Source details

Biodiversitas

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Publisher: Biology department, Sebelas Maret University Surakarta

ISSN: 1412-033X E-ISSN: 2085-4722

Subject area: Agricultural and Biological Sciences: Animal Science and Zoology | Agricultural and Biological Sciences: Plant Science | Biochemistry, Genetics and Molecular Biology: Molecular Biology

Source type: Journal

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COUNTRY

Indonesia

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SUBJECT AREA AND CATEGORY

Agricultural and Biological Sciences
- Animal Science and Zoology
- Plant Science

Biochemistry, Genetics and Molecular Biology
- Molecular Biology

PUBLISHER

Biology department, Sebelas Maret University Surakarta

Universitas Negeri Sebelas Maret in Scimago Institutions Rankings

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PUBLICATION TYPE

Journals

ISSN

1412033X, 20854722

COVERAGE

2014-2021

INFORMATION

Homepage

How to publish in this journal

grahameagleton@gmail.com

SCOPE

"Biodiversitas, Journal of Biological Diversity" or Biodiversitas encourages submission of manuscripts dealing with all biodiversity aspects of plants, animals and microbes at the level of gene, species, and ecosystem.

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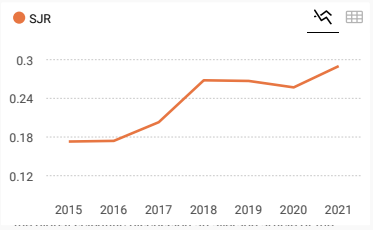

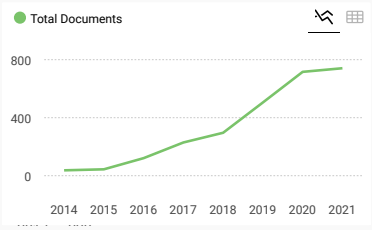

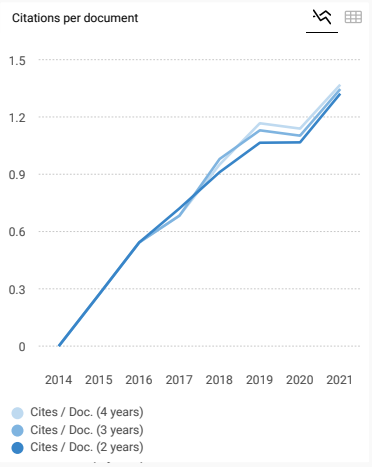

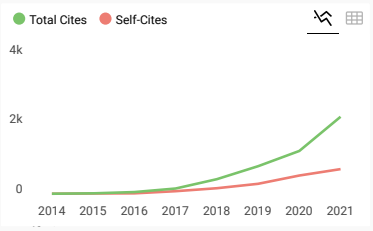

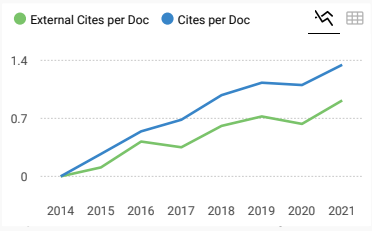

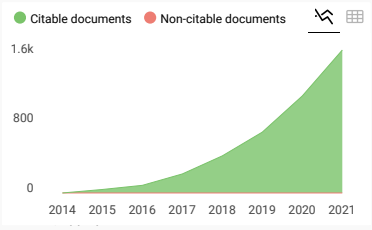

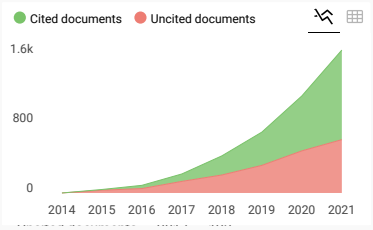

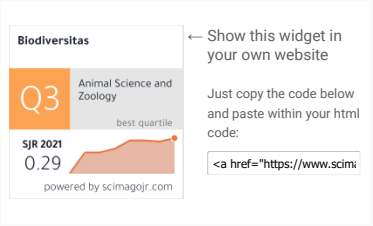

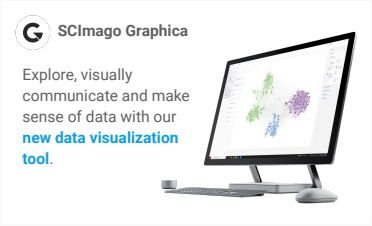

Metrics based on Scopus® data as of April 2022

W **Widi Sunaryo** 3 months ago

Good Journal, fast response, good quality, good reviewing process, divers in diversity.....

