

## APPENDIX A

### PHOTOGRAPHS OF SEKOLAH KEBANGSAAN KUALA KOYAN (SKKK) AND SEKOLAH KEBANGSAAN POS BETAU SCHOOL (SKPB)



Sekolah Kebangsaan Kuala Koyan (Control school)





**Sekolah Kebangsaan Pos Betau (Intervention, HELP school)**



## APPENDIX B

## PHOTOGRAPHS OF ORANG ASLI CHILDREN AND THEIR VILLAGES



Walking and playing barefooted





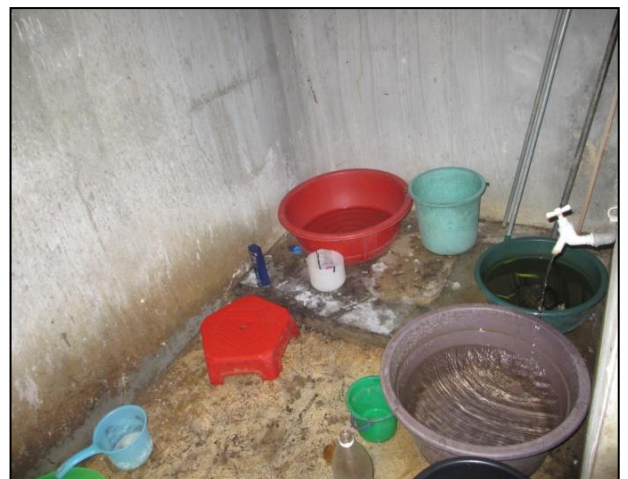
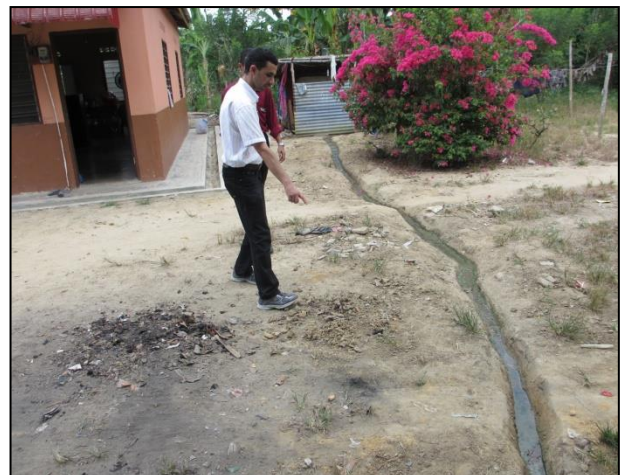
**Dirty long nails**



**Indiscriminate/open defecation**



**Lack of proper sanitation**



**Poor water supply**





**A new house made of bricks and concrete and an old house made of bamboo**



**Toilets inside the new houses are used as store rooms**



**For cultural beliefs, Orang Asli prefer to build the toilets outside the house**





**Road to Orang Asli villages**



**River means “the life” for Orang Asli**



**Orang Asli believe in witchcraft and sorcery in defending diseases and evil spirits**



**APPENDIX C**

**QUESTIONNAIRE SURVEY**



**Questionnaire surveys at Orang Asli communities**



## APPENDIX D

## ANTHELMINTIC TREATMENT



Albendazole (400 mg; 2 tablets, 200 mg each)



Administration of Albendazole (Zentel®) tablets, direct observation therapy (DOT)



