eyes and leads to prevalence of refraction errors such as myopia and other eye conditions.

Globally, the improvement of eye care services, health technologies, and health systems are some of the challenges that the world is facing. As reported by WHO, people need access to eye care without suffering financial hardship. In the Philippines, DOH aims to establish comprehensive eye care services and integrate eye care within the Philippines' health systems for all Filipinos.

Lack of public awareness

In the article published by The Manila Times in 2018, it is said that due to lack of education and knowledge of Filipinos about common eye problems, these lead to a rise in chronic eye conditions. Although the DOH implemented an awareness campaign last 2017, entitled: Universal eye health: No more avoidable blindness, Filipinos still lack awareness of different eye conditions.

Increase in eye health awareness would help prevent the development of severe eye conditions. In the study of Ebeigbe and Emedik in 2016, entitled: Parents' awareness and perception of children's eye diseases in Nigeria, parents are aware of common childhood eye problems but have misunderstandings on their causes. Only one parent has heard of amblyopia, a preventable and treatable condition, especially when it is detected early in children below the age of eight.

Although they are aware of strabismus, some refer to it as 'half past four,' a local word, many are uninformed of possible treatments available. Some parents believe that exercise is a viable therapeutic option, while others believe that the eyes will heal on their own. Few people were aware of risks of not treating the child (Ebeigbe and Emedik, 2016).

Most parents believed that self-medication is the best. The common drug they use for nearly all eye conditions is chloramphenicol eye drop, which all parents agreed they used without seeing a doctor. Furthermore, they also tend to treat their children based on the counsel of their elders in the society like grandfathers or grandmothers. This means that public awareness and health education programs are encouraged to help parents understand the implications of the various eye problems, their causes, and the consequences of leaving them untreated.

Research Framework

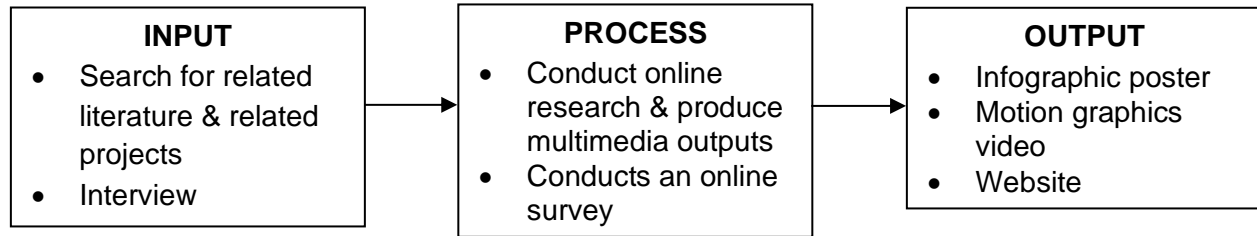


Figure 1. Research framework of the Study

Figure 1 shows the input, process, and output of the research study. The researcher conducted online research by searching for related literature to gather information about the said topic. By also finding some related projects or design pegs online, the researcher was able to determine outputs to be produced. These are infographic posters, a motion graphics video, and a website. Furthermore, the researcher surveyed Filipinos aged 13 to 60 years old to know their perceptions on visual impairments online.

For the outputs, infographic posters are visual representations of six eye conditions. It contains graphic illustrations and short texts. The design of infographic posters is of contemporary look.

Then, the motion graphics video provides information about visual impairments. The problems, significance, and solutions are discussed using the Filipino language so many Filipinos can understand more about the issue.

Last, the website is composed of all multimedia outputs. It is shared in social media such as

Objectives of the Study

Generally, the study seeks to provide the epidemiology of rabies cases in the Visayas Region of the Philippines. Specifically, the study aims to assess how Regions VI, VII, and VIII are successful in the implementation of canine vaccination and human post-exposure prophylaxis in order to provide a scientific claim in considering this rabies free regions as a Model Regions for the prevention and elimination of rabies in the Philippines.

