Environmental Pollution Contributory on Open Dumping of City Solid and Organic Wastes: The Risk Among Sangkol Residents

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ABSTRACT

This study sought to find the perception of the residents towards the environmental pollution contributed by the dumpsite and its effects to their health and lifestyle in Brgy. Sangkol, this academic year 2019-2020. It uses descriptive method of research utilizing questionnaires as its principal tool of gathering data. The data gathered was statistically treated using frequency counting and percentage computation, weighted mean, Kuskal-Wallis H-test and Wilcoxon Rank-Sum U Test.

The continued dumping of solid and organic wastes was observed by the residents of Brgy. Sangkol, Dipolog City to have a great effect on the environment, health and lifestyle. The residents frequently experienced skin diseases and other skin infections, and frequently experienced respiratory problems caused by smoke emissions of waste transport and unpleasant odor. Thus, there is a need to heighten and improve the waste management of the dumpsite to lessen its effects to the environment and its nearby residents. Furthermore, the age and educational attainment greatly affects how they perceived the environmental pollution of the dumpsite. Therefore, the residents are mature and educated enough because they know the dumpsite affects them and their environment.

The barangay captain should review the provisions of "Implementing Rules and Regulations of the Philippines Ecological Solid Waste Management Act of 2002, Rule XIV-Operations of Sanitary Landfills". Further, the health center of Barangay Sangkol should always monitor the residents living in proximity along the dumpsite and give them proper health care and treatments. Finally, separate studies should be conducted in order to validate the veracity of the herein findings.

Keywords: Environmental pollution, dumpsite, solid and organic wastes, health risks, waste management

Introduction

Dumpsites are a global problem. According to Waste Atlas 2014 report list, dumpsites collect approximately 40% of the world's waste and they serve about 3.5-4 billion people. These are found both within and on the outskirts of cities worldwide, most especially to developing countries. And due to poor and ineffective management, the dumpsites turn to sources of health hazards to people living in the area of such dumps.Thearea is therefore littered with 'mountains' of rubbish in landfills and open waste dumps, which are covered with flies and thus serve as breeding grounds for rodents and mosquitoes which are carriers of diseases.Environmental pollution of a dumpsite such as ground and water contamination, and air pollution affects the quality of life and health of thes residents.

The Philippines is currently facing waste problems despite the passage of the Ecological Solid Waste Management Act or the Republic Act (RA) 9003.Dipolog City made advancements concerning structural productions. As the innovation continues, Dipolognons never deliberated where their rubbish aredisposed. Filipinos produce the average of 0.5kg to 0.3kg of garbage every single day. As of 2015, Dipolog City has the estimated population of 130,759 which has only 1 dumpsite in Barangay Sangkol that accommodates all the waste disposals in 21 barangays. In fact there are residents living nearby and within said site.

Various population studies document that solid waste pollution on dumpsites can have serious effects on the health and wellbeing of the population. Despite methodological limitations, the scientific literature on the health effects of dumpsites provides strong indications of the existing linkages between dumpsites and adverse health effects for workers, informal recyclers and nearby residents. The different waste streams disposed of as well as the practices that are followeddetermine both the health and the environmental impacts of dumpsites. The atmosphere is a dynamic system and it absorbs various pollutants from natural as well as man-made sources, thus acting as a natural risk.

Since the existence of human settlements cannot be avoided near a dumpsite, it is important to determine how environmental pollution such as ground, surface and water contamination, air pollution, and spread of disease affect individuals and families in relation to their health and lifestyle.

Thus, this study aims to know how the dumpsite affects the resident's health, quality of life, and how they perceive environmental pollution and its effects. This pursues to raise health-risk awareness on nearby residents. Moreover, this enables to escalate the effectiveness of waste management in the dumpsite by seeking to achieve proper and more sustainable solid waste disposal to minimize environmental pollution and improve the life and health conditions of the residents.

Literature Review

In the study of White (2012) on the Growth of Microbial Pathogens in Municipal Solid and Organic Wastes, it was assessed that organic wastes in dumpsites are biodegraded and thus they create conditions favourable for the survival and growth of microbial pathogens. These conditions can be further heightened if the waste is disposed of with pathogens from human body fluids such as faeces, urine, blood and sputum. All are present in typical municipal waste through nappies, sanitary pads and the general discards from vomiting and human secretions. Organic wastes also provide a food source for carriers of enteric pathogens such as rodents, insects, birds and larger wild mammals.

