

EMERGENCE OF PREVALENT DISEASES IN METRO CEBU, PHILIPPINES: AN EPIDEMIOLOGICAL EXPLORATION

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ABSTRACT

This study aims to determine the most prevalent diseases existing in Metro Cebu based on the 11-year most widespread diseases. This study will help to alert the community as well as the health care provider regarding the results in order to render early/anticipatory managements to prevent its widespread. This study was conducted in Metro Cebu which comprises seven cities and six municipalities. The cities include Carcar City, Cebu City, Danao, Lapu-lapu, Mandaue, Naga, Talisay City and Municipalities consist of Compostela, Consolacion, Cordova, Liloan, Minglanilla and San Fernando. This study utilized a descriptive-normative design. Universal population was included. This study utilized percentages and correlation statistics. The proponent hired a field researcher/ research assistant to collect the necessary data. Transmittal letters to the Department of Health (DOH), City Health Office, Public Health Office, Municipal Health officer /Rural Health Officer and other concerned personnel were distributed and permission to conduct the said study was sought. Highly urbanized areas have higher income, more prone to suffer from communicable and infectious diseases and more densely populated compared to that of rural areas. Despite the opposing characteristics, the identified variables are not significantly related to prevalent diseases in Metro Cebu. Noticeably, urban areas are more prone to contagious and communicable diseases such as upper respiratory tract infections, pneumonia, pulmonary tuberculosis and diarrhea.

Keywords: *Prevalent diseases, Metro Cebu, URTI, Pneumonia, Tuberculosis, Communicable and non-communicable*

INTRODUCTION

There are various emerging and re-emerging diseases that are continually affecting the people over the centuries and this has resulted in a number of national and international initiatives to restore and improve surveillance and control of these diseases (World Health Organization, 1998).

In the Philippines, Universal Health Care (UHC), also referred to as Kalusugan Pangkalahatan (KP), is the “provision to every Filipino of the highest possible quality of health care that is accessible, efficient, equitably distributed, adequately funded, fairly financed, and appropriately used by an informed and empowered public”. The Aquino administration puts it as the availability and accessibility of health services

and necessities for all Filipinos (Department of Health, 2010).

In Cebu particularly, notwithstanding the fact that several health agencies are taking steps to ensure health and prevent occurrence of diseases, still some communicable and non-communicable diseases are alarmingly arising. It is with these premises that the proponent, as a health care provider, would like to create a health risk map of Cebu based on the trends of the most common diseases over the last 11 years. Diseases can be easily prevented if occurrence of diseases in a specific municipality can be anticipated in a specified time/season. This health risk map will aid in alerting the community as well as the health care providers in order to render early interventions and

further prevent its widespread. To date, there are no researches yet reflecting the trends of diseases in Cebu island.

Statement of Objectives

This study aims to determine the existing health risks of Metro Cebu based on the 11-year most widespread diseases (2000-2011).

Specifically, this answers to the following objectives:

- To determine the most prevalent diseases affecting every municipality of Cebu per month for the last 11 years (2000-2011)
- To determine the trends of these diseases in relation to:
 - Income classification
 - Type of diseases (communicable or non-communicable)
 - Population density
 - Type of area/location
- To alert the community as well as the health care provider regarding the results in order to render early/anticipatory managements to prevent the spreading of the disease.

Review of Related Literature and Studies

There are several reports reflecting the various diseases affecting the country. According to Philippines Field Health Service Information System (FHSIS, 2008), cardiovascular diseases, pneumonia, malignancy, cerebrovascular diseases, sepsis, genitourinary system diseases, injuries, diabetes mellitus, peptic ulcer, chronic obstructive pulmonary diseases are the leading causes of mortality in Region 7 for the year 2003-2007.

