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Parasitic Infections among The Refugee of The UNHCR in Ciputat, and Related Risk Factors to The Diseases

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Abstrak

Background: Parasitic infections are reported in the most recent years as the disease infected among the refugees from countries with war conflict in Asia and Africa. Several factors have reported as causative agents and routes of transmission of the disease. Objective: to provide epidemiological data of parasitic infections among the UNHCR refugees with some aspects of socio-behavioral and medical history as risk factor to the disease. **Method:** The design of the study was cross-sectional with a total sampling of the refugees visiting the Puskesmas Pisangan, Ciputat, South Tangerang. We conducted blood diff-count, microscopic examination, and rapid diagnostic tests for the blood; feces by microscopic; while for urine was assayed by dipstick and bacterial culture. **Result:** The study revealed that there were evidences of parasitic infections in : one patient with positive malaria vivax, one positive patient with non-specific bacteria in urine and with an increased number of leucocyte in the blood (Leucocytosis), also two subjects with higher titer of thrombocyte in their blood (thrombocytosis). Meanwhile, the medical history and transmission profile of the diseases, cultural, social behavior, and other related risk factors to the diseases have shown no strong evidence as a potential disease's transmission of the parasite from the refugees to their indigenous community. **Conclusion:** The study has concluded that the evidence of parasitic infections might be at risk of disease's transmission

Introduction

United Nations High Commissioner for Refugees (UNHCR) in Indonesia was established since 1979. Since then, the country has a long hosting for refugees and people in need from different countries of conflict under international protection and care. Today, it is registered about 14.000 refugees in Indonesia, which 29% among them are children. By December 2018, UNHCR reported that most of the refugees came in Indonesia is from Afganistan (55%), Somalia (11%), and Myanmar (6%).[1]

There are several reports on the prevalence of intestinal parasitic infections among refugees from Palestine, Syria, Iraq, Turkey, and other African refugees. High prevalence of 17.99% intestinal parasite was reported from Gaza refugees, such eight parasites were identified 3 protozoan (*Entamuba histolytica, Giardia lamblia, and Entamuba coli*) and 5 helminths (*Ascaris lumbricoides,Trichuris trichiura, Strongyloides stercoralis*, *Enterobius vermicularis* and *Hymenolepis nana*) were identified.[2] While people arriving from sub-Saharan Africa had the highest prevalence of most diseases, with 8% having malaria,

7% Schistosomiasis, 5% hookworm, and 2% Strongyloidiasis.[3] *Strongyloides sp* infection was found in 3% of tested patients, with higher rates among refugees from Africa (6%, p = 0.003). *Schistosoma sp* infection was identified in 15% of patients from Africa. While intestinal parasites were identified in 16% of patients who submitted stool samples.[4]

This aggregated distribution is probably due to a complex combination of factors related to exposure infection, e.g.: environmental and host behavior and factors related the host's ability to resist infection such as the genetic constitution and immune responsiveness.[5] Intestinal parasites are widely prevalent in developing countries due to poor sanitation, and inadequate personal hygiene.

By the beginning of 2016, more than 4.6 million Syrians had crossed international borders since the civil war began in Syria in 2011. Most of these refugees are currently in Turkey (> 2 million), as well as in Lebanon, Jordan, and Iraq.[3] In the most recent years, several data have been reported regarding the detection of parasitic infections among refugees from countries with war conflict in Asia and Africa. Intestinal parasites are considered one of the higher mortality factors causing malnutrition and anemia among children in Gaza. Refugees living in camps are found the low standard of living due to lack of sanitary services and spread of unemployment.[5]

Access to healthcare is an important part of the humanitarian response to this crisis. To date, there is a lack of epidemiological or clinical data that can be used to guide screening for the most prevalent health conditions in this large refugee population. The study will conduct coordination between all local health takers and the district health department in South Tangerang to provide and develop the epidemiological and clinical data among the refugees detained in this area. This study highlights the importance of screening for infectious diseases among refugee patients to provide timely preventive and curative care. The data also point to the possible policy and clinical implications, such as targeted screening approaches and improved access to vaccinations and therapeutics.

Lack of the data and information from the local health takers in Tangerang Selatan and national publication in Indonesia, may role an obstacle to initiate a better understanding about the diseases among the refugees. The objective of the study is to provide clinical and epidemiological data of parasitic infections among the UNHCR refugees in Ciputat area, and to see the transmission profile of the diseases with several aspects of medical history, cultural and social behavior, as well as the other related risk factors to the diseases.