Consequently, the diffuse airborne emissions from biologically and chemically decomposing municipal solid wastes at dumpsites are clearly a health risk. Decomposition of organic fraction in dumpsites results in the generation of gases and contributes to leachate formation. Thus the main sources of pollutant emissions from a dumpsite are as follows: (a) The wastes as they are brought onto site, normally in heavy vehicles, (b) Emissions from transport and bulldozers, compactors etc. (c) Waste blown by the wind as it is tipped or deposited at the dumpsite, (d) dust generated from the surface of the dumpsite and when waste is tipped or unloaded, (e) Historical waste that have been already disposed off, (f) Any gas generated as the waste decomposes (if not collected and treated), (g) Any leachate produced as the waste decomposes, (h) The discharges from any processes used to treat the leachate (if any at all).

While in modern sanitary landfills all those emissions are eliminated or under complete control (due to the use of advanced environmental protection measures like liners, top covers, biogas and leachate management system, continuous monitoring), in dumpsites those emissions are uncontrolled and they are actually associated with serious health hazards.

According to Mavropoulos (2015), on The Tragic Cases of Dumpsites, the health risks and impacts from dumpsites are associated with some of the pollutants (or hazardous substances) that are found in waste streams or with pollutants that are created at the dumpsite through physical-chemical interactions. In general terms, pollutants can move through air, soil and water. They can also settle on or digested by plants or animals, and can get into the air, the food chain and the water.

The different ways a person can come into contact with pollutants are called exposure pathways. There are three basic exposure pathways: inhalation, ingestion, and skin contact. Inhalation is breathing or inhaling into the lungs. Ingestion is taking something in by mouth. Skin contact occurs when something comes in direct contact with the skin. Ingestion can be a secondary exposure pathway after skin contact has occurred.

Exposures can be either acute or chronic. An acute exposure is a single exposure to a hazardous substance (pollutant) for a short time. Health symptoms may appear immediately after exposure; for example, a burn when exposed to a strong acid such as from a leaking battery.

Chronic exposure occurs over a much longer period of time, usually with repeated exposure in smaller amounts. For example, people who lived near Love Canal, a leaking hazardous waste dump, did not notice the health effects of their chronic exposure for several years. Chronic health effects are typically illnesses or injuries that take a long time to develop, such as cancer, liver failure, or stunted growth and development. one reason chronic exposure to even tiny amounts of hazardous substances can lead to harm is bioaccumulation. Some substances are absorbed and stay in human bodies rather than being excreted. They accumulate and cause harm over time.

Adverse health effects depend upon the factors of exposure. Factors that play a part in whether or not adverse health effects may result from an exposure are: (1) The type of pollutant; (2) The amount or dosage (the amount or level of a pollutant a person was exposed to); (3) The duration (how long did exposure occur); (4) The frequency (how many times the person was exposed).

Kimani (2011), on the study Health and Economic Implications of Solid Waste Dumpsites, said that "over the last three decades there has been increasing global concern over the public health impacts attributed to environmental pollution, in particular, the global burden of disease". Most tropical diseases like typhoid, dengue and malaria fever, rash, cholera, dysentery, diarrhea, whooping cough etc are due to unsanitary environment. Smokes from waste dumps may be toxic due to the nature of the elements in the waste dumps. Poorly managed and wrongly sited waste dumping sites are pathogen and epidemiology centres where germs breed and diseases spread among residents and passers-by. Viruses, bacteria and fungi which breed regularly in waste dumps, landfills, waste tanks and waste-bins can produce infectious diseases, toxic gases and radioactive elements. Waste dumps and land-fills may emit toxic compounds or harbour radioactive materials that are dangerous to human health and well-being. Waste dumps, where wastes are burnt openly, generate carbon dioxide, carbon monoxide, nitrogen dioxide, nitrogen monoxide and other gases due to burning of remnants of chemicals in bottles and other containers containing sulphide, nitrate, fluoride, benzene, nicotine, lead etc, which react with oxygen to form poisonous gases that are inhaled by residents.