## APPENDIX E

### FECAL SAMPLES EXAMINATION



**Kato-Katz Kit technique for STH eggs**



**Harada Mori fecal culture technique for hookworm larvae**

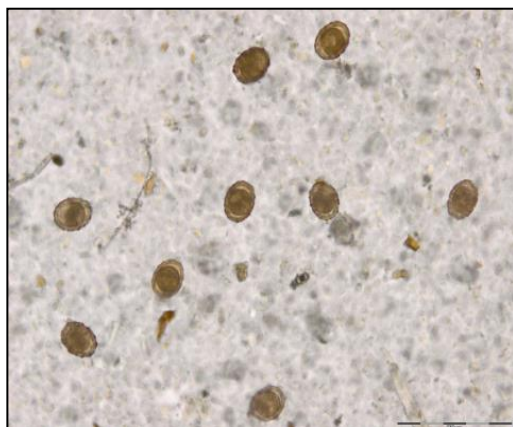
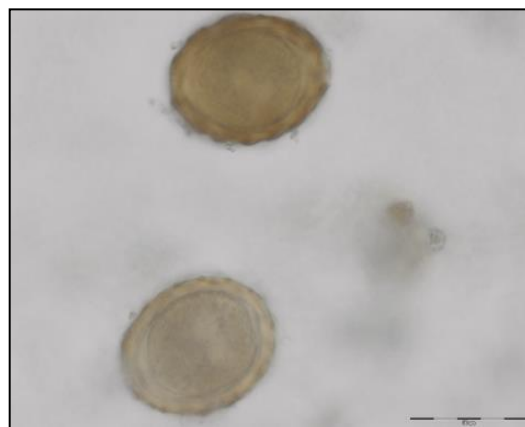
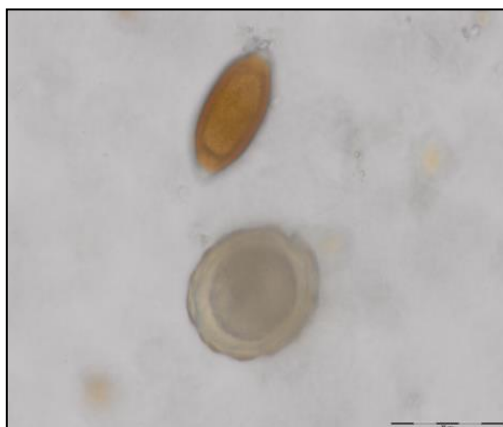
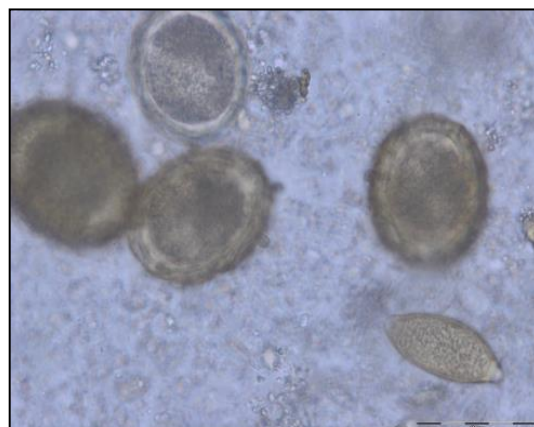


**Processing and microscopic examination of fecal samples**



## APPENDIX F

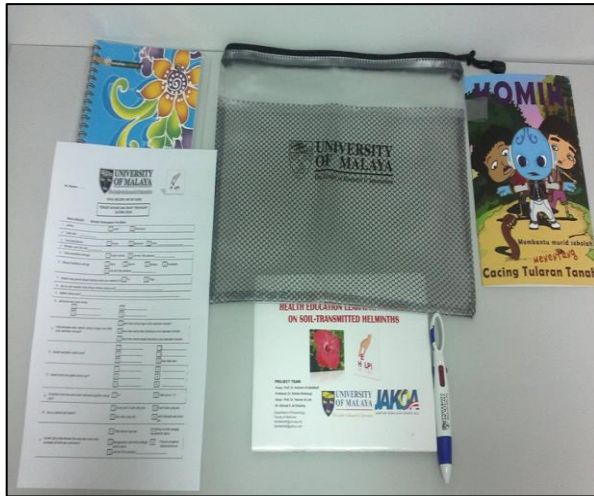
## PHOTOMICROGRAPHS OF EGGS AND LARVAE OF STH

**Ascaris lumbricoides eggs (x10)****Ascaris lumbricoides eggs (x40)*****T. trichiura* and *A. lumbricoides* eggs in mixed infection (x40)****Heavy mixed infection of *A. lumbricoides* and *T. trichiura* egg (x40)****Hookworm egg (x40)****Hookworm larva (x10)**