Method

The design of the study was approached by cross-sectional, with total sampling from all attendance refugees visiting the Puskesmas Pisangan Timur, Ciputat. Out-patient refugees at the Puskesmas were collected for their stool, blood, and urine samples. The samples were processed and analyzed at the laboratory of Parasitology in UIN Syarif Hidayatullah, by microscopic examination and rapid diagnostic test. While the blood diff-count was conducted at the laboratory of Puskesmas Pisangan.

All attendance refugees visiting Puskesmas Pisangan Timur were asked for their agreement by signing up the informed consent. Meanwhile, we collected samples and performed some tests for the intestinal parasite through a stool microscopic, for the blood parasite utilized microscopic and rapid test, and for urine samples were checked by dipstick and media culture.

The respondent should be required to fulfill questioner for subject analysis of their socio-demographic characteristics, the background of nation, race, and religion, history of endemic disease from the original country and profile of illness, and their activity during detention in Indonesia. For the children participant, parent should assist the interview for the questionnaire. Some procedures were conducted on different sample types during sample collection and laboratory examination as following steps in

For malaria, we utilized the combo rapid test by PALUTOP+4, OPTIMA^{R} Strasbourg-France, which have 4 indicators of control, Pan malaria, *Plasmodium vivax*, and *Plasmodium falciparum*. While for confirmation of bacteria specific in urine, we use Mac Conkey by Merck as selective and differential culture medium agar for bacteria, to isolate *Eschericia coli* O157.[6] Descriptive analysis were included these measurements of socio-demographic characteristics (age, sex, the region of birth, race, nation, religion, and family background), medical history, route of infection, social and cultural aspects. While quantitative analysis by means to measure: microscopic and rapid test result, as well the correlation between the sample examination result and the sociodemographic.