According to Newman (2015), on the study Solid Waste Decomposition in Waste Disposal Facilities, leachate is a liquid produced when wastes undergo decomposition, and when water (due to rainfall, surface drainage, groundwater, etc.) percolate through solid waste undergoing decomposition. As the water percolates downward, biological and chemical constituents of the waste leach into the solution. The percolating water may also mix with the liquid that is squeezed out of the waste due to the weight of the material. Thus, leachate is a liquid that contains dissolved and suspended materials that, if not properly controlled, may pass through the underlying soil and contaminate sources of drinking water, as well as surface water. The composition of leachate depends on the stage of degradation and the type of wastes within the disposal facility.

Furthermore, Dalton (2014) stressed on the study Odorous Emissions of Biodegradable Waste on Dumpsites and its Health Effects to Human Settlement, that odorous emissions are often

accompanied by reports of ill-health from communities. Odors are frequently a key issue for dumpsites, especially those receiving biodegradable waste. Odors are typically associated with activities such as the handling of odorous wastes and the covering of biodegradable wastes or with the presence of trace components in gas or leachates. Individuals may report a wide range of non-specific health symptoms, attributing these to odor exposure, including nausea, headaches, drowsiness, fatigue and respiratory problems. Health symptoms reported in association with odorous emissions can arise at olfactory detectable concentrations well below the levels associated with toxic effects or thresholds for mucous membrane irritation. Individual responses to odors are highly variable and are influenced by many factors including sensitivity, age and prior exposure to the odor. Psychological and social factors, in addition to an individual's level of concern about the potential harm to their health, will also play an important role in an individual's response.

Ali et al (2014) stated on the research The Effects of Landfills on Rural ResidentialProperty Values,that soil pollution is another environmental problem caused by dumpsites. Waste carries different metals, which are then transferred to plants by different ways. Depending on the tendency of the contaminants, they end up either in water held in the soil or leached to the underground water. Contaminants like Cd, Cu, Ni, Pb and Zn can alter the soil chemistry and have an impact on the organisms and plants depending on the soil for nutrition.

Vestergaard (2014) asserted that waterborne diseases are caused by drinking contaminated or dirty water. Polluted water can cause numerous sorts of diarrheal sicknesses, including Cholera, and different genuine ailments, for example, Guinea worm disease, Typhoid, and Dysentery. Water related maladies cause 3.4 million deaths every year.

Meanwhile, India (2017) stressed that air contamination is a standout amongst the most widespread contamination and is one of the inescapable ones. Being a regularly infesting medium and transporter, air can exchange the toxins quick in the blink of an eye; making it relatively incomprehensible for any individual taking in the contaminated air, to stay away from the disease. In spite of the fact that the poison level, response to the toxins and invasion of the contamination based sicknesses in each individual is extraordinary; the way that air contamination can effetely affect the human body can just not be disregarded. Here are some diseases present when there is air pollution; Asthma, lung cancer, COPD (Chronic Obstructive Pulmonary Disease), Leukaemia, Pneumonia and others.

Moreover, World Health Organization (2016) estimates that about a quarter of the diseases facing mankind today occur due toprolonged exposure to environmental pollution. Unsanitaryenvironment can encourage the spread of malaria fever,typhoid fever, cholera, tetanus, eczema, dysentery, denguefever and inhaling carbon dioxide can worsen such ailment asemphysema, pneumonia and asthma.

On the other hand, according to O'Neil (2014) on Human Body Adapts To Its Environment, the human body promptly reacts to changing ecological worries in an assortment of organic and social ways. We can adapt to an extensive variety of temperature and stickiness. When

venturing out to high heights, our bodies change with the goal that our cells still get adequate oxygen. We likewise are continually reacting in physiological approaches to our inner and outer burdens, for example, bacterial and viral diseases, air and water pollution, dietary imbalance, and overpopulation. This capacity to quickly adjust to fluctuating natural conditions has made it workable for us to get by in many locales of the world. We live effectively in humid tropical forests, harsh deserts, arctic wastelands, and even thickly populated urban communities with significant measures of contamination. Most other creature and plant species are confined to one or generally couple of conditions by their more constrained versatility.

In addition, Miller (2011) on How the Body Adapts to Its Environment, stated that as far back as 1970s, there has been an exploration of developing assemblage of research on natural life and lab creatures and epidemiological investigations of people. These investigation shows that long haul introduction to different harmful chemicals in the earth can upset the body's immune system, nervous system, and endocrine framework.