In Cebu specifically, there are no published reports regarding the most common diseases affecting the community people. However, Dr. Tayag (2010) reported that there are at least 126 new cases of HIV in the country in 2009, which is the highest in the past 25 years. From 1984-2009, a total of 4, 424 cases have been recorded in the Philippines. Furthermore, the HIV incidence in Cebu, like the rest of the country, is also rising according to the City Health Department.

Herriman (2010) as cited in DOH, Cebu DOH cautioned citizens of diarrheal diseases with the arrival of rainy season. Diarrheal diseases through contaminated water are an issue during heavy rainfalls

especially where wells and similar water sources are the supplier of drinking water. The latest incident in Barangay Calmante in Tudela, Cebu, Philippines where in the course of one week, 55 people have been stricken with waterborne diarrheal diseases. This has caused Department of Health Environmental Health Program Coordinator Engr. Evangeline Canoneo to issue some warning and recommendations to the public.

METHODOLOGY

This study was conducted in Cebu Island. Cebu is an elongated island about 250 kilometers from north to south and 45 kilometers across at its widest point. It is central to the Philippine archipelago. Cebu is known for its narrow coastlines, limestone plateaus, and coastal plains, all characteristics of a typical tropical island. The island's area of 4,468 square kilometers supports over 3.6 million people, of which 2.3 million live in Metro Cebu. The climate is warm, generally 23 to 33 degrees Celsius. Rainfall is evenly distributed throughout the year, except for the summer months from March to May which are dry. In terms of health and illnesses, Typhoid Fever, Hepatitis B, Tetanus, Cholera, Malaria and Dengue Fever are the most common diseases. METRO CEBU comprises seven cities and six municipalities. Cities include Carcar City, Cebu City, Danao, Lapu-lapu, Mandaue, Naga, Talisay City and Municipalities consist of Compostela, Consolacion, Cordova, Liloan, Minglanilla and San Fernando.

This study utilized a descriptive-normative design. Data such as prevalent diseases affecting every municipality of Cebu per month for the last 11 years (2000-2011), municipality income classification, type of diseases (communicable or non-communicable), season or month of the year where these diseases are highest and Population density will be gathered. A trend of these diseases was determined.

Universal Sampling Method was employed. This included all the municipalities in the island of Cebu. This is necessary to create the Cebu Health Risk Map.

This study utilized percentages, correlation statistics and multiple regression. Percentages were used to get the profile of the municipalities, correlation test to determine the relationship between variables (example: type of disease and type of municipality) and

multiple regression to determine the various predictors of diseases.

The proponent hired a field researcher/ research assistant to collect the necessary data. The field researcher is a nurse and was oriented regarding the study and was trained in proper research implementation phase. The proponent included the field researcher in the group insurance.

Transmittal letters to the Department of Health (DOH), City Health Office, Public Health Office, Municipal Health officer /Rural Health Officer and other concerned personnel were distributed and permission to conduct the said study was sought. After seeking the approval, the data were gathered through document review and data mining; however, not all data were available due to varied reasons. The field researcher approached other agencies that might have the copy of the data but unfortunately, all possible sources discarded their data every 5 years. Among others it was found that they were not collating the data on a monthly basis but rather yearly. Due to all these limitations, the proponent has revised some of the research questions that cannot be answered.

RESULTS AND DISCUSSION

This section presents the findings and interpretations of the study per municipality/city of Metro Cebu. METRO CEBU comprises seven cities and six municipalities. Cities include Carcar City, Cebu City, Danao, Lapu-lapu, Mandaue, Naga, Talisay City and Municipalities consist of Compostela, Consolacion, Cordova, Liloan, Minglanilla and San Fernando.

I. Identified Top Diseases per City/Municipality

Seven Cities

A. Carcar City Results

In the years 2001-2006 and 2008, there are no available data since the Department of Health is consolidating all the health data per island, neither per municipality nor per city. The Public Health Office and City Health Office also have no available data since they are discarding their data every five (5) years. Fortunately, in the years 2007 and 2009-2011, there were available data but only annual data, not monthly as proposed.