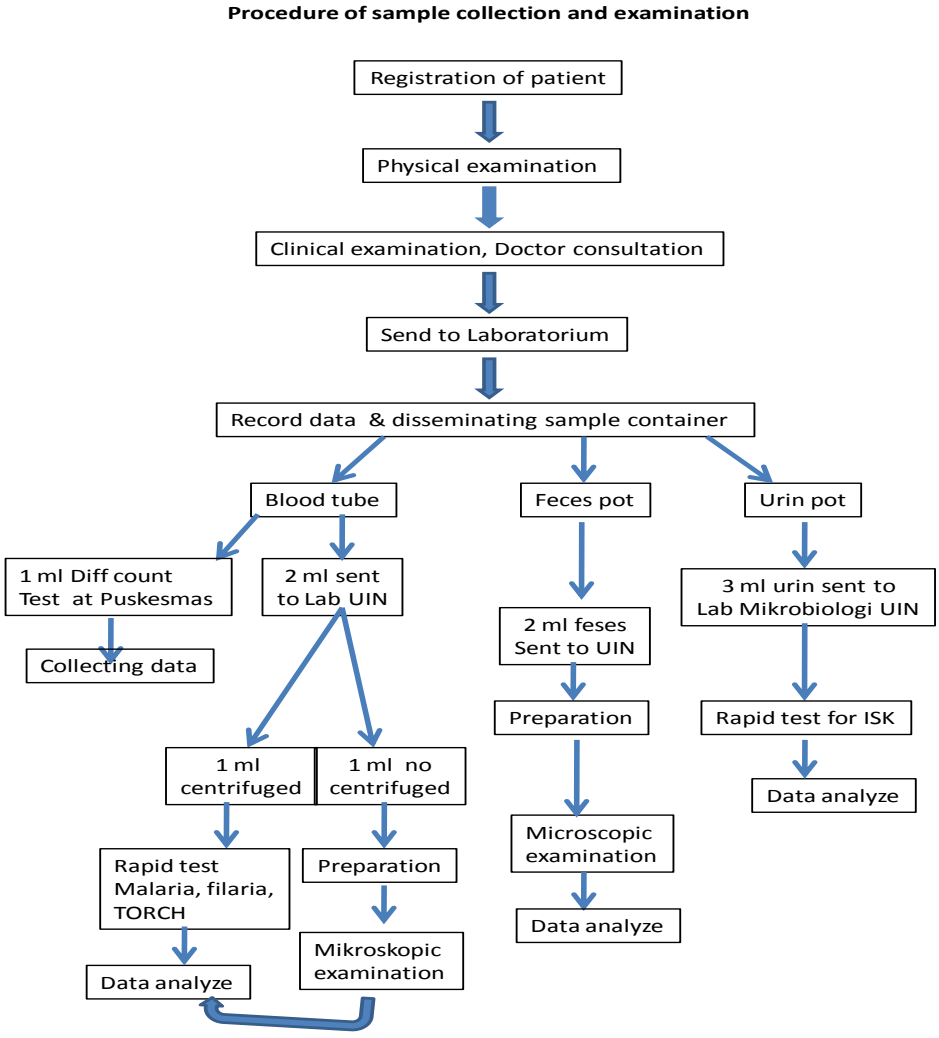

Figure 1. The procedure of sample collection

Results

We interviewed 21 subjects but only 10 people have returned the complete questionaires. Among those 21 subjects, we have collected samples of 21 blood, 15 urine, and 2 feces. The finding results of the study was described in the following data on table 1 to 5. On the Table 1, it shows the characteristic of subjects, which most of our respondents (23.8% or 5/21) came from Iraq, Afganistan, Somalia, Nigeria, respectively, while the other 38.1% was unknown nationality. According to previous reports, the origin of country of the refugees seemed to correlate with the parasite infection burden within the refugees. For example, pathogenic intestinal parasites were found in 40.6% of the 956 African asylum seekers coming from areas south and east of the Sahara[7], and helminthiasis infections (strongyloidosis, Schistosomiasis) was identified in 15% of patients from Africa.[4] Meanwhile, according to Benzequir et.al., refugees coming from South East Asia, Africa and Latin America were found parasitic infection rates 48%, 43% and 42%, respectively of the 1377 samples, than in those from Eastern Europe (22%) and the Middle East (32%).[8]

Table 1. Characteristic of subjects

Characteristic (N=20)	(%)
Nation*ality*	
Somalia	14.3
Afganistan	19
Iraq	23.8
Ethiopian	4.7
Others (No data)	38.1
Age	
Toddler (1 – 5 yo)	14.3
Kids (6 – 16 yo)	19
Adult (> 17 – 60 yo)	66.7
Sex	
Female	47.6
Male	52.38
BMI (Body Mass Index)	
Normal	
Underweight	50
No data	50
Profession	
Unemployment	100
Education Background	
College / University	100

Among these 21 people were aged above 17 to 60 years old and were male (52.38%) as our major respondents, and only 14.3% are children under 5. Children aged between 3 years and above were the most affected group and the infection rate was highest among the illiterate, overcrowded and large sized families. Among 298 stools specimens were examined: 116 were positive for a single parasite, while samples from 15 children showed ova and cysts for two types of parasites giving a prevalence rate of 44%. The commonest infestations were Giardiasis (21.1%), Taeniasis (10.4%) and Enterobiasis (7.4%).[9] Somehow, we found no parasitic infection was determined in our fecal samples from the children on this study.

As our observation in the Puskesmas, we notified that male and female subjects were even in numbers, but male seems more responsive to the interview than female. Westerhuis and Mank had reported that sex, age and area of origin were important indicators for the species of parasite. On the basis of this, the screening for potentially pathogenic intestinal parasites can be provided by selecting the risk factor groups.[7] We also identified other characteristics of the subjects on the table 1. But, we found incomplete data that filled in the questionnaires.

For example in the group of measurement of Body Mass Index (BMI), there was only 50% of the respondent had written their body weight and height in the questionaire, which the BMI was classified as an underweight group, while the other 50% had no data on it. Other than it, 100% of the respondents are unemployment, but they have higher education in college/university. We have noticed that most of the refugees have a language barrier to understand the questionnaire, whether it is written in English or Bahasa Indonesia. Hence, the quality and validity of the questionnaire were unsatisfactory.