According to Galarpe (2017) on the Review on the Impacts of Solid Waste Disposal Sites in the Philippines, it can be inferred that potential contamination of disposal sites to environment can manifest in groundwater, soil, air, plants, and scavenging animals adjacent to the site. Adjacent community can similarly be affected jeopardizing their own health. Prevalence of gastrointestinal, skin, upper-respiratory, and dengue diseases were likely common. Although disposal sites can pose health risks, community tends to continually settle with present options owing to perceived economic dependence through employment and resources. It is fundamental that local government units will consider the economic options, health, and environment of adjacent communities while pursing the mandate of RA 9003.

Demayo (2012) on Philippine Solid Wastes and Its Health Implications At A Glance, stressed that germs such as viruses, bacteria and fungi, breed regularly in waste dumps and landfills. These antibodies affect the lung and weaken the heart and other organs in the body. Waste dumps, incinerator plants and land-fills may emit toxic compounds that are detrimental to human health and well-being. Exposed waste dumps and land-fills are also eyesores that are social menace to the residents where they are sited. Uncontrolled waste dumps are danger zones toscavengers, mostly youths, who may tramp on infected sharp objects while searching for 'treasure'.

In the study of Villareal (2012), on the Impact of Waste Dumps on the Human Health, it was stressed that residents and traders in areasnear a waste dump are prone to rash, lung infection, cholera,tetanus, dysentery, diarrhea, nauseating, child birth defectand pre-mature birth more than those who live or trade in faraway areas. Waste dump can serve as breeding ground formosquitoes, fly, rodents and rats. These animals can transmitdiseases to human being either from the waste dump or othersources.

Meanwhile, in the study of Quizon (2016) on the analysis of the Physical Parameters of Water Focusing on Color and Turbidity, it revealed thatthere is no association between the location of wellsfrom the dumpsite and the color of the groundwater.On the other hand, there is an

association between the location of wells from the dumpsite and theturbidity levels of the groundwater. Results revealedthat the proportion of wells that yielded poor inturbidity is significantly higher among wells sampledin the areas far from the dumpsite than in the areasnear the dumpsite.

In the study of Cortez (2014) on Heavy Metal Concentration of Dumpsite Soil, it was revealed that soils in the dumpsitehave high concentration content of heavy metals Cu, Zn, Pband Cd than its counterpart agricultural land. Consequently,plants grown on dumpsite soils accumulated higherconcentrations of heavy metals ($p<0.05$) than theircontrol and showed significant differences ($p<0.5$). Amongconcentration of heavy metals than plants grown on thenormal farm soils; hence, efforts should be intensified todiscourage the practice of cultivating at dumpsite soilswhich is a common practice of residence in Smokey Mountain, TondoManila.Moreover, the alarming high concentration accumulatedin corn grown in the dumpsite soil must be given attention.Despite the age of the closed dumpsite, Pb still occur andaccumulated by other crops being grown. Consuming of foodwith high metal content is exposing the individual intopossible health risks.

According to National Solid Waste Management Commission (2016), The Philippines' waste generation continues to rise with the increase in population, improvement of living standards, rapid economic growth, and industrialization especially in the urban areas. Filipinos produce the average of 0.5kg to 0.3kg of garbage every single day. In addition, the NSWMC calculated that from 37,427.46 tons per day in 2012, the country's waste generation steadily increased to 40,087.45 tons in 2016 with an estimated average per capita waste generation of 0.40 kilograms per day for both urban and rural.

According to Atienza (2011), waste dumps which are common sights in developing nations' cities such as the Philippines, are source of epidemiology and generatepathogens which are dangerous to people working or livingin nearby environment. Improperly manage waste dumps cancause diseases and affect the lifespan of the people working on it. Waste dumps are unsightly and can cause stress to thepeople living or working around it. Rodents, which causeEbola disease, can breed easily on waste dumps. Over 30%of people residents in Payatas,are exposed to health hazards intheir daily activities without awareness.

Lapid (2011) asserted that the traders around the waste dump at Payatas are not aware of the havoc the waste dump is doing to their health becausethey are all illiterates. Those that have children with birthdefects attribute the cause to nature or spiritual. Thescavengers are aware that they are prone to danger workingon the waste dump, especially as they regularly fall sick, butthey have no other means of livelihood. They are aware ofsafety boots but they cannot afford them.