It can be gleaned from the figure that pneumonia,

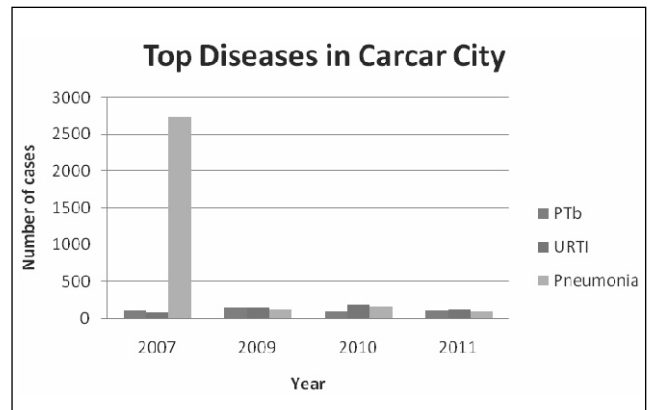


Figure 1: Top Diseases in Carcar City

pulmonary tuberculosis (PTb) and Upper Respiratory Tract Infection (URTI) were the identified top diseases in Carcar City for the last four (4) years. Noticeably, these diseases are respiratory-related conditions. This result is consistent with the Philippines Field Health Service Information System (FHSIS) report last 2008 stating that pneumonia and COPDs along with other diseases are the leading causes of mortality in Region 7 for the year 2003-2007.

Respiratory infections were common in the city since it is already highly urbanized. There are a lot of business establishments and vehicles that could be the source of air pollution causing common respiratory ailments. According Jamison *et al.*, (2006), this could be due to lack of access to basic amenities such as adequate housing and exposure to risk factors such as smoke pollution and overcrowding in cities. Furthermore, these identified conditions are communicable diseases which implies that the spread can be facilitated in overcrowded areas. Hence, more prevalent in cities.

It is significant to note the trend illustrating that the cases of identified diseases especially pneumonia is decreasing. This implies that if the community is initiating health programs or other activities to reduce the incidence, they are effective and must be continued to further reduced, if not eliminate, these alarming contagious diseases.

B. Cebu City Results

There are no available data in the years 2001 until 2003 since the Department of Health is consolidating all the health data per island, neither per municipality nor per city. The Public Health Office and City Health Office also have no available data since they are

discarding their data every five (5) years. The recorded top diseases in Cebu City in the year 2004-2011 illustrated in Figure 2.

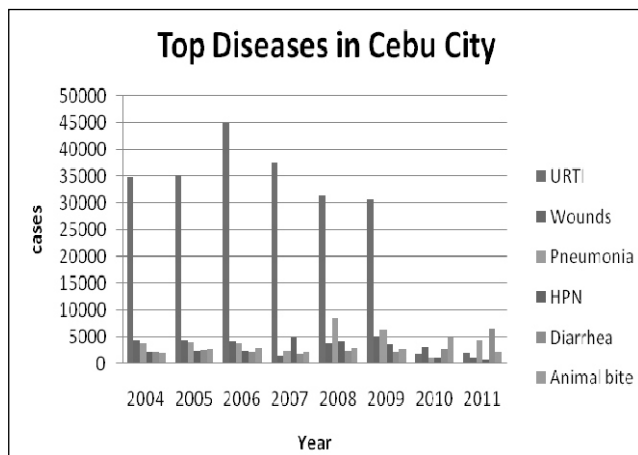


Figure 2: Top Diseases in Cebu City

In Cebu City, there were six (6) identified most prevalent diseases, namely: URTI, wounds, pneumonia, hypertension, diarrhea and animal bite. Like in Carcar City, respiratory conditions were still observable such as upper respiratory tract infections and pneumonia which reflected a very high prevalence rates as shown in Figure 2.

