



PROCEEDING

INTERNATIONAL SEMINAR

ENVIRONMENTAL HEALTH & SUSTAINABLE TOURISM

Widya Sabha Theatre, Faculty of Medicine, Udayana University

Bali, 23rd September 2016

**SCHOOL OF PUBLIC HEALTH
FACULTY OF MEDICINE
UNIVERSITAS UDAYANA**

**Proceeding of The International Seminar on
“Environmental Health and Sustainable
Tourism”**

Widya Sabha Theatre, Faculty of Medicine,
Udayana University
Bali, 23rd September 2016

**School of Public Health
Faculty of Medicine, Udayana University
Bali**

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PREFACE

The International Seminar on Environmental Health and Sustainable Tourism held in Denpasar, Bali on 23rd September 2016 by School of Public Health, Faculty of Medicine, Udayana University in collaboration with Indonesian Public Health Association (IAKMI) Bali Chapter. This International Seminar aimed to provide an opportunity for participant to increase their knowledge, sharing ideas and strategies, develop recommendation based on the recent research findings towards sustainable tourism and environmental health.

This volume of proceedings from the seminar provides an opportunity for readers to engage with a selection of refereed papers that were presented during the seminar. The paper published were ranging from issues under themes of sustainable development in Health Tourism, Environmental Health, Health Policy, Health Promotion, Occupational Health, Epidemiology, Maternal and Child Health, Community Nutrition and other topics related to Health and Tourism.

The seminar committee congratulates participants whose paper is finally published in this proceeding. The committee would like to thanks Indonesian Public Health Association (IAKMI), participants, sponsor, and Udayana Press for the contribution to the publishing to this proceeding.

Sincerely yours,

Committee of the International
Seminar

TABLE OF CONTENT

PREFACE iii
TABLE OF CONTENT iv
SYNOPSIS vii

Case Report: Snake Bite in a 32 Years Old Female Traveler
Y.P. Winston Wilson, Maria Chrismayani, Putu Anda Tusta Adiputra. 1

Prevalence and Determinants of Demensia Among Elderly in West
Selemadeg, Tabanan 2016
Radhaningsih NLA, Septarini NW 17

The Overview Quality Of Service To Patient Satisfaction In National
Health Insurance In Public Health Center Pupuan II
Ni Luh Gde Ari Natalia Yudha, Anny Eka Pratiwi, Septi Susanti..... 29

Charge for Plastic Bags: How Community Reacted to the Policy?
Ni Made Sri Nopiyan..... 42

The phenomenon of Use of Traditional Medicine in Rural
Communities Accordingly Sanur City of Denpasar
Ni Made Elinawati, Ni Komang Ekawati 51

Determinants of Pneumonia among Under-five Children in South
Denpasar, Bali
Aswina Dewi AASM, Septarini NW 63

Perception of Bitter Taste and Expensive Priced Related to Iodized Salt Consumption Behavior of The Household Level in Petulu Village District of Ubud Ni Wayan Arya Utami, Ni Luh Pebi Priyanti	86
The Relationship between Worm Infestation and Nutritional Status among Elementary School Children in Jagapati Village Denpasar-Bali Septarini NW, Kurniati DPY, Artawan EP IWG., Suariyani LP, Widari IAW, Kowara M	103
Differences Value of Sodium, Potassium, Magnesium And Albumin in Cervical Cancer Squamous Cell Stadium Iib-Iiib Beforea After Chemotherapy Bleomycin, Oncovin®, Mitomycin and Carboplatin for Three Cycle Noviyani R, I.N.G Budiana, K. Tunas, Indrayathi,. P.A., N.N.T.N.P.S. Suatra, N.W.E Sriwedari, N.W.N Lestari, P.P.G Prayani, I.G.N.W Prihantara, R. Rosita	114
An Effort to Enhance the Knowledge on HIV/AIDS among Teenagers in a Tourist Destination in Bali Septarini NW	128
The Adolescent’s Perception of Student Group That Concern on Aids And Drugs (KSPAN) And Information Counseling Centre for Adolescent (PIK – R) Program on School in Denpasar Ni Luh Eka Purni Astiti, Ni Komang Ekawati	137