Moreover, Ancheta (2014), stated that the lifespan of those who scavenge unprotected on waste dumps is lesser than for national average. Though causes ofdeaths were not known, they were not due to accidents. Thepresence of very high percentage of remnants of metals,chemicals

and medical wastes is a great challenge to wastemanagement. Metals are not yet being recycled fully andthere are still high reserves of metals on our waste dumping sites.

Additionally, Torres (2012) drugs, medicines and medical wastes like drug remnants,syringes, needles and bottles should be professionallymanaged because their reuse is dangerous as they cantransfer diseases to the users. Nitrates which percolate intorivers and water-wells have been found to cause teethcoloration where drank over a long period. Some herbicides(leachates) like Gamoline can be washed by rain and leach tothe river to endanger aquatic life. Inhalation of poisonousgases over a long period of time can affect the immunesystem and lead to cancer. Pregnant women who inhale highlevel of carbon dioxide, carbon monoxide and otherpoisonous gases may give birth to abnormal child or havepremature birth.

Furthermore, Gonzales (2015) on the study about soil contamination in landfills, stated that soil contamination happens when there is a development of steady toxic mixes, salts, dangerous materials, chemicals or ailment causing operators in the dirt which influence human, creature and plant well-being. Soil contamination is essentially a consequence of human movement, for example, the utilization of pesticides like Atrazine, which is a famous weed killer, and the age of undesirable mechanical waste like arsenic. Soil contamination changes the structure of the dirt and makes a pathogenic soil condition, prompting the spread of illnesses like cancer, kidney and liver diseases, brain and nerve damage, malaria, cholera and dysentery.

According to Japan International Agency (JICA) (2011), on Profile on Environmental and Social Considerations in Iraq, the specification of Sanitary Landfill of Wastes include:

First - Limitations of Assigning the Site:

The following conditions shall be achieved when assigning a site as a landfill:

- The site shall be outside the basic design of the cities.
- It is preferable to choose the natural low lands and mud, sand, stones, and lime quarries. If the low lands are not available, the non-agricultural lands are used by digging trenches of this purpose.
- The areas which contain high levels of underground water shall be avoided.
- It is to choose locations far away from the main streets and cities entrances.

Second – Sanitary Landfill Methods:

The sanitary landfill shall be carried out according to the following specifications:

- The wastes shall be spread in layers, pressed by mechanical means, covered with sand and rolled then there is a second layer of wastes and another layer of sand, provided that the following items shall be complied with:
    - The thickness of the wastes layer is (1.01-1.5) meter.

  - The thickness of the sand layer above the wastes layer is (20-30) cm.
  - The wastes shall be covered at the end of each working day with a layer of sand as mentioned in item (b) to prevent the growing of insects and the emission of bad smells.
  - The thickness of the last sand layer shall be (50-80) cm. The necessary licenses shall be given to discharge rain water to prevent its gathering.
  - The process of rolling the wastes and sand layers shall be accurate.
- Pesticide and chemical materials shall be used to kill rodents and insects.
- The ruins of buildings produced from destruction and maintenance and materials resulted from construction could be used to cover wastes.
- If the low lands are not available, trenches shall be dug to bury wastes in a depth that is no less that (3-4) meter and (6) meter in width. The same method of burying above mentioned (1) shall be used.

Third – Necessary Tracks:

- An integral unit of tracks and equipment shall be provided for each of the sanitary landfills and shall be assigned to the purpose of burying wastes; they shall not be used for other purpose.
- The unit shall consist of the following trucks. Their number depends on the size of the work location and the nature of the work.

Fourth – Providing the requirements that are needed in landfills:

- To enclose the site before using it as a landfill and plant trees on its sides as far as possible.
- To provide suitable roads to carry wastes to the site and good inner roads to facilitate movement of the trucks.
- To provide suitable ceiling to protect the trucks from weather conditions.
- To provide a room to the administration, another one to the guards, a storage for the materials, water closet, and a balance in the entrance of the landfill to weigh the wastes trucks incoming to sites, especially in the center of provinces.
- To put clear signs and billboards to find the location of the sanitary landfills.
- To provide water and electricity in the the landfill to control fires, if happened, and operate trucks and lights.