reply

SCImago Team

Melanie Ortiz 2 months ago

Dear Widi, thanks for your participation! Best Regards, SCImago Team

B **BOURAADA KHALID** 9 months ago

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Melanie Ortiz 9 months ago

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L **Lyes** 1 year ago

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SCImago Team

Melanie Ortiz 1 year ago

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E **Eko** 2 years ago

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SCImago Team

Melanie Ortiz 2 years ago

Dear Niken, thanks for your participation! Best Regards, SCImago Team

Z **zainal abidin** 2 years ago

This journal management is good, fast response, and communicative.

reply

SCImago Team

Melanie Ortiz 2 years ago

Dear Zainal, thanks for your participation! Best Regards, SCImago Team

R **Rubiyo** 2 years ago

Thank yuo SCimago Team

reply

K **KETUT SUADA** 2 years ago

Dear Editors
May I know the reason/s of Why my article title"The potential of various indigenous Trichoderma spp. to suppress Plasmodiophora brassicae the pathogen of clubroot disease on cabbage" DOI: 10.13057/biodiv/d180418, in BIODIVERSITAS VOL 18/4 OCT 2017, PAGES:1424-1429, was justified as "SHORT COMMUNICATION", WHILE THE DATA IN THE ARTICLE WAS COMPLETE INCLUDING TO DIVERSITY AND EVEN ITS EFFECT TO THE TRICHODERMA IN PLANT (CABBAGE), CAN YOU TELL ME SOON?
REGARDS
I KETUT SUADA

reply

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Best Regards, SCImago Team

F **Fitra Syawal Harahap** 2 years ago

I want to submit my manuscript in this journal

reply

I **Istiyanto Samidjan** 2 years ago

I want to submit my manuscript in this journal
my regards

Istiyanto Samidjan

SCImago Team

Melanie Ortiz 2 years ago

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SCImago Team

Melanie Ortiz 2 years ago

Dear Fitra, thank you very much for your comment, we suggest you to look for author's instructions/submission guidelines in the journal's website. Best Regards, SCImago Team

J **Joko Prasetyo** 3 years ago

I want to submit my manuscript in this journal

reply

SCImago Team

Melanie Ortiz 3 years ago

Dear Joko, thank you very much for your comment, we suggest you to look for author's instructions/submission guidelines in the journal's website. Best Regards, SCImago Team