In addition with the respiratory problems, diarrhea was also prevalent. This is also a very contagious disease especially in crowded places with limited access to potable water, inadequate sanitation and poor hygiene practices. These are very much common problems in developing countries with a lot of informal settlers/slum areas. According to Kung'u *et al.*, (2002), diarrhea is a serious health problem in the overcrowded Kibera slum. There is inadequate source of health information for the slum dwellers. Poor environmental conditions, poor methods of feces disposal and high poverty levels expose the community to diarrheal diseases.

In contrary, there were three (3) non-communicable diseases identified, namely; wounds, hypertension and animal bites. All types of wounds are common due to easy access of the populace in alcoholic drinks and prohibited drugs which results to interpersonal conflicts and physical fights. Hypertension is a type of cardiovascular concern which is highly attributed by high cholesterol intake from the fast-food chains which

are highly accessible in industrialized areas. Sedentary lifestyle is an added risk factor. Animal bites, mostly by stray dogs, are also common since compulsory pet vaccination and other related policies for responsible pet ownership is not fully implemented in the city especially in the slum areas.

On the lighter side, Cebu City is fortunate since for the last years, URTI cases were exponentially reducing.

C. Danao City Results

In 2001-2004, there were no available data since the Department of Health is consolidating all the health data per island, neither per municipality nor per city. The Public Health Office and City Health Office also have no available data since they are discarding their data every five (5) years. The common diseases in the Danao City's (2005-2011) were depicted in the Figure 3.

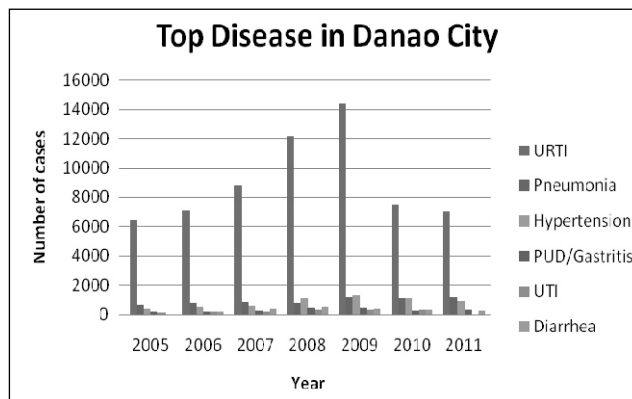


Figure 3: Top Diseases in Danao City

There were five common diseases in Danao City. These were URTI, hypertension, pneumonia, Urinary Tract Infection (UTI) and diarrhea. Evidently, URTI was consistently in rank 1 and displayed a certain pattern. In 2005, it continually increases and peaks in 2009. However, it again decreases the years thereafter, while the rest of the diseases seemed to have the same trends.

D. Lapu-lapu City Results

The recorded top diseases in Lapulapu City in the years 2006-2011 were URTI, Skin diseases, diarrhea and pneumonia. All these disorders can be categorized as communicable diseases. The figure showed the varying behavior of the disease incidence. It has an increasing and decreasing rate over the last 5 years.

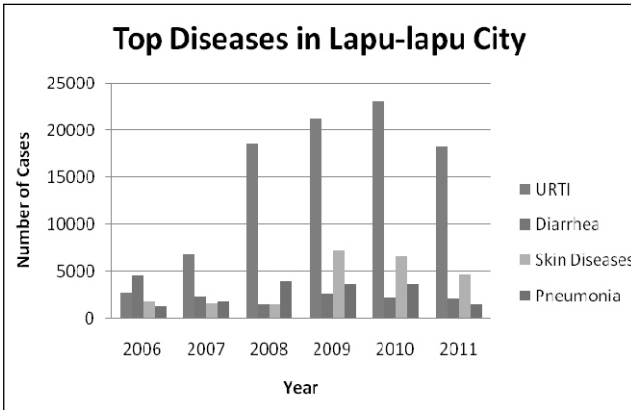


Figure 4: Top Diseases in Lapulapu City

E. Mandaue City Results

In 2001-2005, there were no available data since the Department of Health is consolidating all the health data per island, neither per municipality nor per city. The Public Health Office and City Health Office also have no available data since they are discarding their data every five (5) years. Based on 2006-2011 data, the top diseases identified in Mandaue City were depicted in Figure 5.