## APPENDIX G

## HELP WORKSHOP FOR TEACHERS



Teacher's kit



Assessment of teachers' knowledge about STH



Scientific lecture on STH



Introducing HELP to the teachers



Posters demonstration



Microscopic slides and gross specimens for STH



## APPENDIX H

### HELP ADMINISTRATION & FOLLOW UP



Training for teachers as 'HEALTH EDUCATORS' to pupils and to follow up HELP activities



Distribution of HELP posters, aid kit and sanitary



Fixing up HELP stand rolls





Fixing up HELP posters



Nail cutting





HELP- Puppet show





**HELP posters were fixed up by children at their households**



APPENDIX I  
HELP FOLLOW UP

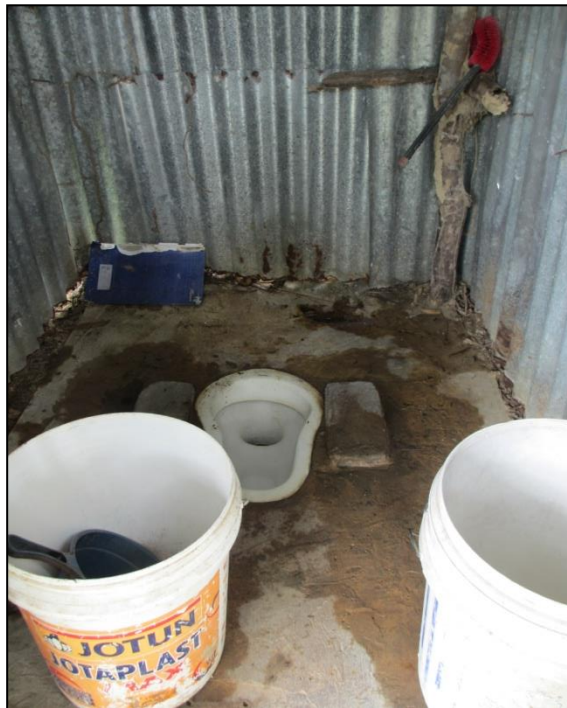
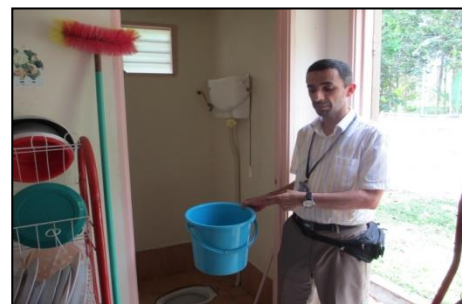