salamiah 3 years ago

I see the subject area

reply

Afik 3 years ago

Bagus kali jurnal nya

reply

SCImago Team

Melanie Ortiz 3 years ago

Dear user, thanks for your participation! Best Regards, SCImago Team

Feron 3 years ago

Wow bagus banget..samangat berkarya untuk Indonesia yang kebih maju

reply

SCImago Team

Melanie Ortiz 3 years ago

Dear user, thanks for your participation! Best Regards, SCImago Team

muhamad iksan 4 years ago

i want submit my journal thanks

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ahmad 3 years ago

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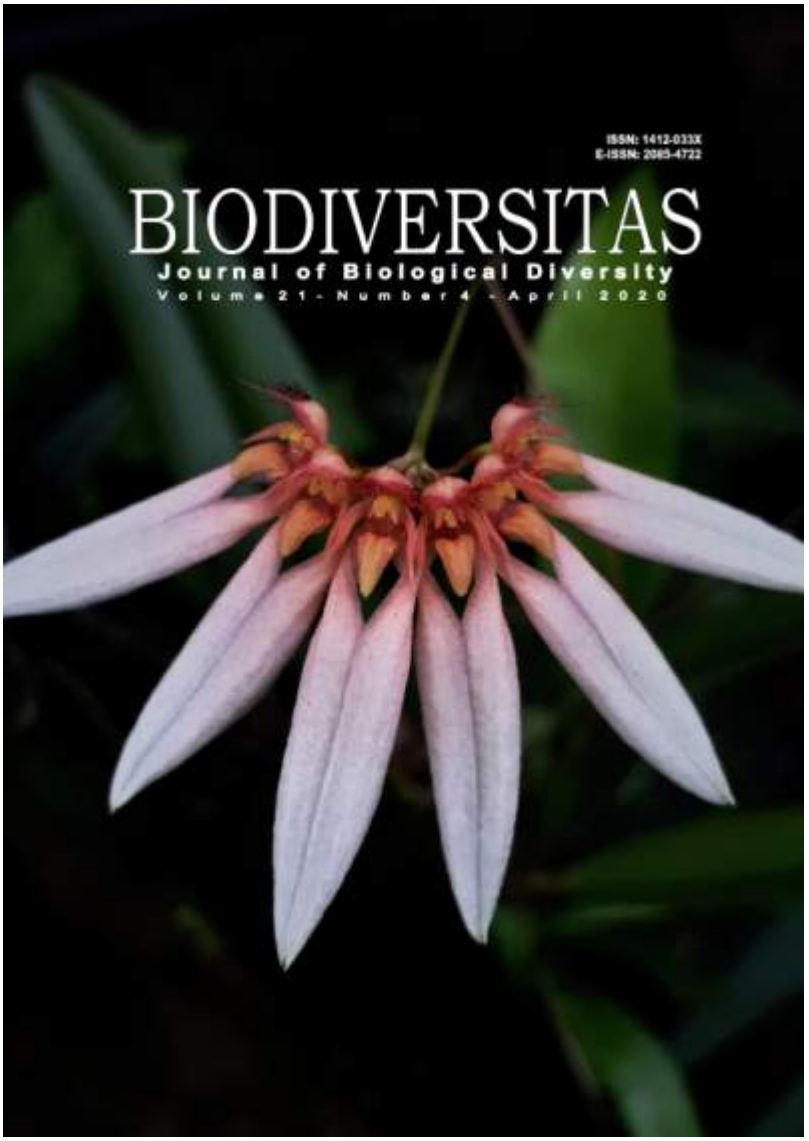
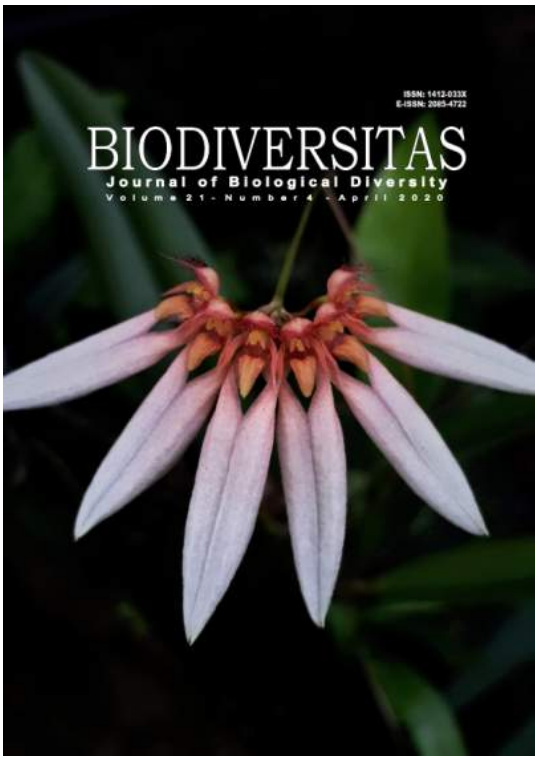

ISSN: 1412-033X
E-ISSN: 2085-4722
BIODIVERSITAS
Journal of Biological Diversity
Volume 21 - Number 4 - April 2020



(https://smujo.id/biodiv/issue/view/257)

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ASRIYANA ASRIYANA, NUR IRAWATI, HALILI HALILI

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I MADE DIRA SWANTARA, I GUSTI AGUNG GEDE BAWA, DEWA NGURAH SUPRAPTA, KADEK KARANG AGUSTINA, I GEDE RAI MAYA TEMAJA

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Short Communication: New record of Stenotrophomonas sp. as endosymbiont bacteria in Rhizopus microsporus (https://smujo.id/biodiv/article/view/5017)

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BIODIVERSITAS
Volume 21, Number 4, April 2020
Pages: 1535-1540

ISSN: 1412-033X
E-ISSN: 2085-4722
DOI: 10.13057/biodiv/d210434

Short Communication: Prevalence and risk factors of soil-transmitted helminth infection among farmers in Gelgel Village, Klungkung District, Bali, Indonesia

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[1]Department of Microbiology and Parasitology, Faculty of Medicine and Health Science, Universitas Warmadewa. Jl. Terompong, Panjer, Denpasar 80235, Bali, Indonesia. Tel.: +62-361-240727, ♥email: putuindah51@yahoo.com

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Manuscript received: 6 January 2020. Revision accepted: 21 March 2020.

Abstract. *Apsari PIB, Indraningrat AAG, Arwati H, Dachlan YP. 2020. Short Communication: Prevalence and risk factors of soil-transmitted helminth infection among farmers in Gelgel Village, Klungkung District, Bali, Indonesia. Biodiversitas 21: 1535-1540.* Soil-transmitted helminths infection remains a problem in tropical and subtropical regions worldwide. Indonesia is one of the tropical countries with a high prevalence of STH infection in children and high-risk population such as farmers. This study aimed to assess the prevalence and risk factors of STH infection from farmers. STH infection was diagnosed by Kato-Katz modified technique, while risk factors relevant to STH infection were assessed by a questionnaire. Data were analyzed by logistic regression and multiple regression test. A total of 162 fecal-samples and questionnaires were obtained from 250 participants. Twenty-two subjects (13.5%) were positive, and 140 subjects (86.5%) were negative for STH infection giving the prevalence rate of 13.5% among farmers. Several significant risk factors for STH infection were age, gender, level of study, income, eating fresh unwashed vegetable, hand washing without soap, defecation site, without wearing hand gloves and protective cloth, bare walking foot, and the use of synthetic fertilizer. So we can conclude that personal hygiene factors were the most contributed factors for STH infection.

