CONTAMINATION OF WORM EGGS IN CABBAGE (BRASSICA OLERACEA) AND LETTUCE VEGETABLES (LACTUCA SATIVA) IN TRADITIONAL MARKETS OF MAKASSAR

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ABSTRACT

Helminthiasis is still a public health problem in the tropics right now, especially those caused by intestinal nematodes that are transmitted through soil or often called Soil-Transmitted Helminthes (STH), cabbage and lettuce are one of the vegetables that have the potential to contaminate Soil-Transmitted Helminth. The purpose of this study was to find out the types of worm eggs in cabbage (Brassica oleracea) and lettuce (Lactuca sativa) in the traditional markets of Daya, Tamamaung, Kalimbu, Sambung Jawa, and Hartako market in Makassar. The type of this research is descriptive research. Research locations were conducted in five traditional markets in Makassar, including Pasar Daya, Tamamaung, Kalimbu, Sambung Jawa, and Hartaco markets, as well as examinations carried out in the parasitology laboratory of the Environmental Health Department Makassar Health Polytechnic. The samples of cabbage and lettuce were 20 samples, 2 samples of cabbage vegetables and 2 samples of lettuce vegetables taken from each market. The results of this study showed that of the 20 samples of cabbage and lettuce which tested positive for worm egg contamination as many as 14 samples (70%). All samples of cabbage and four of lettuce contaminated with worms. Cabbage and lettuce were sold in the Daya, Tamamaung, Kalimbu, and Sambung Jawa markets more contaminated with worm eggs compared to the Hartako market. The researcher found Ascaris lumbricoides worm eggs on cabbage and lettuce samples. The conclusions obtained from the conducted research are all cabbage in the five traditional markets of Makassar contaminated with Ascaris lumbricoides and four of lettuce vegetables also contaminated with Ascaris lumbricoides worm eggs.

Keywords: cabbage vegetables and lettuce, worm eggs, Ascaris lumbricoides

INTRODUCTION

Worm infection is a health issue that is still prevalent in developing countries, including Indonesia. Worm infections are the most common worm infection of Soil-Transmitted Helminth (STH) because it infected more than 1.5 billion people (24% of the world population) mainly children of school age (Adrianto, 2017).

Indonesian community, in general, are accustomed to consuming raw vegetables as a fresh vegetable mix with other food. When the vegetables cooked with enough heat, it should not cause any problem. Problems arise when the vegetables are eaten without cooking it first. In this case, along with the vegetables usually participate bacterial, or parasitic pathogens that sooner or later will lead to illness. The eating habit of consuming raw vegetables has become a community habit in Indonesia and it seems difficult to change (Lobo, et al., 2016).

One type of vegetable that is often contaminated by the Soil-Transmitted Helminths (STH) is cabbage. Cabbage (*Brassica oleracea)* is a vegetable that is generally consumed raw, as seen from the texture and organoleptic these vegetables seem as fresh and interesting. Vegetables cabbage leaf surfaces have squiggly allowing the worm eggs to settle in it (Nitalessy et al., 2015)

METODE

Design, place, and time

Type research was an observational, descriptive to describe the results of the examination of worm eggs on cabbage and lettuce sold in some traditional markets Makassar. Location of the study was conducted in five traditional markets, the market in Makassar namely Daya market, Kalimbu market, Hartaco market, Tamamaung market, and Sambung Jawa market. Collecting and examining of these vegetables was carried out in April 2019.

The population in this study were all cabbage and lettuce sold in the Makassar traditional market, where in Daya market there were 12 vendors selling cabbage and 4 merchants lettuce, in Tamamaung market there were eight vendors selling cabbage and 4 lettuce merchants, in Kalimbu market there were 37 vendors selling cabbage and 8 lettuce green grocers, in Sambung Jawa market, there were 20 vendors selling cabbage and there were 6 lettuce traders, as well as at Hartaco market there were 22 vendors selling cabbage and 5 lettuce merchants**.**

The sample in this study was taken from Daya market cabbage 2 pieces and lettuce 2 pieces, Tamamaung market

cabbage 2 pieces and lettuce 2 pieces, Kalimbu market cabbage 2 pieces and lettuce 2 pieces, Sambung Jawa market cabbage 2 pieces and lettuce 2 pieces, as well as Hartaco market cabbage 2 pieces and lettuce 2 pieces, the number of samples representing the amount of the overall population, selected by non probability sampling using purposive sampling technique. The place where vegetable placed was considered when taking sample of this study, only vegetable stored on the shelves or clean vegetables taken as a sample, while vegetables laying on the ground or soil surface excluded in this study.

