P-ISSN : 2527-4627
Warmadewa Medical Journal
Available online http://ejournal.warmadewa.ac.id/index.php/warmadewa_medical_journal

WMJ (Warmadewa Medical Journal), Vol. 3 No. 1 Mei 2018, Hal. 1-5

Taeniasis in Karangasem, Bali

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Abstract

Taeniasis is an infectious disease caused by the tapeworm *taenia saginata* (beef tapeworm), *Taenia solium* (pork tapeworm), and *taenia asiatica* (Asian tapeworm). Purpose of the study was to determine the relationship between meat consumption, individual characteristics, and environmental factors with taeniasis. Case-control study was used to identify taeniasis among two groups: people living at Datah village (personal livestock) and people living at Karangasem village (obtained their meat from traditional market or slaughterhouse). Each group consisted of 98 people. Two subjects from the case group were positive for taenia egg both by direct smear and Willy's Malory floatation methods. Prevalence of taeniasis in the case group was 2.04% and 0.00% in the control group (p=0.001).

Keywords: *Taeniasis, Direct method, Willy's Mallory floatation method, Taenia's egg*

Abstrak

Taeniasis merupakan penyakit infeksi yang disebabkan oleh cacing pita taenia saginata (beef tapeworm), taenia solium (pork tapeworm), dan taenia asiatica (Asian tapeworm) di dalam tubuh manusia. Penelitian ini bertujuan untuk mengetahui hubungan antara konsumsi daging, karakteristik individu dan faktor lingkungan dengan kejadian taeniasis. Jenis rancangan penelitian yang digunakan yaitu case-control antara 2 kelompok penduduk, yaitu penduduk di Desa Datah dan Kelurahan Karangasem, Kabupaten Karangasem, Bali. Kelompok kasus yaitu penduduk Desa Datah yang memenuhi kriteria kasus (mengkonsumsi daging dari hewan ternak pribadi), sedangkan kelompok kontrol yaitu penduduk di Kelurahan Karangasem yang memenuhi kriteria untuk kontrol (mengkonsumsi daging dari membeli di pasar atau tempat pemotongan hewan). Tiap kelompok terdiri dari 98 orang. Metode pemeriksaan feses dengan metode langsung dan pengapungan. Terdapat 2 orang yang positif taeniasis dari kelompok kasus dan tidak ditemukan yang positif pada kelompok kontrol pada pemeriksaan feses metode langsung dan pengapungan (p=0,001).

***Kata kunci**: Taeniasis, Metode langsung, Metode Pengapungan Willy's Mallory, Telur Taenia sp.*

INTRODUCTION

Taeniasis is a neglected infectious disease caused by the *Taenia sp*. Humans can become infected with these tapeworms as a result of eating raw or undercooked beef (*T. saginata*) or pork (*T. solium* and *T. asiatica*) containing infective cysticercus larvae[(1)]. Taeniasis and cysticercosisare is still prevalent in four provinces in Indonesia namely Papua, Bali, East Nusa Tenggara and North Sumatra[(2)]. The highest incidence of taeniasis in Bali is found in 4 districts: Gianyar, Karangasem, Badung, and Denpasar. The highest incidence of taeniasis saginata was in Gianyar Regency and taeniasis soliumin Karangasem[(2)]. In rural areas of Karangasem including Datah village, pork

"*lawar*" and roasted pig are consumed as local traditional food since long time ago it has been a part of indegenous Balinese culture. The existence of individual slaughtering of pigs in Datah village for ceremonies or parties without supervision from the animal health department is thought to increase the risk of taeniasis. In contrast, people living in Karangasem village obtain meat of cattle or pigs which are slaughtered at supervised slaughter houses.

A number of studies on taeniasis have been carried out with various purposes. Impacts brought by taeniasis to a large number of patients throughout the world have been in the interest of scholars and researchers to conduct investigation on it. Taeniasis is believed to remain in neglected zoonosis, such as in Southest Asia countries resulting from nescience of its emergence[3]**.** It is claimed that programs made to control taeniasis and cysticercosis are better to be adopted with consideration on diversities in culture, religion, socio-economic status and level of education. Condition of taeniasis presence, such as in Thailand during 2000-2005, has been investigated and reported to have been resulted from the consumption of raw/half-cooked meat, and it is claimed that such habit of consuming raw/half-cooked meat will allow taeniasis to livingly exist[4].

However, the leading factor of taeniasis emergence is eating habits. Consuming undercooked pork can result in persons infected with *T. saginata*-like tapeworms. This evidence mostly happened in the North part of Indonesia in 1991[5]. Thus, eating pork can be the source of taeniasis transmission causing neurocysticercosis, a parasitic tissue infection that can be chronic and severe. In addition, identifying taeniasis is not an easy project to perform since many are asymptomatic and go undetected and unreported[6]. There are so many previous studies reporting the existence of taeniasis and its condition in infected persons [7, 8, 9]

Grounded the fact described above, this paper is made to determine the relationship between meat consumption, individual characteristics, and environmental factors in Datah village and Karangasem village with taeniasis.