Keywords: Bali, farmers, prevalence, risk factors, soil-transmitted helminth

INTRODUCTION

The soil-transmitted helminths are a group of parasitic nematode helminth that are transmitted primarily through contaminated soil. This group causes human infection through contact with parasite eggs or larvae (Bethony et al. 2006). These helminths grow in the warm and moist soil of the world's tropical and subtropical countries (Bethony et al. 2006). More than 1,5 billion population in the world infected by STH. Of particular worldwide importance species are the roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*), and Hookworms (*Necator americanus* and *Ancylostoma duodenale*) (WHO 2017) Population at risk are children, farmers, gardeners and tea pickers (WHO 2017). In rural population of Indonesia, the prevalence of STH infection among farmer were 13.5% and immune protection was not be able to clear the parasite (Apsari et al. 2018). In Bali, during 2004-2011 the prevalence of STH infection in rural populations was relatively high, 74% for *A. lumbricoides*, 63% for *T. trichiura*, and 35% for Hookworm. In 2004 more than a thousand students from 37 primary schools in Singaraja, Badung, Denpasar, Klungkung, Gianyar, and Bangli areas showed an average prevalence of STH infection of 58.3% - 96.8% (Sudarmaja et al. 2011). The STH infection is related to poverty, low social-economic status, and decreased productivity (WHO 2017)

In Vietnam, the most prevalence of STH infection was in children aged less than 12 years compared with adults, related to the maturity of the immune system, knowledge and education, and better hygiene behavior in adults (Pham-Duc et al. 2013). The increased prevalence of STH infection also relates to individual education levels, land-related work such as agriculture, fish farming, and plantations (Ensink et al. 2005). Risk factors obtained in households include the use of latrines in households, building construction, sanitation, handwashing before meals (Pham-Duc et al. 2013). Risk factors associated with employment as farmers are the use of wastewater for land irrigation and the use of manure fertilizers as plant fertilizers, the use of personal protective equipment (footwear and gloves) during work, handwashing behavior after work (Ensink et al. 2005). In Indian fishing village, the parental occupation, the child's age, and mother's education as the potential risk factors contributing to the high intensity of STH infection (Naish et al. 2004).

In addition to the above-mentioned climatic factors, Indonesia is a tropical climate with high humidity and temperature that supports the development of larva and worm eggs. The level of education, the majority of Indonesian people still live in villages with low levels of education, so that the understanding of personal hygiene and personal health and the environment is very low, such as large waste in any place (on land or river), do not use

footwear in daily activities outside the house and often do not wash hands before eating (WHO 2017; Widjana et al. 2000) Socio-economic, mostly Indonesians, low-income, causes the community's inability to provide individual and environmental sanitation (Widjana et al. 2000)

This study aimed to analyze prevalence and risk factors of STH infection focused on the adult population with high-risk occupations, especially farmers. Klungkung District was chosen because they had the largest population working in agricultural so the soil exposure will be frequent.

MATERIALS AND METHODS

This study was conducted in December 2017 until January 2018. The design of the study is descriptive-analytical research and implemented with a cross-sectional design. Data were collected from the adult farmer in Gelgel Village, Klungkung District, Bali, Indonesia (Figure 1).

Samples

A total of 250 farmers in Gelgel Village were selected by simple random sampling. Fecal analyses with Kato-Kats methods were performed in the Parasitology laboratory at Udayana University. The intensities of STH infection then categorized by the World Health Organization (for roundworms: Light [1-4999 epg], Moderate [5000-49.999], High [>49.999]; for hookworms: Light [1-1999 epg], Moderate [2000-3999], High (>3999]; and for whipworms: Light [1-999 epg], Moderate 1000-9999], High [>9999] (WHO 1991; Levecke et al. 2010)

Ethical consideration

Faculty of Medicine Airlangga University approved this study and release ethical certificate number 294/EC/KEPK/FKUA/2017. The headman of Gelgel Village also approved this study.