Table 2. Medical History

Clinical Symptom / Diseases (N=20)	(%)
Diarrhea during the last 6 months	40
Dysentry	10
Fever > 37ºC	20
Diarrhea with vomit, headache, worm in feces, jaundice, anemia, stomachache	30
Anti-diarrhea consumption	30
Loss weight during the last 3 months	20
Allergic symptoms	30
Hospital Care history	20
Malaria	10
Filariasis	10
Trypanosoma	0
Helminth infection	0
Anti-helminth, anti-malaria, antibiotic	0
Urinary infection	10
Vaccination in Indonesia	0
Malnutrition	10
Skin diseases	0

As we can see from table 2, we found that most of the disease (40%) were diarrhea, and 30% of it has accompanied symptoms by fever, vomit, headache, helminthiasis, jaundice, anemia, and stomach ache. Among those, only 30% have treated their selves with anti-diarrhea, while the second most reported case was allergic symptoms. However, we did not conduct any allergic tests on this study, but we need the data to investigate the correlation between the clinical symptom and the laboratory result. The other study of retrospective cross sectional which was conducted between October 2014 and April 2016 included 154 refugees in Germany, only 12.3% of all participants had no clinical finding at arrival. Main health findings were skin diseases (31.8%), and mental disorders (25%).[10] It seems contrary to the finding result in our study which no skin diseases was detected.

In correlation to BMI data of 50% of the respondents with underweight, we can see that 20% of them have lost weight during the last 3 months. However, we found no evidence of the malnutrition case nor the helminthiasis, by their sample test. No further information we have followed to provide a better explanation about it. Nevertheles, there was no significant association between undernutrition and the overall prevalence of intestinal infestations, although Giardia lamblia significantly affected the undernourished group.[9]

The data in table 3 shows that vector and soil transmission helminth respectively were identified as the major (50%) route of infection among the refugees. The finding result from our survey in terms of vector transmission was that an abundant population of mosquitoes had pullulated during the hot season when we conducted the study. While the other route of transmission was by soil helminth.

Table 3. Route of Infection

Media or Vector transmission	(%)
No Clean water access	0
No Toilet access	30
Food-borne	10
Water-borne	0
Airborne (No proper ventilation)	30
Sanitation	30
Vector of mosquito	50
Personal hygiene	20
Pets transmission	20
Rats transmission	20
Cattle transmission	0
Soil transmission helminth	50

Table 4. Religion, Social, and Cultural Aspects

Religion, Social, and cultural Aspects	(%)
Religion / Faith	80
Food Restriction	40
Social Interaction restriction	0
Interaction barrier between male and female	0
Interaction barrier to native community	0
Circumcision	20
Social conflict between the refugees	0
Social conflict to the native community	0
Number of family member at home > 4 people	5

In observation of socio-demographic and social-behavior among the refugees, the children held in detention had significantly more social, emotional and behavioral difficulties than children living in the community. Statistically significance in differences between the community and detention children is marked and arguably demonstrates the negative impact of post-arrival detention in children. Most refugee children have developmental and well-being outcomes within the normal range by year 3. However, a minority of children have persistently poor social-emotional outcomes.[11,12]

As we can see in the table 4, most of the respondents are Muslim (80%) but only 20% of them had reported practicing circumcision for their children. In term of social-behavioral aspects, there is no social conflict among the refugees as well as their interaction with the neighbourhood of the native community. Children and adults of the refugee have been living in harmony with no interaction barrier with their neighbourhood. They also send their children to public school and let their children play and have daily interaction with their neighbourhood.

In table 5, we found that one patient was indicated suffering by malaria infection of *P. vivax*. The result had confirmed both with microscopic as the gold standard for parasitic identification and rapid diagnostic test (RDT). Unfortunately, we have no information about the origin country of the subject, nor clinical history about the disease.

Table 5. Parasitic Examinations

Amount of Result of Sample Test	
Urinary infection	1 positive, non specified bacteria
Intestinal infection	None
Malaria	1 positive, Malaria vivax
Filaria	None
Blood Count Diff	1 Leucocytosis with non-specified bacterial infection, 1 patient with thrombocytosis

Meanwhile, in the urine test, we found one patient with a higher value of positive result for leucocyte and nitrite. We have interpreted that the patient was infected by unspecified bacteria in the urine. This finding was matched with 10% of urinary infection data in table 2. Furthermore, we have conducted a bacteria culture by Mac Conkey to confirm a specific bacterial for *Escherichia coli* 0157 infection in the urine.[6] However, we found no colony growth on the culture media. More assay will be required to investigate other bacterial infection in the urine. Among our six pediatric patients, only two patients have given a fecal sample to examine. The finding result has revealed no intestinal parasitic infections in the sample. The similar result in the Table 2 showed that zero case of helminth infections were found among the respondent.

The blood diff-count test had indicated one adult patient with an urine infection by *E. coli*, had shown an increased number of leucocyte at 13.800 /uL. While two patients of aged 1 and11 years old were detected an increased titer (647.000 and 481.000/µL) of thrombocyte in their blood.