METHODOLOGY

The researcher used a descriptive quantitative style of study. Data that are used were collected through a bibliographic method. Specifically, manual electronic database searching from Google Scholar and PubMed which covers MEDLINE and EBM (Evidence Based Medicine) reviews (Soares, 2013) and includes references from the World Health Organization, Philippines' Department of Health, and Local Government Units from Regions VI, VII, and VIII.

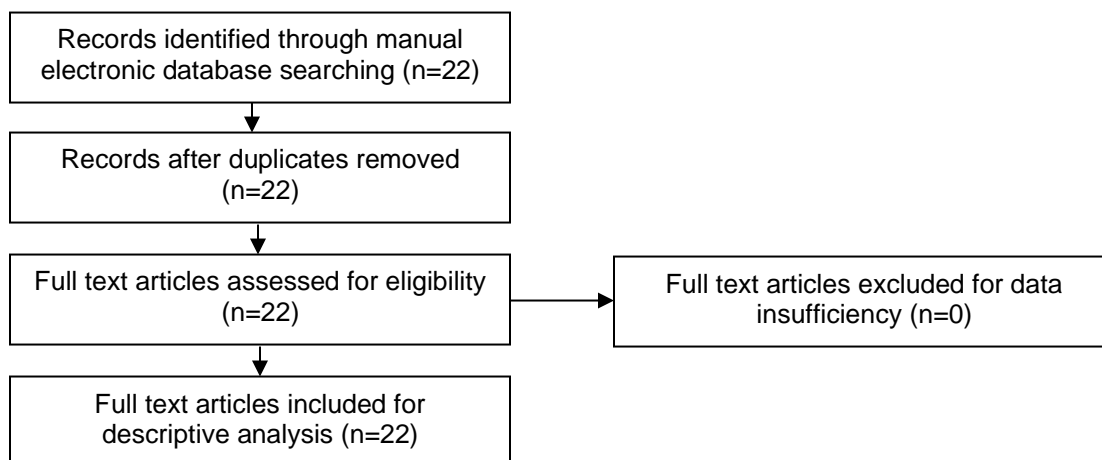


Figure 1. Number of Full Text Articles Gathered from Manual Electronic Database Searching

RESULTS AND DISCUSSIONS

A total of 276 human rabies cases was recorded in the year 2018 (Department of Health Philippines, 2020). According to the Philippines Statistics Authority, in 2018, the population of Filipinos is estimated at 107,587,132 which gives an average of 2 people per million of population is susceptible to death due to the Rabies lyssavirus.

Moreover, having this high incidence rate of human rabies cases in the Philippines, Region 3 or the Central Luzon had the highest number of human rabies cases (Lagayan, 2018). This is followed by Region 4A CALABARZON. Despite the Department of Health declaring in 2017 that Regions II, IV-B, V, VII, and X are rabies free areas, the data submitted by each municipality in each region to the Department of Health shows that these rabies free areas and municipalities still have positive cases of human rabies.

Table 1. Human rabies cases in the Philippines per region in 2018

Region	No. of Human Rabies Cases
3	58
4A	30
7	25
12	21
1	20
6	16
2	16
11	16
NCR	15
9	12

10	11
5	11
4B	10
CARAGA	6
8	5
CAR	4
ARMM	0
Total	276

Data source: Disease Prevention and Control Bureau, Infectious Disease Office, DOH Philippines

As shown in Table 2, a total of 10,757 are cases of Category I exposure which includes licking of undamaged skin with secretions and excretions of rabid animals, touching, and feeding animals. As treatment for Category I, washing and flushing for at least 15 minutes with soap and water on the bite wounds or scratches is required to be done immediately upon exposure (Beyene et al., 2018). In addition, there are a total of reported 836,616 cases of Category II exposure which includes bites, scratches, and scratches without the result of any bleeding. Category II exposure patients with or without prior vaccination need to receive RIG and CCEV immediately or not beyond 72 hours of the bite (Reece, 2008). Lastly, there is a total of 309, 004 cases of Category III which includes simple and multiple transdermal bites with simple to severe bleeding (Nelwan, 2018). Treatment for category III patients requires immediate administration of both RIG and CCEV according to the WHO since category III is more severe than category II (Peters, 2018). For the RIG, there are two clinically available treatments namely: HRIG or the human rabies immunoglobulins and ERIG which is the equine rabies immunoglobulins.

