

# Taeniasis, a Neglected Tropical Disease in Sumatra Utara Province, Indonesia

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**Abstract:** Taeniasis is humans and animals infection due to *Taenia* or tapeworm specieses. The infection that occurs in humans because ingestion of meat and visceral organs that containing cysts as infective stage (*Cysticercus* larvae). The cause of taeniasis in humans are *Taenia solium*, *Taenia saginata* and *Taenia asiatica*. Taeniasis is one of the neglected diseases and is an unsolved problem in the world because it correlates with human behavior and lifestyle. **Material and Methode:** The survey was conducted from September 2017 until November 2017 ini Nagori Dolok, Village, Silau Kahaean Sub-district, Simalungun Regency, Sumatra Utara Province, Indonesia We met some of the people who had been Taeniasis patients and conveyed the purpose of the team's arrival. From 180 patients we suspect as *Taenia* carriers by clinical signs and physical examination and microscopic examination of eggs and proglottid worm that passing with feces or by anal swab. **Result:** From 180 suspected taenia carriers, we confirmed 171 patients diagnosed as Taeniasis and we treated by Praziquantel Tablet single dose and laxative. All of patients passing proglottids (segment of the worms), taenia eggs and proglottids strands. The longest proglottids strands that we found were 10.5 meters. **Conclusion:** Taeniasis (Tapeworm infection) is still widely found in the district Simalungun Regency which is neglected tropical disease that needs to get the attention of the Indonesia government through the Health Office of Regency and Province.

## 1 INTRODUCTION

Taeniasis is an infection caused by *Taenia* or tapeworm species in humans and animals (Ito et al., 2004). Human taeniasis results from ingestion of meat and visceral organs containing cysts at infective stage (*Cysticercus* larvae). *T. solium* and *T. asiatica* are acquired by eating inadequately cooked pork contaminated with cysts, whereas *T. saginata* by eating undercooked beef. Taeniasis is one of the neglected diseases and is an unsolved problem because it correlates with human behaviour and lifestyle. Taeniasis cases are found mostly in developing countries, but has been spreading to developed countries like USA and Japan due to increase in tourism and immigration (Yanagida et al., 2012). Prevalence in the world is about 50 million people, whether infected with *T. saginata*, *T. solium*, or *T. asiatica*. WHO reported that there were 2-3 million people infected with *T. solium* tapeworms. The highest prevalence of taeniasis is found in Latin America, Africa, and Asia (CDC., 2013). Taeniasis is an endemic infection in several countries in Southeast Asia such as Thailand, Cambodia, Lao PDR,

Philippine and Indonesia ( Wandra et al., 2006a, WHO 2011, CDC., 2013).

The prevalence of taeniasis in Indonesia was estimated to be 1.1%-45.8% (Suroso et al., 2006; Wandra et al., 2006a). At present there has been reported 4 endemic provinces for taeniasis and cysticercosis in Indonesia: Papua (formerly Irian Jaya), Bali, East Nusa Tenggara, and Sumatra Utara (MoH RI, 2012). The highest prevalence reported in Papua was 42.7% in 1997. (Widarso et al., 2001). In Assologaima, a subdistrict in northwest of Wamena, Jayawijaya District, a total of 293 new cases of epileptic seizures were reported during 1991-1995. Resected cysts from patients and a pig examined histopathologically revealed *T. solium* cysticerci, which were confirmed by DNA analysis (Wandra et al., 2000). Meanwhile, Theis et al., reported that the prevalence of human cysticercosis in Bali was 13%. Positive serological results was 10/74 (13.5%) among patients with epilepsy suggested a significant cases suffered from neurocysticercosis. Sporadic taeniasis cases was also reported in Lampung, Sulawesi Utara and Sulawesi Tenggara from the transmigrant Balinese who are mostly Hindu and eat pork.