Nutritional Status in The First Year of Antiretroviral Therapy on Children With HIV/AIDS Wirandani N.K.N.S, Diantini D.M.A, Ulandari N.L , Niruri R, Adnyana I.G.A.N.S, Kumara K.D.....	158
Part Innards More Contain Lead than In Part Muscles of Contaminated Beef I Ketut Berata, I Made Kardena, Ida Bagus Oka Winaya	167
Interpersonal Communication (Counseling) Effectiveness on Information Delivery About Vasectomy Contraception (KB) in Order To Increase Fertile Age Couple (PUS) Using Vasectomy Contraception at Gianyar Regency Ni Komang Ekawati.....	176
The Effecto of Mixing Promotion on The Participants Registration of National Healthcare Insurance (JKN) in Informal Sector of The Market Merchantsi Denpasar City I Putu Dedy Kastama Hardy, Made Gede Mas Sandhi Nugraha	190

The Relationship between Worm Infestation and Nutritional Status among Elementary School Children in Jagapati Village Denpasar-Bali

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Abstract

Worm infection is one of neglected disease since it would not induce epidemic and death. Indonesia is a tropical country which has a good environment for *Soil Transmitted Helminths*. This make people in Indonesia especially children are vulnerable to worm infestation. The prevalence of worm infestation in Bali during 2003-2007 among school children was from 40.94% to 92.4%. This study aimed to distinguish the prevalence of worm infestation among elementary school children in Jagapati Village and its relationship to the nutritional status of the children.

It was a cross sectional descriptive quantitative research. The sample and respondents were the school children from grade 4,5 and 6 of two elementary schools in Jagapati Village in 2014. Sixty one students were participated in this study which chosen by simple random sampling technique.

The result shows that the prevalence of worm infestation among this school children were 3.3%. Most of the students were in normal nutritional status (BMI/age and sex). All of the students that infected by worm were in normal nutritional statuses. Therefore, no significant relationship found between worm infestation and nutritional status in this research. However, from the Public Health perspective, this research shows the significant decrease in the prevalence of worm infestation among school children in Bali from around 40% to only 3.3%.

Keywords: nutritional status, school children, worm infestation

Background

Worm infection is one of neglected disease since it would not induce epidemic and death. WHO data shows that the prevalence of people around the world who infect by *Soil Transmitted Helminthes (STH)* was approximately 1.5 billion or almost 24% of world population is infected. *Soil Transmitted Helminthes* were spread especially in the tropical areas including Indonesia¹.

Survey conducted by Diarrhea Department in 2002 and 2003 in 40 elementary schools in 10 provinces in Indonesia, showed that the prevalence of worm infestation was 2,2% to 96,3%.² Worm infestation is one factor that reduce the level of health, nutritional status, cognitive and productivity which can cause

economic failure as well as decreasing the human resources quality since it is triggering the loss of carbohydrate, protein, and anaemia. In one hand the target of of Healthy Indonesia 2010, health development is one part of national development which have a goal to make healthy, productive and highly competitive people. On the other hand, productive human resources is related to the quality of adolescent including elementary school children. One of the diseases that infected elementary school children is worm infestation³.

Based on research conducted by Kapti et al in Bali from 2003 to 2007, the prevalence of worm infestation were around 40,94%- 92,4%. Kapti stated that the high prevalence of worm infestation might be due to lack of knowledge of

children and parents about this disease⁴. From the initial assessment in Jagapati Village, the researcher saw that the community including children in this area were remain swimming and bathing at the river and most of the children still playing with soil. Researchers were also obtained information that there was report of worm infestation every year in Abiansemal II Community Health Centre and it was believe that many more children were having similar problem but had not reported. Therefore, this study aimed to distinguish the prevalence of worm infestation among elementary school children in Jagapati Village and it relationship to the nutritional status of the children.