Methodology

This section contains the methods of research used, the research environment, reliability and validity of the questionnaire, respondents of the study, research instrument, data gathering procedure, and statistical treatment of data.

Research Method

The study employed the descriptive method of research using a structured questionnaire and an interview guide as principal tools in gathering data. The use of descriptive method was necessary in order to know the perceptions of the residents on the environmental pollution contributed by dumpsite and its effects to their lifestyle and health. The questionnaire was administered by the researchers to know their views and insights about the dumpsite.

Research Environment

The research was conducted in Barangay Sangkol, Dipolog City, focusing on the dumpsite with a land area of 10 hectares and the residential area. It can be observed that the area around the dumpsite is polluted. The residents are bothered by the problems such as the foul odor and eyesores of garbages brought by the dumpsite. Barangay Sangkol is one of the 21 barangays of the city of Dipolog created into a barangay under Republic Act No. 7160. It has a population of 2, 000. Under Resolution No. 19-137, it was resolved that the city government was authorized to negotiate, acquire, and purchase the lots adjacent and traversed by road leading to the sanitary landfill of the city, situated at Barangay Sangkol, pursuant to SP Resolution No 19-780 dated April 30, 2019. Thus, the research environment was a government property. It is divided into nine sectors (purok), where PurokPinya and Lumboy is situated near the dumpsite.

Respondents of the Study

The respondents of the study were the residents in Barangay Sangkol, Dipolog City, particularly the residents of SitioDampalan, PurokLumboy and Pinya which is near the dumpsite. Base on the records of the their Health Center, year 2018, it was noted that majority of the people who consult are from PurokPinya, with sickness such as high fever, coughs, pneumonia, skin rash, and tetanus. The number of respondents are distributed according to their distance from the dumpsite. There should only be one respondent per household.

TABLE 1

RESPONDENTS' DISTRIBUTION

DISTANCE OF HOUSEHOLDS FROM DUMPSITE	NUMBER OF RESPONDENTS
LESS THAN 100 METERS	10
100-200 METERS	10
200-300 METERS	10

RESEARCH INSTRUMENTS

Questionnaire is the principal tool use in this study. The questionnaire contained two (2) parts, the first part calls for the profile of the respondents. The second part calls for their perception on the environmental pollution of the dumpsite and its effects to their health and lifestyle.

Interview was also conducted to determine the authenticity of the data gathered, conducted by the researchers.

Validating the Instruments

The questionnaire prepared by the researchers was subjected for validation, recommendation, and modification by the persons whom the researchers sought guidance relative to the fulfillment of this study. The same questionnaire was administered by testing it with ten (10) people. The result of the pre-testing was incorporated on the modified questionnaire. The final, modified, validated, and corrected questionnaire was then administered to the respondents.

Data Gathering Procedures

The researchers asked permission from the Barangay Captain of Barangay Sangkol, Dipolog City, for them to be allowed to administer the questionnaire to the residential area within 300 meters in proximity to the dumpsite. The administration of questionnaire was done personally by the researchers and the questionnaire was collected after the respondents answered the same.

Statistical Treatment of Data

1. Frequency Counting and Percentage. This basic statistical tool was utilized to establish the profile, i.e, age, gender, and years of living of the respondents in the area. Percentage is computed by:

Percentage = (Frequency per Category/Total Respondents) x 100

2. Weighted Mean. This measures the central tendency that was used to determine the perception of the respondents on the environmental pollution contributed by the dumpsite and its effects to their health and lifestyle. The formula is:

Weighted mean = (data interval frequency x assigned weight) / total respondents

Weighted mean was then interpreted using the two given intervals:

Scale	Continuum	Descriptive Equivalent
5	4.21-5.00	Always
4	3.41-4.20	Frequent
3	2.61-3.40	Sometimes
2	1.81-2.60	Seldom
1	1.00-1.80	Never

3. **Kruskal-Wallis H-test**. This test was used to compare the existence of difference between the perception of the respondents on the perception of the residents on environmental pollution of the dumpsite and the effects of environmental pollution to the residents of Brgy. Sangkol. The formula is:

$$H = \left[\frac{12}{n(n+1)} \sum_{j=1}^{c} \frac{T_j^2}{n_j} \right] - 3(n+1)$$

Where: H = Kruskal-Wallis test

N = total number of observation

Rj= sum of the jth rank

nj= number of observation per jth category

Results and Discussion

The following are the findings of the study:

1. Profile of the Respondents.

   1.1 That the respondents of the study were the residents in Barangay Sangkol Dipolog City, particularly the residents of Sitio Dampalan, Purok Lumboy, and Pinya which is near the dumpsite.