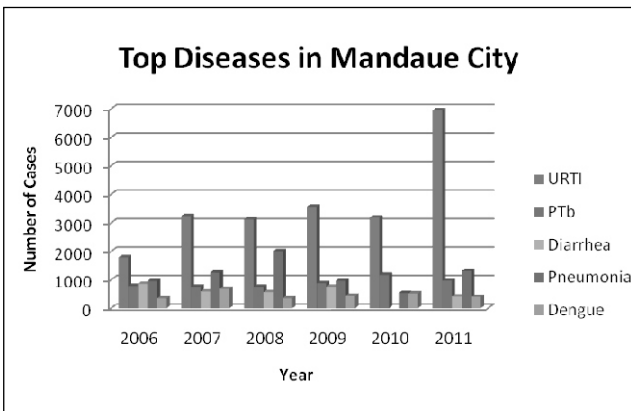


Figure 5: Top Diseases in Mandaue City

As presented in the figure, URTI, pneumonia, pulmonary tuberculosis, diarrhea and dengue were the most prevalent diseases in Mandaue City. Noticeably, URTI was constantly on top list and pneumonia on the bottom.

F. Naga City Results

Based on 2006-2011 data, the top diseases identified were URTI, diarrhea, pneumonia, pulmonary tuberculosis and hypertension. As expected and as seen in the results of the other cities, contagious

diseases were leading since can be spread easily, airborne/droplet.

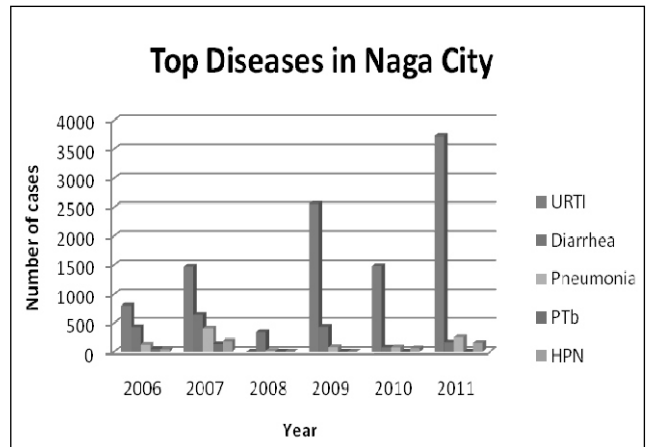


Figure 6: Top Diseases in Naga City

G. Talisay City Results

Based on 2003-2011 data, the top diseases identified, namely; URTI, bronchitis, diarrhea, pneumonia, hypertension and pulmonary tuberculosis.

It can be observed in figure 7 above that Upper Respiratory Tract Infections (URTI) and bronchitis were constantly on the top among the diseases. The cases were alternating with some ups and downs. These identified diseases were also the most prevalent disease observed in other cities within Metro Cebu. The similarities of widespread diseases among the cities identified is greatly attributed by the commonalities of personal, environmental and social characteristics among the populace living the cities which further affects health conditions.