Data collection

One month before collecting data, we met the headman of farmers and informed him how this study would be conducted. In the first step, we asked for approval to follow this study by signed in informed consent. Then the subjects would be interviewed by systematical questionnaires by the researchers and gave them a 50 ml fecal container. Tomorrow morning after subjects defecated, they should put the fecal in container gave before. Fecal samples and questionnaires were collected from farmers, and the fecal sample will be added 10% formalin until 50 mL. The intensity of infection was determined by Kato-Katz thick smear method resulted in the number of eggs per gram of feces (EPG) (WHO 1991). Fecal containers volume 50 ml were given to subjects, and these containers were collected back in the next morning. Fecal samples were then fixed with 10% formalin and stored in a sample box about 4^{o} C. Fecal specimen is examined by Kato-Katz thick smear use malachite green dying to define and count egg per gram (EPG) feces based on WHO counting method (1991). Morphology of egg per species was identified by microscopic analysis (Olympus, Tokyo, Japan) with an objective lens of 10x. The number of a positive egg was multiplied by 24 (WHO 1991; Levecke et al. 2010).

Data analysis

The prevalence of STH infection was assessed using distribution frequency table, and risk factor analyses then examined using Logistic regression and multiple regressions in SPSS 16.

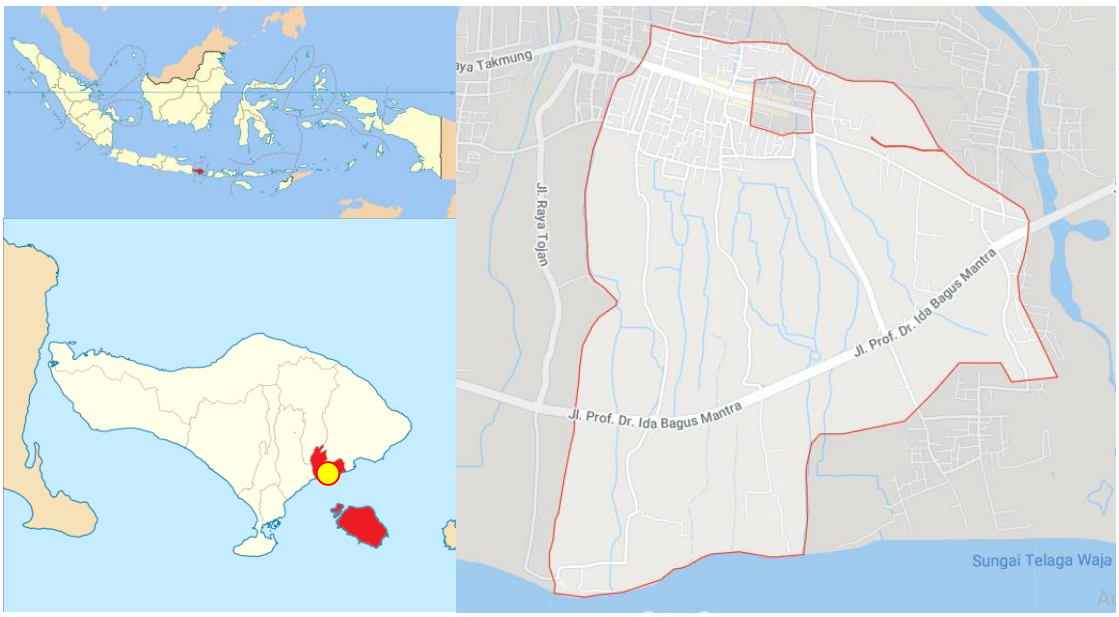

Figure 1. Map of Gelgel Village, Klungkung District, Bali, Indonesia

RESULTS AND DISCUSSION

Results

A total of 162 fecal samples were collected from 250 selected farmers at the Gelgel Village, out of the 22 fecal samples were positive of STH infection, and 140 samples were negative. The prevalence of STH infection among farmers was 13.5%. Most of the infected subjects were male age intervals of 54-64 years, the length of work for about 20 years, and the duration of work for about 9 hours. Most of the subject has passed an elementary school and also cattle owners with low income under 250 thousand rupiahs per month (Data 2017). All data are shown in Table 1.

Based on the helminth's egg identification, it could be stated that a single infection of *A. lumbricoides, T. trichiura,* and Hookworm was 1.85% (3/162), 9.26% (15/162), and 0.61% (1/162), respectively. The mixed infection was detected in *A. lumbricoides* with *T. trichiura* (1.23%), and *A. lumbricoides* with Hookworm (0.61%) (1/162). The highest mean EPG was found in *A. lumbricoides* infection where as many as 160 eggs per gram feces counted, then was followed by *Ascaris*+Hookworm mixed infection of 144 eggs per gram feces, *Trichuris+Ascaris* 132 eggs per gram of feces, while in single infection of Hookworm and *T. trichiura* was 48 and 53.5 eggs per gram ~~of~~ feces, respectively. The intensity of infection according to the WHO table is entirely mild. All data are shown in Table 2. The significant risk factors affecting STH infection were eating raw vegetables of their yield (OR = 4.4 p <0.05) and the place of defecation in a river or rice field (OR = 4.7 p <0.05).