   1.2 That out of 30 respondents, ten (10) were living less than 100 meters away from the dumpsite.

   1.3 That out of 30 respondents, ten (10) were living approximately 100-200 meters away from the dumpsite.

   1.4 That out of 30 respondents, ten (10) were living approximately 200-300 meters away from the dumpsite.

2. Respondents' Age.

   2.1 That the data pointed out that most of the respondents from 0-100 meters and 100-200 meters were within the age bracket of 36 to 45 years old.

   2.2 That those from 200-300 meters were within the age bracket of 26 to 35 years old.

   2.3 That the data stressed that most of the respondents were within the age bracket of 36 to 45 years old, which implies that most of the residents of Barangay Sangkol, Dipolog City are adults.

3. Respondents' Sex.

   3.1 That the data shows that most of the respondents from 0-100 meters and 100-200 meters are females, with a percentage of 40% and 70% respectively.

   3.2 That the respondents from 200-300 meters where both sexes were properly represented having the percentage of 50% on each sex.

4. Respondents' Occupation.

   4.1That the data pointed out that most of the respondents were garbage collectors, living within 200-300 meters away from the dumpsite.

   4.2 That most of the respondents living within 0-100 meters are construction workers.

   4.3 That most of the respondents from 100-200 meters are garbage collectors, government employees, businessmen and women, and unemployed.

4.4 That the data stressed that most of the respondents were construction workers and garbage collectors which implies that most of the residents depend their livelihood and source of income within the area.

5. Respondents' Annual Household Income

5.1 That most of the respondents from 0-100 meters, 100-200 meters, and 200-300 meters earn an annual household income within the bracket of Php 20,001- Php 50, 000 with a percentage of 40%, 50% and 60% respectively.

5.2 That most of the respondents are earning Php 20,001 to Php 50, 000 annually, which implies that they are marginalized.

6. Respondents' Highest Educational Attainment

6.1 The data shows that most of the respondents living 100-200 meters and 200-300 meters away from the dumpsite reached high school, with a percentage of 50% and 60% respectively.

6.2 That the respondents from 0-100 meters who only reached elementary and college has an equal percentage of 40%.

6.3 That the data stressed that most of the respondents finished high school which implies that most of the residents are educated.

7. Respondents' Length of Stay in Area

7.1 That the data pointed out that most of the respondents within 0-100 meters resided in Barangay Sangkol for more than 7 years.

7.2 That the respondents within 100-200 meters and 200- 300 meters resided within 4 to 6 years in the said barangay.

7.3 The data stressed that most of the respondents resided in the area for more than 7 years, which implies that most of the residents of Barangay Sangkol were natives to the area.

8. The Perception of the Respondents on the Environmental Pollution in terms of Air Pollution

8.1 That in the distance of 0-100 meters from the dumpsite, the average weighted mean of 3.13 indicates that most of the respondents frequently notice abundant presence of flies, mosquitoes, cockroaches, and other disease-carrying insects in the atmosphere followed by being bothered by the emissions and dust from the

transportation used to carry waste regularly, which can be verbally interpreted as "sometimes".

8.2 That in the distance 200-300 meters away from the dumpsite, the average weighted mean of 3.22 indicates that the respondents also observed animals such as birds, dogs and cats within the area, which can be verbally interpreted as "sometimes".

8.3 That in the distance 100-200 meters, the average weighted mean of 3.36 indicates that the respondents are always bothered by the emissions and dust from the transportation used to carry waste regularly, which can be verbally interpreted as "sometimes".

9. The Perception of the Respondents on the Environmental Pollution in terms of Ground and Surface Contamination

9.1 That the average weighted mean of 3.23 in the distance 0-100 meters, the respondents always observed the presence of earthworms in the soil compared to there are no wastes carried out during transportation of wastes to the dumpsite, which can be verbally interpreted as "sometimes".