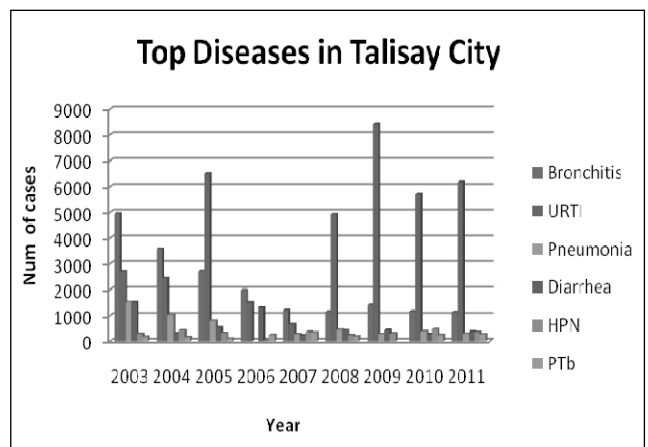


Figure 7: Top Diseases in Talisay City

Municipalities

H. Compostela

In the years 2006-2011, Compostela was suffering from the alarming cases of upper respiratory tract infections (URTI), Gastro-Intestinal disorders, pneumonia and hypertension. Most of the diseases observed were communicable and infectious in nature (Figure 8).

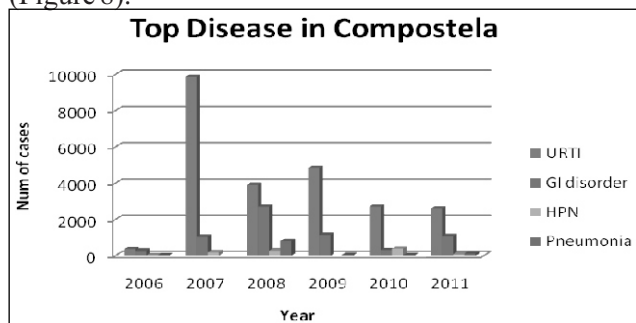


Figure 8: Top Diseases in Compostela

According to the Unite for Sight organization (2013) article with the title *Urban versus Rural Health*, rural residents have significantly poorer health status than urban residents. This is because rural residents smoke more, exercise less and have less nutritional diets. Hence, they are easily infected with communicable diseases.

I. Consolacion

In Consolacion, the widespread diseases identified for the last five years were upper respiratory tract infections, bronchitis, pneumonia, wounds, hypertension and impetigo. It is noticeable that the cases of pneumonia is decreasing which is contrary to wounds. The patterns of other diseases were variable (Figure 9).

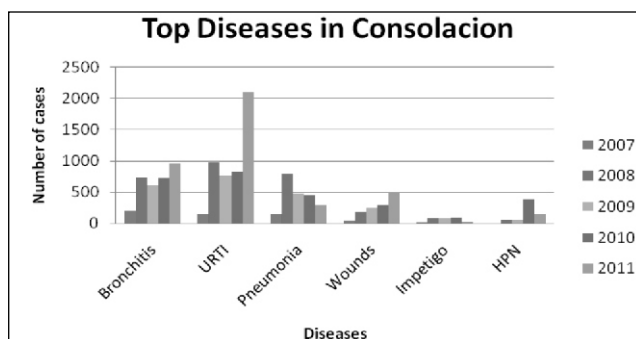


Figure 9: Top Diseases in Consolacion

J. Cordova

Upper Respiratory Tract Infections (URTI), diarrhea, pneumonia, hypertension and bronchitis were the most widespread diseases in Cordova, Cebu in the years 2008-2011. Of the five diseases, only diarrhea cases were reducing constantly (Figure 10).

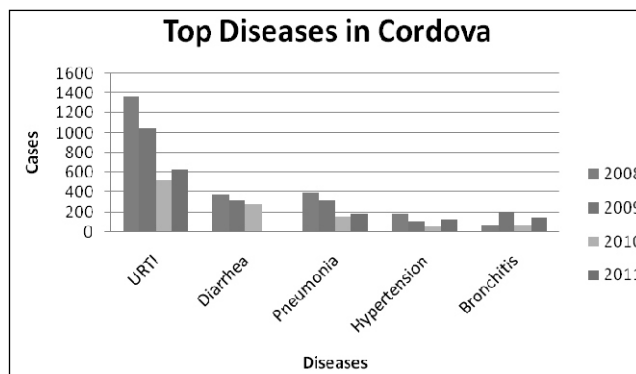


Figure 10: Top Diseases in Liloan

K. Liloan

The common diseases occurring in Liloan, Cebu in the last four years were Upper Respiratory Tract Infections (URTI), pneumonia, diarrhea and hypertension. Most of the diseases were infectious and contagious which can be easily transmitted through airborne/droplet (URTI and pneumonia) and fecal-oral route (diarrhea) (Figure 11).