Follow-up of hygienic practices



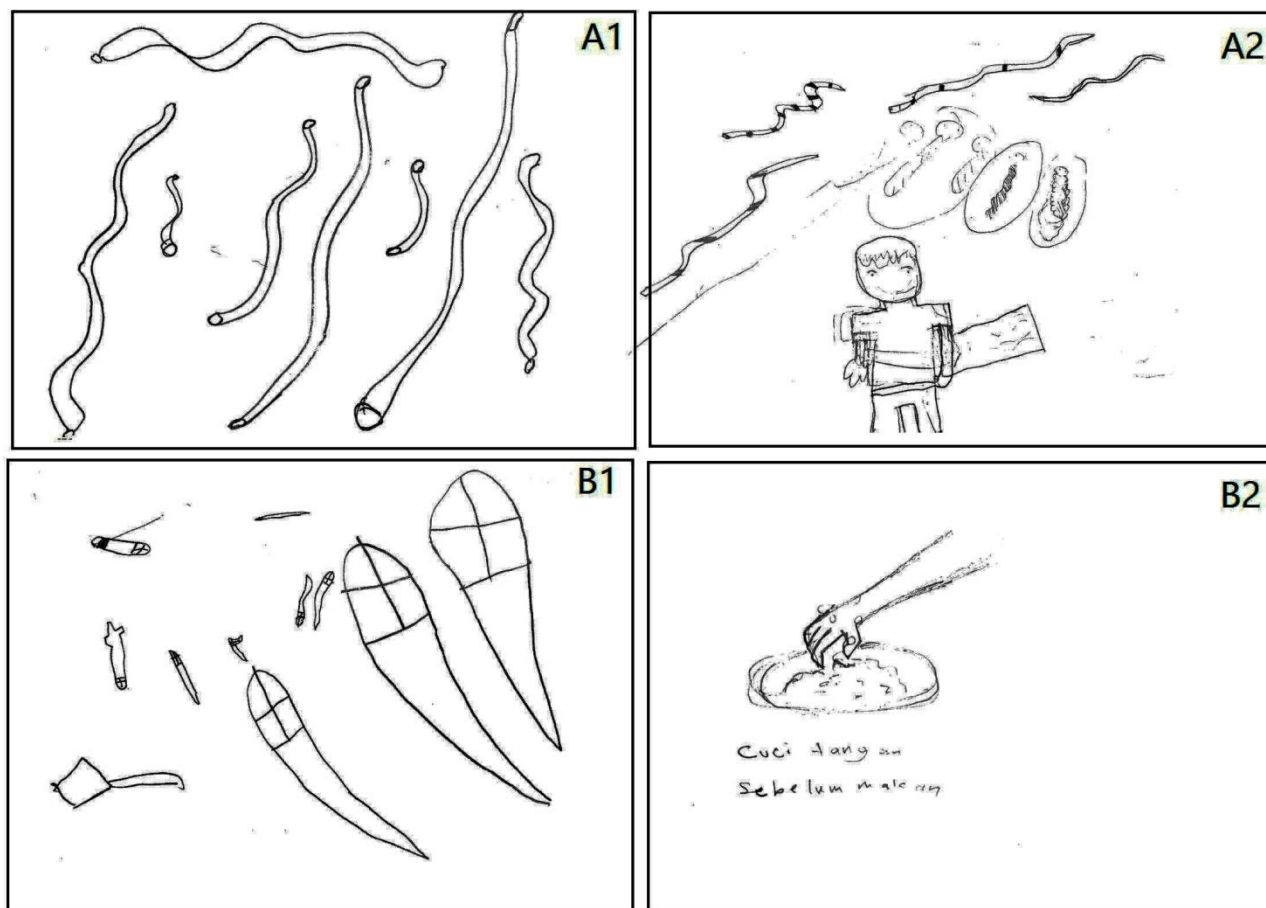
**Before HELP, toilets of the new houses are used as store rooms**

HELP was introduced; people were educated about the importance of sanitation and encouraged to clean & use the toilets



**After HELP, many people started using toilets**





Examples of drawing assessments for children at baseline and after 3 months

A: Control school    B: Intervention school    1: Baseline    2: After 3 months

## APPENDIX J

## QUESTIONNAIRE SURVEY FOR ORANG ASLI PARTICIPANTS



## SOAL-SELIDIK

PENGETAHUAN, TABIAT DAN AMALAN TERHADAP  
JANGKITAN CACING USUS: BERDASARKAN KAJIAN  
KOMUNITI DI KAWASAN LUAR BANDAR DI  
MALAYSIA