Primary data were obtained from the results of laboratory tests on cabbage worm eggs and observations conducted using the observation sheet. Secondary data obtained by reference to the previous research results, reports from the mass media, the internet, some books and literature - other literature related to the research.

The data were analyzed by descriptive results based on field observations and examination of worm eggs on cabbage and lettuce in the laboratory. The results was presented using table and descriptive narration then be concluded.

RESULTS

Based on research conducted on April 2019 on cabbage and lettuce in some traditional markets in Makassar, there are five traditional markets namely Daya market, Tamamaung market, Kalimbu market, Sambung Jawa market, and the Hartaco market. There were 20 vegetable samples taken from these five markets where each taken 2 pieces of cabbage and 2 pieces of lettuce using purposive sampling technique. Cabbage were taken from these five markets have been traced its derived from other region out of Makassar such as Enrekang, Malino, Tombolo Pao, Tinggi Moncong and Bungaya while lettuce came from the area Malino, Bungaya, Malakaji, Jeneponto, and Maros.

Table 1.
Contamination Of Worm Eggs In Cabbage Vegetables (Brassica Oleracea) And Lettuce Vegetables (Lactuca sativa) In Traditional Markets Makassar

No.	Worm Egg Contamination	Frequency	Percentage (%)
1	Contaminated	14	70
2	Not contaminated	6	30
	Total	20	100

Table 2.
Type Contamination Of Worm Eggs In Cabbage Vegetables (Brassica Oleracea) and Lettuce Vegetables (Lactuca sativa) In Traditional Markets Makassar

No.	Market	Cabbage vegetable		Lettuce		Information
		+	-	+	-	(+) *Ascaris lumbricoides*
1	Daya	2	0	1	1	
2	Tamamaung	2	0	1	1	
3	Kalimbu	2	0	1	1	
4	Sambung Jawa	2	0	1	1	
5	Hartako	2	0	0	2	
	result	10	0	4	6	

Type Worm Eggs On Cabbage and Lettuce Vegetables sold in Daya Market

Based on the results of the examination of worm eggs on cabbage and lettuce sold in the Daya market of Makassar, there were two samples of cabbage and two samples of lettuce were taken from this market, in the laboratory examination, it was found that 2 pieces of vegetable cabbage samples were positive contaminated by

eggs of *Ascaris lumbricoides* whereas two lettuce samples taken from this market only one positive contaminated by eggs of *Ascaris lumbricoides*.

Type Worm Eggs On Cabbage and Lettuce Vegetables sold in the Tamamaung Market

Based on the results of the investigation of worm eggs on cabbage and lettuce sold in the Tamamaung market of Makassar, there were two samples of cabbage and two samples of lettuce were taken from this market, in the laboratory investigation, it was found that 2 pieces of vegetable cabbage samples were positive contaminated by eggs of *Ascaris lumbricoides* whereas two lettuce samples taken from this market only one positive contaminated by eggs of *Ascaris lumbricoides*.

Type Worm Eggs On Cabbage and Lettuce Vegetables are sold in the Kalimbu Market

Referred to the results of the examination of worm eggs on cabbage and lettuce sold in the Kalimbu market of Makassar, there were two samples of cabbage and two samples of lettuce were taken from this market, in the laboratory examination, it was found that 2 pieces of vegetable cabbage samples were positive contaminated by eggs of *Ascaris lumbricoides* whereas two lettuce samples taken from this market only one positive contaminated by eggs of *Ascaris lumbricoides*.

Type Worm Eggs On Cabbage Vegetable and Lettuce sold in Sambung Jawa Market

Table 2 above showed the results of the investigation of worm eggs on cabbage and lettuce sold in the Sambung Jawa market of Makassar, there were two samples of cabbage and two samples of lettuce were taken from this market, in the laboratory investigation, it was found that 2 pieces of vegetable cabbage samples were positive contaminated by eggs of *Ascaris lumbricoides* whereas two lettuce samples taken from this market only one positive contaminated by eggs of *Ascaris lumbricoides*.