Method

This was a descriptive quantitative study with cross-sectional design conducted from January to April 2014. The population was elementary schools students grade 3 to 5 of SDN 1 Jagapati and SDN 2 Jagapati. This research was used total sampling method; therefore the total sample was 61. Data collection was conducted using questionnaire and stool collection which then analyze at the Parasitology Laboratory, Faculty of Medicine, Udayana University.

Result

Research samples were from 2 different elementary schools in Jagapati Village. They were SDN 1 Jagapati and SDN 2 Jagapati. The respondents were students who were in grade 3 to 5

Table 1. Worm infestation laboratory result based on sex, schools and age

Variables	Positive	Negative	Total	P
Sex				
Girl	0 (0%)	32 (54.2%)	32(52.5%)	0.222
Boy	2 (100%)	27 (45.7%)	29 (47.5%)	
School				
SD 1 Jagapati	2 (100%)	29 (49.2%)	31 (50.8%)	0.492
SD 2 Jagapati	0 (0%)	30 (50.8%)	30 (49.2%)	
Age (years)				
8	0 (0%)	7(11.9%)	7 (11.5%)	
9	1 (50%)	20 (33.9%)	21 (34.4%)	
10	0 (0%)	13 (22%)	13 (21.3%)	
11	0 (0%)	17 (28.8%)	17 (27.9%)	
12	1 (50%)	2 (3.4%)	3 (4.9%)	
Total	2 (100%)	59 (100%)	61 (100%)	

Table 2. Laboratory result for all type of worm infestation

Lab result	Frequency	%
Positive	2	3,3%
Negative	59	96,7%
Total	61	100%

Table 1 shows that there is no significant different between sex and worm infestation. As well as there is no significant different between school and worm infestation. On the age variable, it is found that the

worm infestation is occurred between age 9 to 12 years old.

From 61 samples in this study, the prevalence of worm infestation is 3.3%. There was no finding on hookworm infestation. This result shows that the worm infestation prevalence in this

area quite small. It can be seen on Table-2 as follows.

Sample nutritional status was analyzed using Body Mass Index (BMI). Body Mass Index obtains by calculating using formula as follows.

$$\text{BMI} = \frac{\text{Weight(kgs)}}{\text{Height(m)}^2}$$

After calculating the BMI, next the samples were categorizing into under-nutrition, normal and obese based on their BMI, age and sex on the 2007 WHO table. The result of nutritional status of the samples can be seen in the following table.

seen on Table-2 as follows.

Table-3 shows that only a small number of samples are falling into under-nutrition status based on BMI and age. Most of the children were in normal nutritional status (86.9%).

Table-4 shows that all students that infected by worm were fall into normal nutritional status. The analysis could not be continued since more than one cells have zero value.

Table 3. Nutritional status of samples based on BMI

Category	Frequency	%
Under-nutrition	2	3,3%
Normal	53	86,9%
Obese	6	9,8
Total	61	100%

Table 4. Relationship between worm infestation and nutritional status

Nutritional status	Positive	Negative	Total
Under-nutrition	0 (0%)	2 (100%)	2 (100%)
Normal	2 (3.8%)	51 (96.2%)	53 (100%)
Obese	0 (0%)	6 (100%)	6 (100%)
Total	2 (3.3%)	59 (96.7%)	61 (100%)

Discussion

Based on laboratory report, this study show that the prevalence of worm infestation among samples was 3.3% and the other 96.7% confirmed to be not infected by worm. Only two samples that had positive result from 61 samples.

Body Mass Index result which had been check using WHO tables for nutritional status for children age 6-12 based on BMI, sex and age shows that most of the children/samples were in normal nutrition status. A normal nutritional status may be obtained with the adequate food consumption especially macronutrients

such as carbohydrate, protein and fat for the children. Only a small number of samples were fall into under-nutrition (3.3%) and 6 of them categorize as obese. This might be because the influence of lifestyle which most of the children consuming food that contain more sugar and fat therefore increasing the risk of obese.