NO. RUJUKAN: \_\_\_\_\_



| A. PERSONAL INFORMATION:                                   |   |
|--|---|
| 1  | Name: _____   |
| 2  | I.C. number: _____  |
| 3  | Ethnic group (Tribe): _____   |
| 4  | Date of birth (dd/mm/yyyy): _____   |
| 5  | Gender <input type="checkbox"/> 1 Male <input type="checkbox"/> 2 Female  |
| 6  | Address: Village: _____<br>District: _____<br>State: _____  |
| 7  | The highest educational level: <input type="checkbox"/> 1 Never go to school <input type="checkbox"/> 2 Primary<br><input type="checkbox"/> 3 Secondary <input type="checkbox"/> 4 Tertiary/ University<br><input type="checkbox"/> 5 Others (please specify): _____      |
| 8  | Spouse's highest educational level: <input type="checkbox"/> 1 Never go to school <input type="checkbox"/> 2 Primary<br><input type="checkbox"/> 3 Secondary <input type="checkbox"/> 4 Tertiary/ University<br><input type="checkbox"/> 5 Others (please specify): _____ |
| 9  | Occupation: _____   |
| 10   | Spouse's occupation: _____  |
| 11   | Average family monthly income: RM _____   |
| 12   | Number of residents in the same house: _____  |
| 13   | Number of rooms in your house (according to the list):<br><input type="checkbox"/> a Bedroom: _____<br><input type="checkbox"/> b Living room: _____<br><input type="checkbox"/> c Kitchen: _____<br><input type="checkbox"/> d Only one room: _____                      |
| B. SOURCE OF WATER, ENVIRONMENT AND SANITATION CONDITIONS: |   |
| 14   | What is the main source of water used for drinking? <input type="checkbox"/> 1 River <input type="checkbox"/> 2 Pipe water <input type="checkbox"/> 3 Well<br><input type="checkbox"/> 4 Rain <input type="checkbox"/> 5 Others: _____                                    |
| 15   | What is the main source of water used for cooking? <input type="checkbox"/> 1 River <input type="checkbox"/> 2 Pipe water <input type="checkbox"/> 3 Well<br><input type="checkbox"/> 4 Rain <input type="checkbox"/> 5 Others: _____                                     |
| 16   | What is the main source of water used for washing clothes and utensils? <input type="checkbox"/> 1 River <input type="checkbox"/> 2 Pipe water <input type="checkbox"/> 3 Well<br><input type="checkbox"/> 4 Rain <input type="checkbox"/> 5 Others: _____                |
| 17   | Is there a river or stream near your house? ( $\leq 150$ meter) <input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 No <input type="checkbox"/> 3 I Don't know  |
| 18   | Is there a gravity feed dam near your house? ( $\leq 150$ meter) <input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 No <input type="checkbox"/> 3 I Don't know   |

|  |  |   |   |
|--|--|---|---|
| 34   | How many times <u>per week</u> do your children have shower (bath)?  | <input type="checkbox"/> 1 Less than 4 times per week                         | <input type="checkbox"/> 2 4-6 times per week         |
|  |  | <input type="checkbox"/> 3 7 times per week                                   | <input type="checkbox"/> 4 More than 7 times per week |
| 35   | How many times <u>per week</u> do your children change their clothes?  | <input type="checkbox"/> 1 They didn't change clothes during the past 7 days  | <input type="checkbox"/> 2 1-3 times per week         |
|  |  | <input type="checkbox"/> 3 4-6 times per week                                 | <input type="checkbox"/> 4 7 or more times per week   |
| 36   | During the past 7days, where did your children usually defecate?   | <input type="checkbox"/> 1 River  | <input type="checkbox"/> 2 Pit latrine                |
|  |  | <input type="checkbox"/> 3 Bush latrine (outdoors)                            | <input type="checkbox"/> 4 Pour flush toilet          |
| 37   | During the past 7 days, how many times did your children eat vegetables, such as tomatoes, cucumber, green salad, or carrots?            | <input type="checkbox"/> 1 They did not eat vegetables during the past 7 days | <input type="checkbox"/> 2 1 time per week            |
|  |  | <input type="checkbox"/> 3 2-3 times per week                                 | <input type="checkbox"/> 4 4 or more times per week   |
| 38   | During the past 7 days, how many times did your children eat fruits, such as rambutan, banana, watermelon, apple, duku, papaya or mango? | <input type="checkbox"/> 1 They did not eat fruits during the past 7 days     | <input type="checkbox"/> 2 1 time per week            |
|  |  | <input type="checkbox"/> 3 2-3 times per week                                 | <input type="checkbox"/> 4 4 or more times per week   |
| 39   | Do you wash fruits such as rambutan, apple, duku, or mango before eating?  | <input type="checkbox"/> 1 Never  | <input type="checkbox"/> 2 Rarely                     |
|  |  | <input type="checkbox"/> 3 Sometimes  | <input type="checkbox"/> 4 Always                     |
| 40   | Do you wash the vegetables before eating?  | <input type="checkbox"/> 1 Never  | <input type="checkbox"/> 2 Rarely                     |
|  |  | <input type="checkbox"/> 3 Sometimes  | <input type="checkbox"/> 4 Always                     |
| 41   | How often do you boil water before drinking ?  | <input type="checkbox"/> 1 Never  | <input type="checkbox"/> 2 Rarely                     |
|  |  | <input type="checkbox"/> 3 Sometimes  | <input type="checkbox"/> 4 Always                     |
| <b>D KNOWLEDGE ABOUT INTESTINAL WORMS:</b> |  |   |   |
| 42   | Did you ever hear about intestinal worm before this time?  | <input type="checkbox"/> 1 Yes  | <input type="checkbox"/> 2 No                         |
| 43   | If yes, where did you hear about intestinal worms ? _____  |   |   |
| 44   | What are intestinal worms? _____   |   |   |
| 45   | Give types or names of intestinal worms that you know:   |   |   |
|  | 1) _____   | 2) _____  |   |
|  | 3) _____   | 4) _____  |   |
| 46   | Do you think that worms are good or bad for people's health?   | <input type="checkbox"/> 1 I think worms are <u>good</u> for health           |   |
|  |  | <input type="checkbox"/> 2 I think worms are <u>harmless</u>                  |   |
|  |  | <input type="checkbox"/> 3 I think worms are <u>harmful</u> to health         |   |
|  |  | <input type="checkbox"/> 4 I do not know                                      |   |