Statistical analysis of risk factors showed that significant risk factors for STH infection were age, gender, level of study, income, eating fresh unwashed vegetables, hand washing without soap, defecation site, not wear hand gloves, not wear protective cloth, unprotected foot, and using fertilizer (Table 4).

Table 1. Characteristic of subjects based on biography and social-economic conditions analyzed by cross-tabulation

Characteristic of subject	STH positive (n* = 22)	STH negative (n = 140)
Age (year); mean ± SD*	55.59 ± 8.1	55.11± 10.9
Duration of work (year); mean ± SD	21.9±11.4	20.7± 13.8
Work hour (hour): mean ± SD	9.1± 1.6	8.6± 1.7
Gender; n (%)		
Male	12 (54.5)	90 (64.3)
Female	10 (45.5)	50 (35.7)
Level of study; n (%)		
Understudy	9 (40.9)	39 (27.9)
Elementary	9 (40.9)	70 (50.0)
Junior high	1 (4.5)	12 (8.6)
High	3 (13.6)	18 (12.9)
University	0 (0)	1 (0.7)
Salary per month (IDR); n (%)		
<250 thousand	12 (54.5)	72 (51.4)
500-<1 milion	10 (45.5)	62 (44.3)
>1 milion	0 (0)	6 (4.3)
Cattle owner: n (%)		
Yes	17 (77.3)	117 (83.6)
No	5 (22.7)	23 (16.4)

Note: *n: total amount, SD: standard deviation

Table 2. Species distribution, mean of EPG and Intensity of STH infection

Species	n (%)	Mean±SD (EPG)	Intensity of infection*
Ascaris lumbricoides	3 (1.85)	160 ±176	Mild
Trichuris trichiura	15 (9.26)	53.5±27.9	Mild
Hookworm	1 (0.61)	48	Mild
Ascaris+Trichuris	2 (1.23)	132±118	Mild
Ascaris + hookworm	1 (0.61)	144	Mild

Note: * Category based on WHO (2017)

Tabel 3. Characteristic of hygiene behavior between infected subject versus non-infected subject

Characteristics of subjects	STH Positive	STH negative
	n (%)	n (%)
Eating fresh unwashed vegetables		
Yes	18 (12.4)	127 (87.6)
No	4 (23.5)	13 (76.5)
Hand washing		
Yes	12 (17.6)	56 (82.4)
No	10 (10.6)	84 (89.4)
Boiling water		
Yes	18 (14.9)	103 (85.1)
No	4 (9.8)	37 (90.2)
Defecation site		
Toilet	12 (9.2)	119 (90.8)
River	10 (32.3)	21 (67.7)
Using hand gloves		
Yes	4 (25)	12 (75)
No	18 (12.3)	128 (87.7)
Using personal protective equipment		
Yes	6 (9.5)	57 (90.5)
No	16 (16.2)	83 (83.8)
Using boot shoes		
Yes	2 (5.9)	32 (94.1)
No	20 (15.6)	108 (84.4)
Using growth fertilizer		
Human feces	0 (0)	0 (0)
Animal feces	9 (9.0)	91 (91)
Synthetic fertilizer	13 (21)	49 (79)