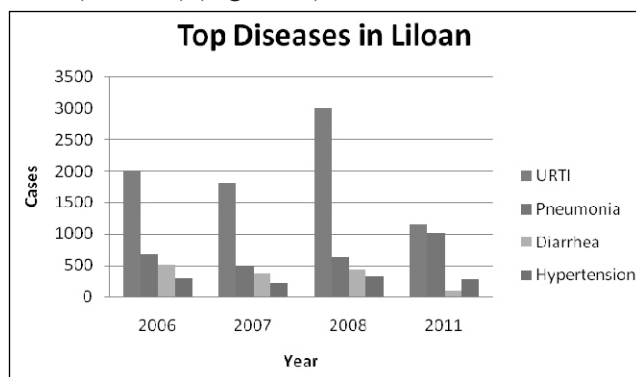


Figure 11: Top Diseases in Liloan

L. Minglanilla Results

For a decade, Minglanilla, Cebu suffered from several diseases such as pneumonia, hypertension (HPN), Loose Bowel Movement (LBM), Pulmonary Tuberculosis (PTb) and Upper Respiratory Tract Infections (URTI). All the diseases observed except hypertension are infectious and communicable diseases.

Seventy five (75%) of the contagious diseases are lung-related disorders. These respiratory diseases are highly contagious which can be transmitted through airborne or droplet routes. This implies that such diseases can infect the population more easily (Figure 12).

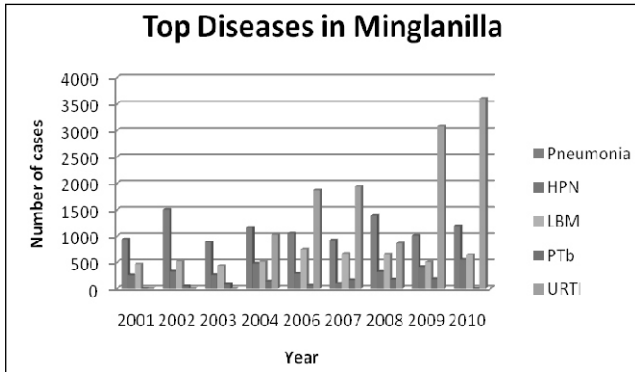


Figure 12: Top Diseases in Minglanilla

M. San Fernando

A. Based on 2002-2011 data, the leading diseases observed in San Fernando were Upper Respiratory Tract Infections (URTI), mixed infection and gastritis. URTI was consistently on the top. Gastritis is common in areas where poverty is observable.

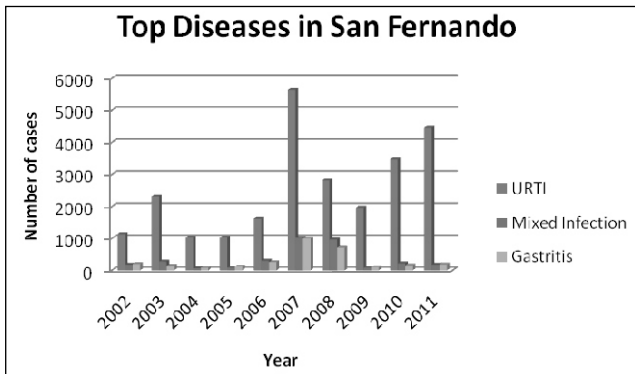


Figure 13: Top Diseases in San Fernando

According to Svec *et al.*, (2000), a high prevalence of *H. heilmannii*-associated gastritis is more common in a small, predominantly rural area which may be a consequence of transmission of the infection from domestic animals, because animal-human contact is generally more common in villages than in towns.

