Intestinal Parasites among school children (7 to 12 years) in rural areas of Kudat District Sabah Malaysia

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INTRODUCTION

Parasitism is the relationship between two species in which one benefits at the expense of the other [1]. Worms are common parasites of human beings. Protozoa and worms are common intestinal parasites in rural settings where the level of sanitation is substandard. Among the common intestinal parasites, soil-transmitted helminthiases (STHs) collectively cause the highest global burden of parasitic disease after malaria and are most prevalent in the poorest communities[2]. In 1999, WHO estimated that schistosomiasis and soil-transmitted helminths represented more than 40% of the disease burden due to all tropical diseases, excluding malaria [3]. Soil-transmitted helminthiases (STHs) are intestinalnematodes (*Ascaris lumbricoides, Trichuris trichiura* and the hookworms *Ancylostoma duodenale* and *Necator americanus*) infecting humans and are included in the World Health Organization list of Neglected Tropical Diseases[2]. This STH infection is now posing a health threat to developing nations due to its large health burden. It is estimated by WHO in 2002 that nearly 2000 million people worldwide would be affected by soil transmitted helminths (STH) [4]. In China alone, it is estimated to have 194 million people infected with STH [5].

The eggs of the parasitic worms are passed through faeces into warm soil where they may contaminate water sources or food. The route of infection for soil-transmitted helminthes begins with eggs in human faeces contaminating the soil. People are infected when they ingest the eggs from unwashed food or hands, or in the case of hookworms, which penetrate the skin, from walking barefoot or any other direct contact with infested soil [6]. Children are likely to be infected from the time they begin to crawl and will be continually re-infected for the rest of their lives. For adults, the problem of whipworm and roundworm becomes less important due to more hygienic behaviours, whereas hookworm infection continues to steadily build up over the years[6]. This is common in areas of poor sanitation and overcrowding is usually a predisposing factor for its high prevalence. Once a person is heavily infected, it manifests as symptoms such as abdominal pain, diarrhea, general malaise and weakness[7] . *Ascaris lumbricoides* has been associated with biliary and pancreatic duct obstruction. Hookworm infection has long been linked to iron deficiency anemia [8] . As majority of infected persons are children, the ramifications of severe infection are even greater. Complications such as malnutrition, physical and cognitive growth retardation may arise. In a study by De Silva, Chan, and Bundy (1997), they

estimated that about 1.5 million children would never make up the deficit in growth, even if treated [9]. It is stated that the soil-transmitted helminthes are one of the world's most important causes of physical and intellectual growth retardation [10]. Thus, the STH infection would hinder not only educational betterment but also the long term economic growth of a country. Factors like low family income, inadequate sanitation, presence of animals in house, drinking water obtained from rivers and wells, low parental education, geophagia and poor personal hygiene, etc; have been proven to increase risk of infection [11] [12] [13]. Increased research into novel methods of intervention and understanding the health impacts of STH infections have been suggested as steps forward to facilitate effective control in highly endemic regions[7].

As a developing country, Malaysia is not spared from the burden of this disease. The list of lumen dwelling protozoa and worms that are prevalent among rural communities in Malaysia include roundworms, whipworms, pinworms and hookworms [14]. In a 1997 study in West Malaysia, the prevalence of ascariasis, trichuriasis and hookworm infection among Orang Asli people ranges between 30.2-69.0%, 15.8- 98.2% and 6.0-51.0% respectively [15]. In 1980s studies, 52.7% of the school children in urban, suburban and rural areas around Kuala Lumpur were infected with one or more of soil transmitted helminthes [16]. The KL school survey (1984), Crocker range park study (2003) and Kelantan school children study by USM (2003) have highlighted the problem of intestinal helminthes among school children[14] [16] [17].

As prevention of soil transmitted helminthes infections is crucial for the betterment of general health of Malaysian population, feasible interventions are being sought for. The three major interventions are anti-helminthic drug treatment, sanitation, and health education. The Millennium Development Goals (MDGs) of Malaysia aimed at reducing the proportion of people without sustainable access to safe drinking water and set its target for 99% population to obtain access to improved drinking water sources[18] [19]. This could result in marked reduction of communicable diseases in both urban and rural settings. The choice of appropriate intervention relies largely on the epidemiological characteristics of an area and the resources available. The widely applied strategy for control of helminthes infection in Malaysia is regular de-worming with anti-helminthic drugs , being provided free of charge in all public health facilities, including outpatient clinics during health campaigns. Laboratories are also available in government health facilities to provide service for confirmation of helminthes infections (MOH Malaysia 2008). Studies have also shown that

the growth and physical fitness deficits caused by chronic STH infections are sometimes reversible following treatment with anti-helmintic drugs[20].

A cross sectional study conducted in Kampung Barambangan, Kudat district in 2007 by DKS Naing et al showed household positivity of 78.9% [21]. And the stool positivity was 59% with a slight female preponderance of 60.5% in contrast to 57.1% of males. Among those positive cases, 19.5% showed mixed infection with *Ascaris lumbricoides* and *Trichuris trichura* while 56% and 24.4% were of single infections with *Trichuris trichura* and *Ascaris lumbricoides* respectively. The study also suggested a significant relationship between household water supply and worm infestation with an Odds ratio of 9.9 (CI of 1.30 to 93.37). The highest prevalence for males (68%) and for females (78.9%) was reported among school going age group (6-15 years) [21]. This information indicated that the school going age group posed highest risk for worm infestation in Malaysian Borneo.

This study aims at assessing the prevalence of intestinal parasitism among school children of Rural Kudat area in Sabah State for the benefit of future preventive services. It is also expected that the study results would form a basis for effective planning of school health programmes in Sabah, Malaysia.