Table 3. Risk factor of any STH species

Risk factor	Species				
	AL	AL+HW	HW	TT	TT+AL
Gender					
Male	2(16.7)	0 (0)	0 (0)	8 (66.7)	2 (16.7)
Female	1(12.5)	1 (12.5)	1 (12.5)	5 (62.5)	0 (0)
Level of study					
Understudy	1(11.1)	1 (11.1)	1 (11.1)	5 (55.6)	1 (11.1)
Elementary	2(28.6)	0 (0)	0 (0)	4 (57.1)	1 (14.3)
Junior high	0(0)	0 (0)	0 (0)	1 (100)	0 (0)
High	0(0)	0 (0)	0 (0)	3 (100)	0 (0)
University	0(0)	0 (0)	0 (0)	0 (0)	0 (0)
Salary per month					
<250 thousand	0(0)	1 (8.3)	1 (8.3)	9 (75.0)	1 (8.3)
500-<1 million	3(37.5)	0 (0)	0 (0)	4 (50.0)	1 (12.5)
>1 million	0(0)	0 (0)	0 (0)	0 (0)	0 (0)
Additional occupation beside farmer					
Labour	-	-	-	-	-
Housewife	-	-	-	-	-
Cattle owner	2(12.5)	0 (0)	0 (0)	12 (75)	2 (12.5)
Cattle owner					
No	1(25)	1 (25)	1 (25)	1 (25)	0 (0)
Yes	2(12.5)	0 (0)	0 (0)	12 (75)	2 (12.5)
Eating freesh unwashed vegetables					
Yes	3(18.8)	0 (0)	1 (6.2)	10 (62.5)	2 (12.5)
No	0(0)	1 (25)	0 (0)	3 (75)	0 (0)
Hand washing with soap					
Yes	2(20)	1 (10)	0 (0)	5 (50)	2 (20)
No	1(10)	0 (0)	1 (10)	8 (80)	0 (0)
Boiling water					
Yes	1(25)	0 (0)	1 (25)	2 (50)	0 (0)
No	2(12.5)	1 (6.2)	0 (0)	11 (68.8)	2 (12.5)
Defecation site					
Toilet	0(0)	0 (0)	0 (0)	0 (0)	0 (0)
River	3(15)	1 (5)	1 (5)	13 (65)	2 (10)
Using hand gloves					
Yes	2(66.7)	1 (33.3)	0 (0)	0 (0)	0 (0)
No	1(5.9)	0 (0)	1 (5.9)	13 (76.5)	2 (11.8)
Using personal protective equipment					
Yes	2(40)	1 (20)	0 (0)	2 (40)	0 (0)
No	1(67)	0 (0)	1 (6.7)	11 (73.3)	2 (13.3)
Using boat shoes					
Yes					
No	2(11.1)	1 (5.6)	1 (5.6)	12 (66.7)	2 (11.1)
Using fertilizer					
Human feces	-	-	-	-	-
Animal feces	-	-	-	-	-
Synthetic fertilizer	3(15)	1 (5)	1 (5)	13 (65)	2 (10)

Table 4. Multivariate analyses of risk factor of STH infection based on multinominal regression

Risk factor	P
Age	0.001*
Gender	0.057
Level of study	0.029*
Income	0.001*
Additional occupation	0.116
Cattle owner	0.998
Eating fresh unwashed vegetable	0.057
Hand washing without soap	0.024*
Boiling water	0.078
Defecation site	0.001*
Not wear hand gloves	0.000*
Not wear protective cloth	0.004*
Unprotected foot	0.030*
Using fertilizer	0.003*

Note: *Significantly p<0.05

Table 5. Risk factor significance by analyses of each variable

Risk factor	p	95% confidence interval	
		Lower bound	Upper bound
Gender			
Male	0.107	2.241	3.568
Female	-	-	-
Level of study			
Unstudy	n.a.	n.a.	n.a.
Elementary	0.179	0.277	917.8
Junior high	0.067	8.049	3.817
High	0.907	6.467	4.073
University	0.981	0.000	n.a.
Salary per month			
<250 thousand	0.944	0.000	n.a.
500-<1 milion	0.943	0.000	n.a.
>1 milion	n.a.	n.a.	n.a.
Additional occupation besides farmer			
Labour	0.992	0.000	n.a.
Housewife	0.991	0.000	n.a.
Cattle owner	0.993	0.000	n.a.
No	0.995	0.000	n.a.
Eating fresh unwashed vegetables			
Yes	0.083	4.26	1.840
No	n.a.	n.a.	n.a.
Handwashing with soap			
Yes	-	-	-
No	0.139	3.487	8.003
Boiling water			
Yes	-	-	-
No	0.094	0.444	2952
Defecation site			
Toilet	0.954	0.000	n.a.
River	n.a.	n.a.	n.a.
Using hand gloves			
Yes			
No	0.862	2.648	4.262
Using personal protective equipment			
Yes	-	-	-
No	0.038	4.846	0.546
Using boat shoes			
Yes			
No	0.87	1.869	4.570
Using fertilizer			
Human feces	n.a.	n.a.	n.a.
Animal feces	n.a.	n.a.	n.a.
Synthetic fertilizer	0.025	0.001	0.634

Discussion

Prevalence of STH infection

STH infection remains a major health problem in many poor and developing countries. Consistent with the findings of previous studies, this study shows that the prevalence of STH infection among farmers is 13.5%, the same as the previous study in Kumasi, Ghana. Most of the farmers consume their own vegetable product that increases the risk of STH ova exposure (OR=1.25, CI 95%) (Amoah et al. 2016). The prevalence of STH infection among adult also have been reported in Nyanza, Kenya, overall 15.7% adult positive for STH infection. The possibility for adults as the carrier of STH was evaluated in Akonolinga, Cameroon, an infected adult, might constitute a potential parasite reservoir and a source of dissemination and persistence of STH infection (Bopda et al. 2016).