Detection of taeniasis carriers is based on questionnaire and stool examination (Wandra et al., 2015). However, it is not easy to detect them as local customs of consumption uncooked or undercooked has changed to a well-cooked pork (Ito et al., 2004). This is also compounded by the fact that most patients are asymptomatic. The most reliable clinical diagnosis of taeniasis is history of the expulsion of the gravid proglottids passed spontaneously through the rectum or in the feces (Wandra et al., 2006a). Microscopic stool examination for detection of the eggs is a simple method but lacks both sensitivity and specificity (Mayta et al., 2008). Differentiation of *T. solium* and *T. saginata* or *Taenia saginata asiatica* is based on the morphological characteristic of the scolex or gravid proglottids. The number of uterine branches present in gravid proglottids or the presence or absence of rostellum in the scolex can be examined by staining with carmine dyes, pressed and fixed with alcohol formalin acetic acid (Parija and Ponnambath, 2013) or histologically using hematoxylin-eosin staining (Mayta et al., 2000). However, PCR-based molecular examinations such as mitochondrial DNA analysis and DNA sequencing are more sensitive for differentiating among the three species of taeniasis carriers (Ito et al., 2008; Okamoto et al., 2001).

The prevalence of taeniasis in Sumatra Utara in 1972 was reported to range from 2.0 to 9.5 % (Widarso et al., 2001; Wandra et al., 2007). However, there had been no other report of taeniasis in Sumatra Utara over the last decade (Wandra et al., 2006b).

The strain of *Taenia saginata asiatica* had been reported in Samosir island, North Sumatra, in 1997 whose larvae were found in the liver of infected pig. This larvae is the source of taeniasis infection for human (Depary et al., 2003). There had been a limited effort to eradicate the disease by conducting a measured program such as training of health professional, community education, and provision of antihelminthics (Suroso et al., 2006). However, drugs of choice for taeniasis such as praziquantel and niclosamide are difficult to be obtained in Indonesia, and prevention is also hampered by local community culture barriers (Zein et al., 2014). Thus, epidemiological data of this disease in the endemic areas has to be provided so that the prevention program can be implemented appropriately. Here, we report our recent surveys of taeniasis carriers in Simalungun Regency, Sumatra Utara Province, Indonesia.

## 1.1 Materials and Method

In September 2017, we did a preliminary survey accompanied by a local community leader to meet taeniasis carriers who were our former patients at Nagori Dolok village, Silau Kahaean, a sub-district of Simalungun Regency. These patients would inform local people who had expelled "worms" previously to be examined by our research team. Subsequently, we conveyed our aims of study to the head of local health officer, who would gather the patients at the Primary Health Center in Nagori Dolok village, so that the fecal samples can be obtained. This collaboration was strengthened by signing a memorandum of understanding. Ethical Clearance for this research from Ethical Committee Faculty of Medicine, Universitas Methodist Indonesia. All subjects signed Informed Consent form before conducted clinical and laboratory examination

On October 20, 2017, we examined 30 patients who had been gathered at the Primary Health Center. Among them twenty nine patients were having worms expelled in the stools, and bring feces samples and we examined them by anal swab to microscopic examination to found taenia eggs in faces, so that they were clinically diagnosed as taeniasis carriers, and were given Praziquantel 600 mg as a single tablet, followed by 2 tablets of Dulcolax 5 mg as a laxative after 1-2 hours. The stools were collected in the plastic bags provided.

The second visit to the Primary Health Center, Nagori Dolok on November 2, 2017, 96 from 104 patients had a history of passing worms in the stools and we diagnosed as *Taenia* carriers. On the third visit conducted on November 4, 2017, we found 46 *Taenia* carriers patients by the same method. The same treatments were given to all the carriers. Thus, a total of 171 taeniasis cases was definitely diagnosed among 180 fecal samples collected

## 2 RESULTS

The youngest patient was 12 years, and the oldest 70 years. The highest numbers of cases found in the age group of 41-50 years (70 patients, 40.9%). The ratio male and female was 7:1. The results of macroscopic and microscopic examinations of fecal samples are shown in Table 1.

Table 1. Age and Gender Characteristics of Taeniasis Carriers

Age (Year)	Gender				Total	%
	Male	%	Female	%		
12 - 30	18	10,5	3	1,8	21	12,3
31 - 40	26	15,2	2	1,2	28	16,4
41 - 50	58	33,9	12	7,0	70	40,9
51 - 60	29	16,9	4	2,4	33	19,3
> 60	18	10,5	1	0,6	19	11,1
<b>Total</b>	<b>149</b>	<b>87,0</b>	<b>22</b>	<b>13,0</b>	<b>171</b>	<b>100</b>

All the samples showed proglottids macroscopically, and eggs were recovered in the gravid proglottids. The longest proglottids strands that we found on October 20, 2017 was 2.86 meters in the stool of a 46 year old male patient (Figure 1).