The relationship between worm infestation and nutritional status in elementary school students in Jagapati Village can be seen that there was no significant relationship between the two variables. It can be seen on the bivariate analysis. It is supposed that children who have worm infestation have lower nutritional status

compare to those who have not infected. However, the result shows that those who positive to have worm infestation have normal nutritional status. This research result was similar to research conducted by Ahdal in Makassar which found the prevalence of worm infestation was 57.7%, but no significant relationship find between worm infestation and BMI ($p=0.453$)⁵. This study is also supported by research conducted by Fauzy Palayangan Sebrang District, Jambi Province, which found that 20.7% elementary school student have worm infestation, however statistical analysis found there was no significant relationship between worm infestation and nutritional status ($p=0.594$)⁶. This result can be explained in several ways such as first, the children might be the children was falling in

obese before they get worm infestation, therefore after get infected their nutritional status become normal. This condition can be proven with the regular and routine weight monitoring. Worm infestation is influence the intake, digestive process and absorption process of food in the body. In long period of time, this type of infection may cause the difficulty and inhibit the absorption of nutritional substance such as calories, protein and hemoglobin. Beside it will be impeding physical development; it will also influence the intelligence dam work productivity as well as reducing the level of immunity. Long term impact of worm infestation is lowering down the human quality. Research conduted by Samosir stated that infection level and hemoglobin level were statistically significant in

influencing the intelligence of elementary school student at SDN 067775 Medan District⁷. This research found children that infected by worm was suffer from mental defective borderline as much as 100 % and those who get mild infection were suffer from mental defective and borderline around 2,6%⁷.

The second explanation that the children only have mild worm infestation, therefore it did not influence the level of metabolism and the absorption of nutrition yet. This condition makes nutritional status of those children remain normal. However, if it is left without any treatment, one day it is likely that the metabolism and absorption will be influenced.. Research conducted by Ahdal showed that even though the prevalence of worm infestation was quite high, but

it is not statistically significant compare in relation to nutritional status⁶. This was because the mild infection. Based on calculation, the intensity of eggs produced by worm (*Ascaris lumbricoides*) was 1108 EPG and from whipworm (*Trichuris tricurua*) was 135 EPG (mild infection), means that the infection in those children were not severe. Therefore, no negative impact occurred including regarding the nutritional status⁶.

Worm infestation can be managed by improving healthy and clean life as well as good food. In short term program, the activity to manage this disease is through prompt-treatment. Prompt-treatment will low down the intensity of worm which will enhance the health condition in general. In this research after found to be positive infected by worm, the

two children were given Albendazole tablet medication. Albendazole is the first of choice for worm and whipworm infestation⁸. Recently, the Jagapati Community Health Services have been conducted mass treatment in order to reduce worm infestation in elementary school students in Jagapati. This effort is a good program if it could be sustain and conduct regularly every six-month. Long term prevention must be conduct continuously and comprehensive with collaboration of many sectors including the private and community members. Empowering the community in order to have power to control worm infestation by their own willingness and way, including maintaining clean and healthy life that will improve personal health and environment⁸.

Conclusion

Based on the analysis the prevalence of worm infestation in elementary school in Jagapati Village was 3.3% or only 2 samples. All of the infections were caused by worm and whipworm infestation (*Ascaris lumbricoides* and *Trichuris trichiura*). The prevalence of hookworm (*Ancylostoma duodenale* and *Necator americanus*) was 0%.

Based on nutritional status analysis, most of the samples were fall in normal nutritional status based on BMI, age and sex. This study did not find the significant relationship between worm infestation and nutritional status of the subjects. All of samples who infected by worm were in normal nutritional status category. However, if seen from the Public Health perspective, this

research has been proven a good improvement on the prevalence of worm infestation if compared to previous research.

Recommendation

It is suggested that Department of Health coordinate with Community Health Centre in order to do routine screening for worm infestation, in order to monitor the newly and re-infestation. Even though the prevalence was found low, however the possibility of transmission is prominent. Besides, monitoring the nutritional status of elementary school students are essential to be able to take early appropriate action based on the result.

It is suggested to parents of the students to involve in maintaining hygiene in order to prevent worm

infestation in the future. The examples are maintaining nail hygiene and washing hand using appropriate soap.

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