Table 2. Human rabies category of exposure in the Philippines per region in 2018

Region	Category of Exposure			Total
	Category I	Category II	Category III	
1	524	62960	11845	75329
2	291	74652	17936	92879
3	596	102746	25363	128705
4A	1635	69894	20945	92474
4B	982	24465	8341	33788
5	868	32830	9403	43101
6	131	50905	42476	93512
7	1651	65578	34936	102165
8	29	15861	11551	27441
9	1107	49928	24336	75371
10	0	47218	11166	58384
11	96	37896	6678	44670
12	572	34840	12589	48001
CARAGA	309	17549	4722	22580
CAR	656	20360	7814	28830
NCR	1154	128125	58443	187722
ARMM	156	809	460	1425
Total	10 757	836 616	309 004	1 156 377

Data source: Disease Prevention and Control Bureau, Infectious Disease Office, DOH Philippines

In connection to this, the coverage of Post-Exposure Prophylaxis (PEP) and Equine Rabies Immunoglobulin (ERIG) is seen on Table 3. A total of 1,073,904 Tissue Culture Rabies Vaccine (TCV) is recorded with a coverage of 93.7% from Region I to ARMM. This significant increase of coverage from 2007 to 2018 shows improvement on Post-Exposure Prophylaxis coverage in the Philippines. As for the Equine Rabies Immunoglobulin (ERIG), there is a total of 162,824 with a coverage of 52.6% from Region I to ARMM.

Table 3. Coverage of Post-Exposure Prophylaxis (PEP) and Equine Rabies Immunoglobulin (ERIG)

Region	TCV	%TCV	ERIG	%ERIG
1	68168	91.1	6420	54.2
2	85910	92.7	12788	71.2
3	126522	98.7	14467	57
4A	85019	93.5	9212	43.9
4B	31046	94.6	4493	53.8
5	47767	113.1	4792	50.9
6	75753	81.1	12732	30
7	98286	96.2	20415	58.4
8	26735	97.5	5835	50.7
9	64730	87.1	11361	46.6
10	58507	100	6505	58.5
11	44601	99.8	3527	52.9
12	48508	102.2	8505	67.5
CARAGA	18413	82.6	2592	54.8
CAR	26018	92.3	4837	61.9
NCR	167286	89.6	34235	58.5
ARMM	635	50	108	23.4
Total	1 073 904	93.7	162 824	52.6

Data source: Disease Prevention and Control Bureau, Infectious Disease Office, DOH Philippines

Visayas Region as Model Region for Rabies Control

As a response of the Philippine Government and Local Government Units, together with the World Health Organization, an effective canine rabies prevention and elimination program was formulated. This included a sustainable and comprehensive approach that needed to achieve (1) affordable human vaccine and antibodies against canine rabies (2) urgent treatment for bite cases of rabies infected canine or human post-exposure prophylaxis; and (3) mass canine vaccination. Upon this initiative, the DOH procured a proposal that is approved by the WHO which aims to implement a rabies prevention and elimination program particularly in the Visayas Region which is composed of regions VI, VII, VIII (Cobonpue, 2020). The program includes mass dog vaccination that started in 2010 satisfying the recommended 70% of the whole dog population in the areas of Western Visayas and half of Central Visayas for Phase I and as for Phase II the second half of Central Visayas and Eastern Visayas (Ferguson et al., 2015).