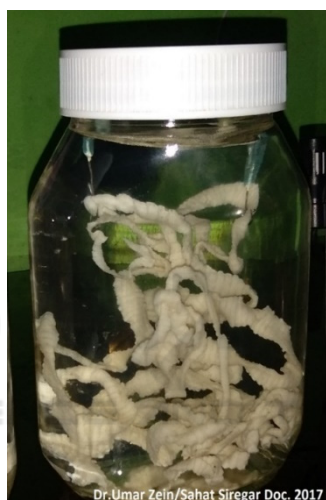


Figure 1. The proglottids strands are 2.86 meters in length.

The longest proglottids strands found in the stool on November 2, 2017 was 10.5 meters and on November 4, 2017, the longest proglottids strands was 8 meters respectively (Figure 2, and Figure 3).



Figure 2. The proglottids strands is 8 meter in length.

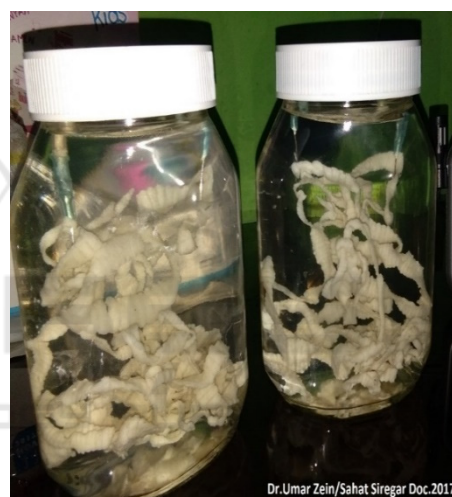


Figure 3. The proglottids strands of the taenia collected in two jars from a taeniasis carrier measured 10.5 meters in length.

## 2.1 Discussion

Three years ago, we found three cases of *Taenia asiatica* infection which was confirmed by histological examination of the proglottids. These cases had a history of consuming inadequately cooked pork. Two patients lived in the Silau Kahaeen, a sub-district of Simalungun Regency, Sumatra Utara and another from Silindak village, Serdang Bedagai Regency (borders Simalungun Regency) of Sumatra Utara Province. These cases led us to discover more cases of taeniasis in this new endemic areas

Batak Simalungun tribe is the indigenous people at the Simalungun Regency. The other tribes are Batak Karo and tribal immigrants. The religions adopted by the Simalungun are mostly Protestant or Catholics Christians (47%), Moslem (46.6%),

Buddhist (2.06%), Hindu (0.05%), and others like Parmalim. This regency has 32 sub-districts with an area of 438,660 ha or 6.12% of the total area of Sumatra Utara Province. The entire sub-district consists of 345 villages (nagori) and 22 new villages (kelurahan).

Table 2. Duration of symptoms and Consumption of Anthelmintic Drugs in Patients

	≤ 1 year	1 – 5 years	5 – 10 years	≥ 10 years	Total
Duration of symptoms	5	10	30	126	171
	Combantrin	Albendazole	Mebendazole	Traditional Medicine	
Anthelmintic consumption	65	54	43	9	171

The duration of symptoms of the disease is felt by all patients more than 10 years. The main complaint is the release of proglottid (worm pieces) from the anus spontaneously or when defecating. All patients claimed to have visited a Primary Health Centre (Puskesmas) or physician clinic and were always given antihelmintic treatment for Soil Transmitted Helminth types, such as Combantrin, albendazole and Mebendazole (Table

### 3 CONCLUSIONS

We have been found a new endemic area of taeniasis Silau Kahaen, a sub-district of Simalungun Regency in Sumatra Utara Province, Indonesia, besides those recorded in Samosir Island, also in North Sumatra and some other parts of Indonesia. We can call this disease is Neglected Tropical Disease, because almost patients have complaint during more than 10 years and specific medicine for the disease no available in Indonesia, especially di Sumatra Utara Province

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