Type Worm Eggs On Cabbage and Lettuce Vegetables sold in the Hartako Market

Based on the results of the examination of worm eggs on cabbage and lettuce sold in the Hartako market of Makassar, there were two samples of cabbage and two samples of lettuce were taken from this market, in the laboratory examination, it was found that 2 pieces of vegetable cabbage samples were positive contaminated by eggs of *Ascaris lumbricoides* whereas no contaminated found over two lettuce samples taken from this market.

DISCUSSION

Type of Worm Eggs on Cabbage and Lettuce Vegetable sold in Daya Market

From the results of the sample inspection over cabbage and lettuce were carried out in the laboratory of health environment department of Makassar Health Polytechnic, the type of eggs of Ascaris lumbricoides was found against cabbage and lettuce. The results of observations carried out in the Daya market of Makassar, the conditions of the market environment was dusty, close to the highway where frequently traveled by the vehicle. Potential contamination come from the dust contained worm eggs blown by the wind and then attached to the vegetables, due to the market was located out door that potentially exposed to dust, in addition, pedestal or table used to put cabbage and lettuce a bit dirty. This could be one factor causing the contamination of the eggs of *Ascaris lumbricoides* in cabbage and lettuce.

Storage cabbage was placed in the open and not clean place. This could be contaminated by worm eggs. Worm eggs in the soil or dust will contaminate vegetables if it was blown by the wind. Besides that, the transmission of the worm eggs can also be through the previously flies landed on the ground or dirt, their legs carrying worm eggs and contaminate vegetables that was not covered during its sold in the market.

Contamination of worm eggs on cabbage and lettuce were allegedly also can occur from production to sale in the market. Contamination can occur through the alleged production of soil that has been contaminated feces or water used for watering comes from the gutter. Soil contaminated with feces due to the use of excreta as fertilizer.

Type Worm Eggs on Cabbage and Lettuce Vegetables sold in the Tamamaung Market

From the results of the sample inspection toward cabbage and lettuce from the Tamamaung Market, the type of contamination found was eggs of Ascaris lumbricoides. This contamination probably occured through air contamination. The observation results was performed in the Tamamaung market Makassar showed that this market located next to the Pettarani main road which is one of the most busy and jammed street in Makassar each day, based on this observation, the potential contamination may come from the dust blown by wind and then attached on vegetables, in addition, vegetables was taken as a sample from this market were cabbage and lettuce, were placed on the base adjacent to the flooded / watery soil so that the potential of vegetables exposed to splashing water flooded / watery soil from vehicles or pedestrians can be a factor this worm egg contamination in vegetables.

Vegetables cabbage and lettuce were stored in the open and not clean can be contaminated by worm eggs. Worm eggs in the soil / dust will be existed on food if blown by the wind. In addition, transmission of the worm eggs can also be through the previously flies landed on soil / dirt, so that the flies that carry the worm eggs will contaminate foods that are not covered.

Type Worm Eggs on Cabbage and Lettuce Vegetables sold in the Kalimbu Market

From the results of the sample inspection; cabbage and lettuce from traditional Kalimbu market, the researcher found eggs of Ascaris lumbricoides contaminate all of cabbage and one of lettuce sample.

Based on the market environmental observation performed by researcher during sample collection, the contamination may be caused through dust or air contamination. This presumption stated because this market located closed to the road that always be passed the vehicle, especially if dust and dirt contained worm eggs blown by the wind and attached to the vegetables. Some trader locations of vegetables were in the outdoor and adjacent to the stagnant water / muddy. Vegetables especially laid out near the soil surface were exposed to splashing wear pads allowing stagnant water / muddy so be factors that cause the presence of eggs of Ascaris lumbricoides in vegetables.

Storage of cabbage placed in the open and not clean can be contaminated by worm eggs. Worm eggs in the soil or dust will be flown on food/vegetables if it blown by the wind. Besides the transmission of the worm eggs can also be through the previously flies landed on the ground or dirt, so their legs carrying the worm eggs and contaminate foods/vegetables that are not covered.

Type Worm Eggs on Cabbage Vegetable and Lettuce sold in Sambung Jawa Market

From the results of the sample inspection; cabbage and lettuce taken from Sambung Jawa traditional market, the researcher obtained any kind of eggs of Ascaris lumbricoides. Based on the observations of market environment performed, this contamination may occurred because of the sampling sites adjacent to the stagnant water / muddy allowing the vegetables exposed to water splashes muddy especially vegetables that were placed near on the ground surface, the vegetables were placed on the table is contaminated by worm eggs because the condition of the table were dirty, there are land and small impurities on the table so that it may became a factor contributed to the presence eggs of Ascaris lumbricoides in the vegetables.