Discusion

The previous study by Paxton et.al had reported that in the blood test result, the prevalence of positive test results related to the parasitic infections on refugee health screening as following described: anemia 9.2%, microcytosis 19.1%, iron deficiency 13.1%, low vitamin B(12) 1.5%, low folate 1.5%, eosinophilia 14.4%, *Schistosoma sp* infection 7%, *Strongyloides sp* infection 20.8%, malaria 0.2%, fecal parasites 43.4%.[13] Other study had also reported similar finding of 8% having malaria, 7% schistosomiasis, 5% hookworm, and 2% strongyloidiasis from refugee of sub-Saharan Africa.[14]

Finding result of this study had revealed that malaria is one of the common parasitic infections among the refugees. The typical *P. vivax* from our subject was identified as imported malaria from Africa. The case

should be reported to the local health care to provide health screening and a better service to improve access to vaccinations and therapeutics for the local community.

However, we concern about how to early detection and prevention on the transmission of the diseases among the refugees and their community. WHO does not recommend obligatory screening of refugee and migrant populations for the diseases, because there is no clear evidence of benefits (or cost–effectiveness); furthermore, it can cause anxiety in individual refugees and the wider community.[15] Medical check-up should be performed for both communicable diseases and non-communicable diseases (NCDs), while respecting the human rights and dignity of refugees and migrants.[16] Demographic information and prevalence of parasitic infections had offered a preventive program and an implication for primary care provider.[17]

The study has also revealed the evidence of unspecified bacteria in urine with leucocytosis, and other case of thrombocytosis (table 5). However, there was no patient showed a significant clinical symptom of any health problem. A further confirmation test should be performed to follow up on the parasitic infection for these two patients. Meanwhile, the questionnaire data in the table 4 should be related to only 20% of subjects performing circumcision in their culture. But this had shown no strong evidence as the risk factor of urinary infection.

In term of potential vector transmission, our survey had identified *Culex quinquefasciatus* which had pullulated during the hot season and *Aedes aegypti* during the rainy season in the study area. The vectors are transmitter potential for filariasis and dengue fever which is reported as an endemic in this area with the prevalence of microfilaria was arranged at 1-2.4%. Nasution, SF had also reported that 38.89% DNA expression of *L3-activated cuticulin transcript m*RNA was detected in *Culex quinquefasciatus* from this area, which determine as filariasis vector.[18,19] The questionnairy data from the table 2 has described 10% of malaria infected subject and 10% of filariasis, which is potentially indicated as source of infection to the community. But no evidence of filariasis was found in our samples.

Meanwhile, another potential parasite to cause 40% infected diarrhea as shown in the table 2 should be related to 50% of soil transmission helminth which is shown in table 3. Related study around the area of Ciputat had reported that 31.7% infected student by helminthiasis (*Ascaris lumbricoides* 78.57 %, *Moniliformis moniliformis* 50%, hookworm 7.14%), and 1.7% was infected by intestinal protozoa.[20] This case was also related with some aspects as the route of transmission such: no toilet access, food-borne, sanitation, personal hygiene, and soil transmission helminth. But, this 40% subjects did not provide their fecal samples to examine. Therefor, we can not be assure to confirm the data. We observed that the children have spent their activities outside with no footwear on. The parasites had found their entry point of transmission to human by skin pore of legs and found their way to infect and build the life cycle in the human body.

Conclusion

The study has concluded that the evidence of parasitic infections which determined as *Plasmodium vivax* infection in blood smear and the unspecified bacteria infection in urine, might be potential risk of parasitic disease's transmission and should be prevented by a proper response of health services. While the aspects of religion, culture, social behavior, have shown no strong evidence as the potential disease's transmission from the refugees to the local community.