Table 4. Dog vaccination coverage in Regions VI, VII, and VIII (2015-2018)

Region	2015	2016	2017	2018
VI	48.43 %	61.62 %	67.78 %	69.46 %
VII	76.27 %	70.32 %	52.27 %	74.09 %
VIII	55.56 %	59.10 %	60.86 %	57.30 %

Data source: Disease Prevention and Control Bureau, Infectious Disease Office, DOH Philippines

As a result of this, it is evident that from 2015 to 2018, the whole Visayas Region is consistently aiming to satisfy the World Health Organization's recommendation of 70% vaccination of the whole dog population. In 2018, Regions VI, VII, and VIII had 69.46%, 74.09%, and 57.30% dog vaccination coverage respectively. It is shown in the table above that the Visayas Region remains consistent in achieving WHO's recommendation and is declared by the WHO as a rabies free area (two provinces, five island municipalities, and five smaller islands) (WHO, 2015) thus, making the Visayas Region as the Model Region for this study. Moreover, based on the manual electronic database searching from Google Scholar and PubMed which covers MEDLINE and EBM (Evidence Based Medicine) reviews (Soares, 2013), the only available data for rabies prevention and elimination program submitted by the local government units to the Department of Health Philippines, came from the areas and municipalities under the Visayas Region (Eleazar, 2010).

One of the available data which focuses on rabies prevention and elimination programs is evident in the study done in Cebu City which belongs to Region VII. It is seen in Figure 1 that the dog vaccination coverage in Cebu City is relatively low. Unvaccinated dogs in rural areas are at 65% and in Urban areas at 48% which gives a total of 56.60% unvaccinated dogs in the whole Cebu City (Kartal, 2017). In response to this, the Bureau of Animal Industry (BAI) together with the Cebu City Local Government Units, have created a program and research study which prioritizes a rabies free and zero human rabies cases in 2020. Due to Cebu City's strategic location, it was chosen by the BAI to be the locus of the study *Report on Owned Dog Population Survey in Cebu City, Philippines* by Dr. Amit Chaudhari, Dr. Kazami Joanne Amano, and Tamara Kartal in 2017. The study was done in order to acquire the accurate data for owned dog population in Cebu City in order to establish a basis for understanding and formulation of an improved and complemented dog population management which includes rabies prevention and elimination program in Cebu City. Since the whole Cebu City did not satisfy the 70% of the dog population to be vaccinated, the study formulated a recommendation and strategic vaccination program and education system which aims to give awareness to the human population as well. Cebu City satisfies consistent update of data and programs in order to achieve their goal of a rabies free area in the Philippines.

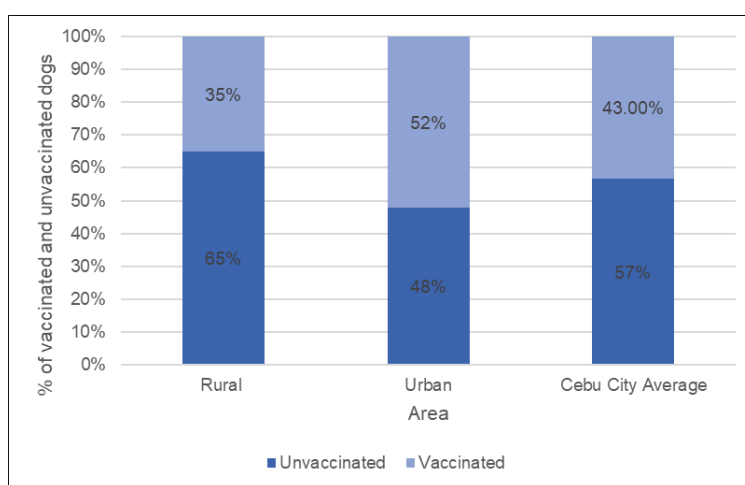


Figure 2. Dog Vaccine Coverage in Cebu City

Moreover, another part of the Visayas Region, Bohol City which is also under Region VII, also has data available in terms of improved strategic programs for post-exposure prophylaxis.

The study “On the path to rabies elimination: The need for risk assessments to improve administration of post-exposure prophylaxis” by Rysava et al. in 2019, identified Bohol’s administration of post-exposure prophylaxis which includes the vaccines Rabies Immune Globulins (RIG) where there are two clinically available treatment namely: HRIG or the Human Rabies Immunoglobulins and ERIG which is the Equine Rabies Immunoglobulins and Cell Culture and Embryonated Egg-Based Rabies Vaccines (CCEV). In the study, it is evident that the location of animal bite treatment centers and animal bite clinics is strategically placed as seen in Figure 3. The location of animal bite treatment centers and animal bite clinics are placed in areas with human density of approximately 500 – 5000 (Rysava et al., 2019).