Helminth egg contamination in vegetable planting may occur from the land itself and the place to sell the vegetables. Sources of contamination of worms in vegetable planting land are very varied, ranging from land, water, fertilizer, and humans. Vegetable planting land can be a source of transmission of the helminth. This worm causes fertile and moist soil suitable for growing vegetables. Vegetables are a medium that is suitable for the development of the worm. The source of water used for watering and fertilize vegetables are also influential. Bowel habit in the land and the use of feces as fertilizer garden (in different areas) is important in the spread of infection.

Type Worm Eggs on Cabbage and Lettuce Vegetables sold in the Hartako Market

From the results of the sample inspection toward cabbage and lettuce in Hartako or Parangtambung traditional market, we found eggs of Ascaris lumbricoides in cabbage only. Field study by observation of market condition showed that contamination may occure because of the sampling sites adjacent to stagnant water / muddy, especially vegetables that were placed on the above ground wear mats. These allowing vegetables exposed to splashes of water that flooded / wet as well as pedestal or table that is used to put cabbage a bit dirty. This could be one factor in the contamination of the eggs of Ascaris lumbricoides in cabbage, while lettuce was not contaminated by worm eggs due to conditions of lettuce was clean and trader location were away from dusty areas and there was no water flooded/muddy adjacent.

Contamination of eggs intestinal nematodes transmitted through the soil on vegetable cabbage and lettuce can be caused by various factors, among others, there are the natural factors. Natural factors include soil, climate, humidity, and temperature. The tropical climate is one of the factors affect the growth and development of intestinal nematode eggs, other natural factors are the state of the soil can be a media development, eggs life, and larval development.

CONCLUSION

Based on the research results, it can be concluded that the type of worm eggs found in samples of cabbage and lettuce in the Daya Market Makassar ie eggs of Ascaris lumbricoides. The type of worm eggs found in samples of cabbage and lettuce in the of Tamamaung Market Makassar ie eggs of Ascaris lumbricoides. The type of worm eggs found in samples of cabbage and lettuce in the Kalimbu market of Makassar ie eggs of Ascaris lumbricoides. The type of worm eggs found in samples of cabbage and lettuce in the Sambung Jawa market Makassar ie eggs of Ascaris lumbricoides. The type of worm eggs found in samples of cabbage in the Hartako market Makassar ie eggs of Ascaris lumbricoides while samples of lettuce not contaminated by worm eggs.

The community should pay attention to the hygiene of vegetables in the processing especially cabbage and lettuce before consumed, such as by washing with running water and cook vegetables optimally so that the worm eggs can be damage. Vegetable traders should choose a location away from sources of pollution such as a dusty location or a location adjacent to the stagnant water/muddy. The next researchers are needed to conduct research to identify the source where cabbage and lettuce cultivated to discover the causes of the presence of worm eggs on vegetables.

REFERENCES

Adrianto, Hebert. 2017. Contamination in Vegetables and Eggs Worm Prevention Efforts. Journal Vol (13) No 2. ISSN: 105-114. (On line). https://www.neliti.com/en/ publications/222703/contamination-ova-in-vegetable-and-effort-prevention, (Of action s On December 6, 2018).

Inayah and Djoko Purwoko. 2016. Practice Guidebook Parasitology. Makassar: Makassar Health Polytechnic Department of Environmental Health.

Lobo, Leonardo Taruk, et al. 2016. Contamination of soil-transmitted worm eggs Helmints (STH) at Basil Vegetables Grill Fish Merchants in Palu, Central Sulawesi.Journal Vol (26) No 2: 65 - 70. (Online). jkb.ub.ac.id/index.php/jkb/article/download/2184/652. (In Access December 6, 2018).

Nitalessy, Rina et al. 2015. Intestinal helminth egg contamination Presence In Vegetables basil (*Ocimum basilicum*) and Cabbage (*Brassica oleracea*) provided to be consume with chicken for dinner at Foodcourt in Piere Tendean Street Manado 2015, Faculty of Public Health, University of Sam Ratulangi. Manado. (On line). Access www.ejournalhealth.com/ index.php/ikmas/article/download/573/561. (December 6, 2018).

Republic of Indonesia. 2017. Ministry of Health Regulation No. 15 about Combating Worms. The Ministry of Health of the Republic of Indonesia. Jakarta.