MATERIAL AND METHODS

Case control study with purposive random sampling was applied in this study. Samples both in the case and control group were selected according to the inclusion and exclusion criteria. Inclusion criteria for case group (people at Datah village): people got meat from individual slaughtering, ≥1 years old, no previous treatment for taeniasis at least 6 months before the study, and consumed meat from individual live stock. Inclusion criteria for control group (people at Karangasem): got meat from slaughterhouse, ≥1 years old, no previous treatment for taeniasis at least 6 months before the study, and consumed meat from market or slaughterhouse. The exclusion criteria included children under 1 year old. About 30 grams of fecal samples was collected from both case and control groups for 3 consecutive days, 10% formalin was used for preservative. Saturated salt was used for Willy's Malory floatation method. Normal saline was used for direct method. Light microscope and optilab were used to identify the taenia egg. Risk factors of taeniasis were identified using questionaire. Descriptive analysis was used to explain the meat consumption, individual characteristics, and environmental factors which contribute to occurance of taeniasis.

RESULTS

Table 1. Characteristics of subjects in Datah and Karangasem Villages, Bali

Characteristics	Case		Control	
	N	%	N	%
Gender				
a. Male	50	51,02	62	63,3
b. Female	48	48,98	36	36,7
Age (Years)				
a. 1-10	14	14,29	12	12,2
b. 11-20	19	19,39	18	18,4
c. 21-30	7	7,14	8	8,2
d. 31-40	21	21,43	19	19,4
e. 41-50	23	23,47	22	22,4
f. 51-60	8	8,16	9	9,2
g. >60	6	6,12	10	10,2
Education level				
a. No school	15	15,31	12	12,3
b. Elementary school	33	33,67	36	36,7
c. Junior High School	17	17,35	29	29,6
d. Senior High School	33	33,67	19	19,4
e. Graduate/ Postgraduate	0	0,00	2	2,04
Occupation				
a. No job	41	41,84	54	55,2
b. Farmer	13	13,26	7	7,1
c. Business	19	19,39	16	16,3
d. Village staff	17	17,35	4	4,1
e. Civil Servant	4	4,08	7	7,1
f. Seller	4	4,08	4	4,1
g. Student	0	0,0	6	6,1

Table 1 shows prevalence of taeniasis, Two subjects from the case group were positive for taenia egg both by direct and Willy's Malory floatation methods, 2,04% in case group and 0 % in control group 2 subject (2,04%) in case group and 0 % in control group. Prevalence of taeniasis in case group showed that most high than control group.

Table 2. Prevalence of Taeniasis in Datah and Karangasem Villages, Bali

Fecal Sample	Case Group		Control Group	
	Number	Percentage	Number	Percentage
Positive	2	2,04%	0	0,0
Negative	96	97,96%	98	100,0
Total	98	100,0	98	100,0

p=0,001

Table 2 shows prevalence of taeniasis (egg *Taenia sp.*was positive) as much as in male and female (male 50%, female 50%, age both 31-40 years old, the education level both junior high school and the occupation of subject farmer and no job)

The relationship between meat consumption (the type of meat consumed, meat processing methods, frequency of consumption, how to obtain meat) with taeniasis both positive subject meat consumption beef and pork, undercooked meat processing methods, frequency of consumption 1x/week and obtain to meat from personal livestock.

DISCUSSIONS

Taeniasis in this study was found in the case group in Datah village i.e. 2 positive taeniasis cases found of 98 participants (2,04%) and 0% in control group. This study diffrerent with study Swastika et al, 2017 in Karangasem District, prevalence of taeniasis founded 1,10% (12/1090). This result shows prevalence of taeniasis in Karangasem is smaller than study in Datah because the participants of study in Karangasem are larger than in Datah. Another result, in Gianyar district prevalence of taeniasis founded 1,7% (3/173).

Prevalence of taeniasis in case group higher than control group because in case group, the existence of individual slaughtering of pigs in Datah village for ceremonies or parties without supervision from the animal health department is thought to increase the risk of taeniasis. In contrast with control group, people living in Karangasem village obtain meat of cattle or pigs which are slaughtered at supervised slaughter houses[10].

These results are certainly not as expected inspite the fact 2 years prior to the

study a health center survey found 10 positive taeniasis in Banjar Bingin, Datah village[11],whereas in this study only two cases found from Banjar Juwuk and Lebah, Datah village, respectively. In this study the methods used for fecal examination were only direct method with Lugol and flotation. It is difficult to distinguish between *T. Solium, T. saginata,* and *T. asiatica*. The two subjects with positive taenia eggs microscopically did not present proglottid so could not determine whether the cases were of taeniasis solium or taeniasis saginata or taeniasis asiatica[12]. Both taeniasis positive samples showed that flotation method was better than the direct method with Lugol.

Local people's habit of eating food with undercooked pork or beef cannot be removed because it is hereditary and closely related to traditional and ritual ceremonies. Balinese Hindu people including those in Datah villagenot only eat pork but also beef. A great segment of Hindu Balinese do eat beef,but according to the religion beef is not allowed for offerings and during religious events[13]. This fact is similar to that in the population of the village Ketewel, Gianyar, who predominantly consume beef lawar[14]. It is clear that people's habit is difficult to change but if the pork or beef consumed is closely observed for cysticercus larvae and meat processing was done properly, thentaeniasiscases can be minimized and the transmission source of cysticercosis in the can also be reduced in the community [15].

CONCLUSIONS

Prevalence of taeniasis among the case group was 2.04%. The type of meat consumed, meat processing methods, frequency of consumption, ways of obtaining meat and individual characteristics, and environmental factors which may contribute to the taeniasis infection in positive cases.

ACKNOWLEDGEMENTS

The authors thank Prof. Dr. Dewa Putu Widjana, DAP & E, Sp.ParK and Prof. Dr. Supargiyono, DTM & H, Sp.ParK for supporting this research and the suggestions given during the study

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