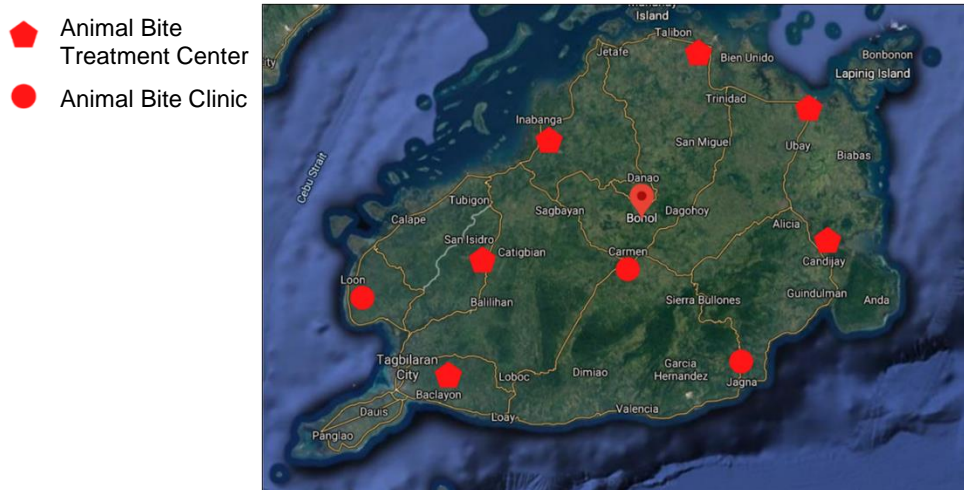


Figure 3. Treatment Centers and Bite Clinics Map in Bohol

Upon gathering data from the consistent updates on rabies prevention and elimination programs and research studies from the Local Government Units and researchers from the Visayas Region, a recommended assessment guide and strategic plan for rabies epidemiology is presented at Figure 4. The model is inspired by the Operational Plan for Rabies Elimination in Dogs in the Philippines (Animal Rabies Medium Term Plan for 2017-2022) presented by Maria Glofezita Ofulencia Lagayan of Alternate Rabies Focal Person, Animal Health and Welfare Division, Bureau of Animal Industry, and Department of Agriculture for the 1st Asian Rabies Control Network (ARACON) Meeting in 2018. The model presented at ARACON mainly identifies the category of risk levels based on the regions’ data and programs implemented within their sectors. As for the recommended assessment guide for rabies epidemiology in Figure 5, it provides recommended actions based on the regions’ rabies program and control status.