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Reference

1. UNHCR. UNHCR in Indonesia [internet]. Indonesia: UNHCR; 2020 [updated 2019 December; cited 2020 Jan 11]. Available from: https://www.unhcr.org/id/en/unhcr-in-indonesia
2. Al-Shawa R. *Intestinal Parasites Infections In Refugees Camps In The Gaza Governorates, Palestine*. The Internet Journal of Parasitic Diseases. 2006;1(2):1-4.
3. Martin JA, MakDB. Changing faces: A review of infectious disease screening of refugees by the Migrant Health Unit, Western Australia in 2003 and 2004. Med J Aust .2006. Dec4-18;185(11-12):607-10.
4. Redditt VJ, Janakiram P, Graziano D, Rashid M. Health status of newly arrived refugees in Toronto, Ont: Part 1: infectious diseases. CanFam Physician. 2015 Jul;61(7):303-9.
5. Mockenhaupt FP, Barbre KA, Jensenius M, Larsen CS, et.al. Profile of illness in Syrian refugees: A GeoSentinel analysis, 2013 to 2015. Euro Surveill. 2016;21(10):1-5.
6. MacConkey AT. Lactose-Fermenting Bacteria in Faeces. J Hyg (Lond). 1905 Jul;5 (3):333–79.
7. Westerhuis JB, Mank TG. Intestinal parasite in African asylum seekers : prevalence and risk

factors. Ned TijdschrGeneeskd. 2002 Aug 10;146(32):1497-501.
8. Benzeguir AK, Capraru T, Aust-Kettis A, Björkman A. High frequency of gastrointestinal parasites in refugees and asylum seekers upon arrival in Sweden. Scand J Infect Dis. 1999;31(1):79-82.
9. Karrar ZA[1], Rahim FA. Prevalence and risk factors of parasitic infections among under-five Sudanese children: a community based study. East Afr Med J. 1995 Feb;72(2):103-9.
10. Kloning T, Nowotny T, Alberer M, Hoelscher M, Hoffmann A, Froeschl G. Morbidity profile and sociodemographic characteristics of unaccompanied refugee minors seen by paediatric practices between October 2014 and February 2016 in Bavaria, Germany. BMC Public Health. 2018 Aug 7; 18(1): 983. doi: 10.1186/s12889-018-5878-7.
11. Zwi K, Rungan S, Woolfenden S, Williams K, Woodland L. Refugee children and their health development and well-being over the first year of settlement: A longitudinal study. JPaediatric Child Health. 2017 Sep; 53 (9): 841-849
12. Zwi K, Mares S, Nathanson D, Tay AK, Silove D. The impact of detention on the social-emotional wellbeing of children seeking asylum: a comparison with community-based children. Eur Child Adolesc Psychiatry. 2018 Apr; 27 (4): 411-422.
13. Paxton GA, Sangster KJ, Maxwell EL, McBride CR, Drewe RH. Post-arrival health screening in Karen refugees in Australia. PLoS One. 2012 ; 7 (5) : 1-7
14. Martin JA[1], Mak DB. Changing faces: A review of infectious disease screening of refugees by the Migrant Health Unit, Western Australia in 2003 and 2004. Med J Aust. 2006 Dec 4-18; 185 (11-12): 607-10.
15. WHO. Migration and health [internet]. Copenhagen: WHO; [updated 2019 December; cited 2020 Jan 11]. Available from: http://www.euro.who.int/en/health-topics/health-determinants/migration-and-health/migrant-health-in-the-european-region/migration-and-health-key-issues#292934
16. Ash LR, Orihel TC. Atlas of Human Parasitology, 5th ed. American Society for Clinical Pathology Press; 2007. 1-484
17. Pottie K[1], Janakiram P, Topp P, McCarthy A. Prevalence of selected preventable and treatable diseases among government-assisted refugees: Implications for primary care providers. Can Fam Physician. 2007 Nov; 53 (11): 1928-34
18. Nasution, SF. Comparative study of filarial detection by microscopic examination and serological assay utilizing BmR1 and BmXSP recombinant antigent for evaluation of filariasis elimination program at Kp. Sawah and Pamulang, South Tangerang District, Banten, Indonesia. Indonesian journal of tropical and infectious diseases. June 2015. Vol 5(6).
19. Nasution, SF, Adhyianto, C. Preliminary Study of Detection of *Wuchereria bancrofti* L3 Larvae in *Culex quinquefasciatus as* Vector Potential of Filariasis in Endemic Area of South Tangerang by Utilizing PCR Assay for L3-Activated Cuticlin Transcript *m*RNA. Indonesian Journal of Tropical and Infectious Disease, Oktober 2018. Vol.7 (3)
20. Nasution, SF. Infeksi cacing dan protozoa usus pada anak sekolah dasar di wilayah KPKM Reni Jaya dan Buaran, Tangerang Selatan. Artikel Jurnal Medika Islamika, vol. 13 No.2 th 2016. FKIK UIN Syarif Hidayatullah Jakarta.