Intestinal worm infections among refugee children in Thailand

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Methodology

- Data sampling
  a) Anthropogenic = Weight, height, upper-arm circumference
  b) Morbidity = Health records of the last 12 months from a local hospital
  c) Socioeconomic = Sex, age, date of birth, household conditions, toilet availability, vehicle, parent’s education/occupation

- Sampling of stool assisted by parents.
- DNA extraction from stool using the PowerSoil DNA extraction kit by MoBio®.
- Multiplexed-Tandem Polymerase Chain Reaction assay to amplify a specific gene of interest which is similar enough among worm species to amplify all DNA samples in one reaction but different enough to differentiate between worm species.
- MT-PCR advantages:
  Higher sensitivity and specificity than usual PCR assay
  Internal control with known standard
  User friendly robotic platform

Note:
Ethic approval was obtained through collaborator’s local HREC (Thailand) and will be reviewed by the WEHI HREC (Australia). Faecal samples will be collected and processed after the standard precaution guidelines by the World Health Organization.

Hypotheses

- High worm infections are present in children <5 years.
- Many children are stunted, wasted and less far developed than compared to healthy children.
- Multi-parasitism is common.
- Drug resistances are emerging over time due to mass drug administration of Benimidazoles.

Aims

1. How many pre-school children from the Karen community are infected with intestinal worms?
2. Which worm species cause infection?
3. Is multi-parasitism common (infection with more than one species)?
4. What are the acute and chronic health implications the children suffer from caused by intestinal worm infection?

References

3. Beautiful images, commons.wikimedia.org - See How They Squiggle and Squirm!?
4. Figure 1: Global impact of Soil-Transmitted Helminths in number of infections and disability-adjusted life years. Please see the attached image.
5. Karen ethnic population: ~146,477 refugees in 7 camps
6. Remote, mountainous and forested living conditions with high summer rainfall
7. Karen, Mon and Kareni minorities since 1984 in the Tak province
8. Figure 2: Global infection prevalence, disease burden and number of children at risk of infection of Soil-Transmitted Helminths. Please see the attached image.
9. Figure 3: Infection intensity of malaria versus infection intensity of Soil-Transmitted Helminths worldwide. A: Global infection prevalence of Soil-Transmitted Helminths. Please see the attached image.
10. Figure 4: Polymerase Chain Reaction procedure. Firstly denaturation of double-stranded DNA splits hydrogen bonds between bases and creates single-strand. Secondly, annealing of species specific primers to DNA strand. Thirdly, elongation of single-stranded DNA synthesizes a new double-strand by using added dNTPs and Taq Polymerase.

Acknowledgements

I would like to acknowledge all participants and their families. Many thanks to the Walter and Eliza Hall Institute, my supervisors Aaron Jes and Harin Karunajeewa as well as the Jex lab. I would also like to thank Mahidol University for the collaboration, namely Su Phanuakmon and Poom Adisakwattana.