Comparison of Characteristics between Cities and Municipalities

The table below shows the differing characteristics between urban (city) and rural (municipality) areas.

Cluster Analysis and simple percentages were utilized to come up with the following results:

Table 1: Cluster Centroids

Variable	Cluster1	Cluster2	Grand centered
Location	1.5000	1.0000	1.4615
Income Class	2.0000	1.0000	1.9231
Type of Diseases	1.5000	1.0000	1.4615
Population Density	2085.4558	13158.0000	2937.1900

Table 2: Characteristics of Urban and Rural Areas

Geographic classification	Income Class	Type of Prevalent Diseases	Population Density
Urban (city)	High Income	Communicable Diseases	High Population density
Rural (municipality)	Moderate	Both communicable and non-communicable diseases	Moderate population density

Of the three characteristics presented, the urban and rural areas showed opposing characteristics. In terms of income class, expectedly, cities have high income generation compared to that of the municipalities. According to Bureau of Labor Statistics (2013), urban population had thirty-two percent (32%) more income than rural areas. Hence, urbanized areas have higher budget that can be allotted to health or other health-related programs of the government (Hawk, 2013). Furthermore, cities have easier access to health services and health information.

Looking closely at the type of prevalent diseases, urbanized areas are more prone to suffer from communicable and infectious diseases. Seventy-five to eighty percent (75-80%) of the diseases were contagious. While in rural areas, half of the diseases are contagious and the other half are non-infectious. Most of the infectious diseases were affecting the lungs of the people. Respiratory infections were common in the city since it is already highly urbanized. There are a lot of business establishments and vehicles that could be the source of air pollution causing common respiratory ailments. According Jamison *et al.*, (2006), this could be due to lack of access to basic amenities such as adequate housing and exposure to risk factors such as smoke pollution and overcrowding in cities. Furthermore, these

identified conditions are communicable diseases which implies that the spread can be facilitated in overcrowded areas. Hence, more prevalent in cities.

Overcrowding may be attributed by the fact that cities have high population density. If the area is highly populated, then existing infections which are communicable can be easily transmitted to other individuals. Which means that the people living in highly congested areas are more prone to come in contact with infections.

Predictors of Type of Prevalent Diseases

The regression equation is:

$$\text{Type of common Disease} = 0.68 + 1.15 \text{ Area type} - 0.63 \text{ Legal Class} + 0.195 \text{ Income Class} - 0.000057 \text{ Population Density}$$

Predictor	Coef	SE Coef	T	P
Constant	0.681	1.528	0.45	0.668
Location	1.1520	0.6275	1.84	0.104
Legal CI	- 0.627	1.018	- 0.62	0.555
Income Class	0.1947	0.3534	0.55	0.597
Population Den	- 0.00005741	0.00009176	- 0.63	0.549

$S = 0.8329$ $R\text{-Sq} = 39.9\%$ $R\text{-Sq}(adj) = 9.8\%$

The regression results above showed if the identified variables are the critical determinants of the existing diseases in Metro Cebu. All the variables are not significantly related to prevalent diseases as reflected in the p values above (more than 0.05). This implies that the types of diseases are affected by other variables that are not included in this study. Furthermore, the R-squared value of 39.9 % means that only 39.9 % can be explained by the identified variables (location, income classification and population density) and the remaining 60.1 % is brought about by other variables.

CONCLUSION

Highly urbanized areas have higher income, more prone to suffer from communicable and infectious diseases and more densely populated compared to that of rural areas. Despite the opposing characteristics, the identified variables are not significantly related to prevalent diseases in Metro Cebu. Noticeably, urban areas are more prone to contagious and communicable diseases such as upper respiratory tract infections, pneumonia, pulmonary tuberculosis and diarrhea.

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