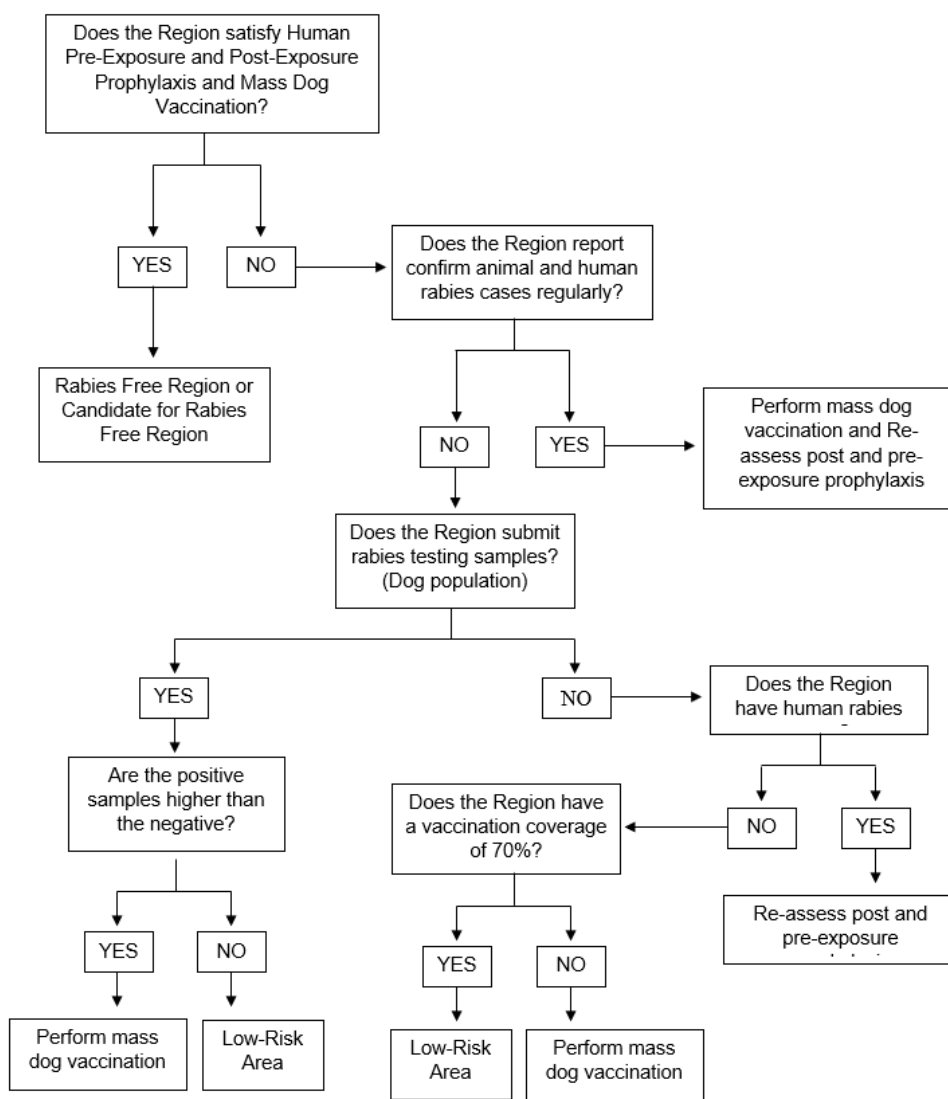


Figure 4. Recommended Assessment Guide for Rabies Epidemiology

CONCLUSIONS

The study showed that rabies cases in the Philippines are still significantly increasing which states that the number of canine bite cases increased by a total of 462% from the years 2009 to 2018 which also increases the risk of human rabies infection. This is due to the fact that 99% of global human rabies cases and deaths are a result of exposure and bite of rabies infected canines. In relation to this, despite the Department of Health declaring rabies free areas in the Philippines such as municipalities in 2017 namely in, Region X, Region VII, Region II, Region IV-B, and Region V, the data provided by both the World Health Organization and Department of Health shows that rabies free areas and municipalities still have positive cases of human rabies. In addition, the study also determined that the total human rabies exposure is at 1,156,377. It is also revealed that most of the human rabies exposure in the Philippines fall under Category II which is at 836,616. Category II exposure can be treated by vaccination of (RIG) and (CCEV) immediately or not beyond 72 hours. In relation to this, the study also showed that the coverage of post-exposure prophylaxis (PEP) in form of tissue culture vaccine (TCV) and equine rabies

immunoglobulin (ERIG) increased by a total of 93.7% and 52.6% respectively from the years 2007 to 2018.

Moreover, analysis of data regarding rabies epidemiology and preventive programs from consistent reports and updates from the Visayas Region, the Model Region for rabies control in this study, a recommended model for rabies control is procured. The recommended model is inspired by the Operational Plan for Rabies Elimination in Dogs in the Philippines presented by Maria Glofiezita Oplencia Lagayan. Furthermore, the recommended model provides an assessment guide for rabies epidemiology. By having a strategic assessment on rabies epidemiology, the model also shows recommended actions based on the regions' number of infected canines, human rabies cases, and rabies program and control status.

For future researchers, they provide an extension of this study by determining the population of stray and owned canines in a certain region or even barangay. By doing so, they can create more specific and attainable strategic actions to improve the current recommended assessment guide for rabies epidemiology and rabies control model. This will further provide a general guideline for small organizations in a certain place and even households so that they may be aware on how to handle post-human rabies exposure and prevention of rabies cases in their vicinity.

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