The prevalence of *A. lumbricoides* infection in this study was 1.85%, this result is in accordance with the study

conducted by Ensink et al. (2005), the prevalence of *A. lumbricoides* infection was 1.9%. They also obtained *Hookworm* prevalence ranges from 0.6% in regular farmers, similar to his study (0.6%). The prevalence of *T. trichiura* infection in this study was 9.26%. In a study conducted by Pham-duc et al. (2013), the *T. trichiura* prevalence was 40%, higher than this study. The reasonable cause must be the utilization of human excreta as fertilizer in farmland in Vietnam but in this study, nobody farmers using human excreta as fertilizer. High transmission of STH infected egg also increased by fecal contains egg (Pham-Duc et al. 2013). This study obtained EPG ranged between 48-160. This result is in accordance with research conducted by Amoah et al. (2016) with the average number of eggs per gram of feces in the rainy season 4-223 EPG and in dry season 3 -124 EPG. The range of a number of the egg influenced by many factors, but the average of EPG was the same as the previous study. The farmers of rice, vegetables, and maize in Gelgel Village were similar to the vegetable farmers subject in Kumasi, Ghana. Because of the same pattern every day exposed to the soil, the risk of STH infection will be higher (OR = 3.99, 95% CI: 1, 15-13,86) among farmers than non-farmer subjects. According to Amoah et al. (2016), the intensity of STH infection was entirely in the mild category.

The risk factor of STH infection

Risk factors were analyzed include livestock ownership, eating self-produced vegetables, washing hands with soap, drinking water, using gloves when working, wearing footwear, wearing protective clothing, and defecating. Livestock ownership could increase the possibility of egg exposure that carried by their cattle, then human will be infected by egg or larva by ingestion or penetration (Bethony et al. 2006). Significant risk factors that influence STH infection are eating self-produced vegetables (OR = 4.4 p <0.05) and defecation site (OR = 4.7 p <0.05).The results of this study are in accordance with research conducted by Amoah et al. (2016). The similarity of the results obtained is because the sample used has similarities with this study. Rice, vegetable, and pulses farmers in Gelgel Village are the same as the vegetable farmers sampled in Kumasi Ghana, with the same pattern of eating vegetables themselves. This can be caused by the worm eggs under the leaves of vegetables and protected from sunlight, thus getting optimal conditions for infections. The habit of farmers eating raw vegetables and defecating in the river (32.3% of positive case) also increase the probability of worm eggs could infect the farmers (Amoah et al. 2016)

Consuming fresh unwashed vegetables was not a significant risk factor in this study (p. 0.057), in contrary with research conducted by Anuar et al. 2014 which mentions several risk factors for STH infection in several tribes in Malaysia namely consuming raw vegetables (OR 3.36, p <0.005) and consuming contaminated fresh fruit (OR 5.19 p <0.017) (Anuar et al. 2014). In a study conducted by Jiraanankul et al. 2011, the risk factors for STH infection were walking barefoot (p <0.023) and raising cattle (p <0.001) (Jiragaankul et al. 2011). This result is also supported by research conducted by Campbell et al. 2016 which states that environmental hygiene and sanitation play an important role in the transmission of STH infections and are very important risk factor (Campbell et al. 2016). The striking behavior found in agriculture in Vietnam is the use of wastewater and the use of human waste as fertilizer (Trang et al. 2007). The prevalence of STH infections in adults, especially those working as farmers, has also been reported in Nepal, with very poor hygiene and sanitation patterns, including not using soap for handwashing and not using footwear when walking out of the house (Parajuli et al. 2014). In contrary to the results of the study by Ross et al. women were more at risk of STH infection than men, with the highest number of education being elementary and high schools. There are no differences in health conditions in subjects infected with STH, good health conditions have the same risk for STH infection compared with less healthy conditions (Ross et al. 2017).

To conclude, the significant risk factor for STH infection in this study was age, level of study, income, hand washing without soap, defecation site, not use hand gloves, not use protective clothing, unprotective foot, using fertilizer. The low prevalence of STH infection among farmers who categorized as low-income populations in Klungkung Bali must not be neglected. The prompt strategy must be made by stakeholders for eliminating the infection. Several risk factors that must be anticipated divide into personal hygiene and sanitation.

ACKNOWLEDGEMENTS

We would like to thank the Dean of The Faculty of Medicine and Health Science, Warmadewa University, Bali, Indonesia for funding this research.

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