9.2 That the average weighted mean of 3.12 in the distance of 100-200 meters, the respondents always observed organic wastes on the ground brought by the transportation of waste to the dumpsite, which can be verbally interpreted as "sometimes".

9.3 That the average weighted mean of 3.09 in the distance of 200-300 metres, the respondents only frequently observed organic wastes on the ground brought by the transportation of waste to the dumpsite, which can be verbally interpreted as "sometimes".

10. The Perception of the Respondents on the Environmental Pollution in terms of Water Contmination

10.1 That the average weighted mean of 2.89 in the distance of 0-100 meters, the respondents always observed that there are wastes that clog water canals in the area, which can be verbally interpreted as "sometimes".

10.2 That the average weighted mean of 2.44 in the distance of 100-200 meters, it was always observed that there are wastes that clog water canals in the area compared to utilizes water pump or deep wells, which can be verbally interpreted as "sometimes".

10.3 That the average weighted mean of 2.27 in the distance of 200-300 meters, the respondents also frequently observed that there are wastes that clog water canals in the area, which can be verbally interpreted as "sometimes".

11. The Perception of the Respondents on the Environmental Pollution in terms of the Dumpsite

    11.1 That the average weighted mean of 3.31 from the distance 0-100 meters, the respondents always acquired monetary income from the wastes coming from the dumpsite, which can be verbally interpreted as “sometimes”.

    11.2 That the average weighted mean of 3.17 from the distance 100-200 meters, the respondents also always acquired monetary income from the wastes coming from the dumpsite, which can be verbally interpreted as “sometimes”.

    11.3 That the average weighted mean of 2.98 from the distance 200-300 meters, the respondents only frequently acquired monetary income from the wastes coming from the dumpsite, which can be verbally interpreted as “sometimes”.

12. The Effects of Environmental Pollution Contributed by the Dumpsite to the Respondents in terms of Health Impact

    12.1 That the average weighted mean of 3.12 in the distance 0-100 meters, the respondents frequently experienced skin rash, skin allergies, skin diseases and other skin infections compared to premature birth, which can be verbally interpreted as “sometimes”.

    12.2 That the average weighted mean of 2.93 in the distance 100-200 meters, they frequently experienced asthma, cough, pneumonia, and other respiratory problems caused by smoke emissions of waste transport and unpleasant odor, which can be verbally interpreted as “sometimes”.

    12.3 That the average weighted mean of 3.08 in the distance 200-300 meters, the residents frequently experienced asthma, cough, pneumonia, and other respiratory problems caused by smoke emissions of waste transport and unpleasant odor, which can be verbally interpreted as “sometimes”.

13. The Effects of Environmental Pollution Contributed by the Dumpsite to the Respondents in terms of Lifestyle

    13.1 That the average weighted mean of 3.32 in the distance of 0-100 meters, the residents frequently maintains cleanliness in the surroundings compared to buying food products out of Barangay Sangkol, which can be verbally interpreted as “sometimes”.

    13.2 That the average weighted mean of 3.67 in the distance 100-200 meters, the respondents always use distilled or mineral water, which can be verbally interpreted as “frequent”.

13.3 That the average weighted mean of 3.33 in the distance 200-300 meters, the residents always maintain the cleanliness in the surroundings, which can be verbally interpreted as “sometimes”.

14. Significant Relationship between Perceptions on the Environmental Pollution of the Dumpsite and Respondents’ Profile

14.1 That there was a significant relationship between the profile of the respondents and their perception on the environmental pollution contributed by the dumpsite when grouped according to age.

14.2 That there was a significant relationship between the profile of the respondents and their perception on the environmental pollution contributed by the dumpsite when grouped according to educational attainment.

15. That there was a significant difference between perception of the respondents on the environmental pollution contributed by dumpsite and the effects of environmental pollution to the residents of Barangay Sangkol.

Conclusion

Based on the summary of findings it is safe to conclude that the continued open dumping in Barangay Sangkol was observed by the residents of the said area had a great effect on their environment, health, and lifestyle. The residents sometimes perceived that there is air pollution, ground, and water contamination, and thus there is a need to heighten the proper waste management of the dumpsite.

It is further concluded that the age and educational attainment greatly affects how they perceived the environmental pollution of the dumpsite, and there is also a significant difference between the perception of the residents on environmental pollution contributed by the dumpsite and the effects of the said environmental pollution.

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