|                                     |  |  |   |  |
|-------------------------------------|--|--|---|--|
| 19                                  | Is there a lake near your house ? ( $\leq 150$ meter)<br>Note: The lake is natural and has inlets that carry fish. | <input type="checkbox"/> 1 Yes                               | <input type="checkbox"/> 2 No                             | <input type="checkbox"/> 3 I Don't know          |
| 20                                  | Is there a pond near your house ? ( $\leq 150$ meter)<br>Note: The a pond is man-made and smaller than the lake.   | <input type="checkbox"/> 1 Yes                               | <input type="checkbox"/> 2 No                             | <input type="checkbox"/> 3 I Don't know          |
| 21                                  | What is the toilet facility used by your household members?  | <input type="checkbox"/> 1 Lead to sewer pipes               | <input type="checkbox"/> 2 Lead to septic tank            |  |
|                                     |  | <input type="checkbox"/> 3 Lead to other places              | <input type="checkbox"/> 4 Others (please specify ):_____ |  |
| 22                                  | Do you have pour-flush toilet in your home?  | <input type="checkbox"/> 1 Yes                               | <input type="checkbox"/> 2 No                             | <input type="checkbox"/> 3 No toilet in our home |
| 23                                  | Is there electricity in the house?   | <input type="checkbox"/> 1 Yes                               | <input type="checkbox"/> 2 No                             |  |
| 24                                  | Do you have cats or dogs in the house or in the surrounding area?  | <input type="checkbox"/> 1 Yes                               | <input type="checkbox"/> 2 No                             |  |
| 25                                  | How do you dispose of your household waste (garbage)?  | <input type="checkbox"/> 1 Dispose of in open fields         | <input type="checkbox"/> 2 Dispose of in the river        |  |
|                                     |  | <input type="checkbox"/> 3 Burying or burning in open fields | <input type="checkbox"/> 4 Others (please specify ):_____ |  |
| <b>C PERSONAL HEALTH PRACTICES:</b> |  |  |   |  |
| 26                                  | Do your children wash their hands before eating?   | <input type="checkbox"/> 1 Never                             | <input type="checkbox"/> 2 Rarely                         |  |
|                                     |  | <input type="checkbox"/> 3 Sometimes                         | <input type="checkbox"/> 4 Always                         |  |
| 27                                  | Do your children use soap when washing their hands?  | <input type="checkbox"/> 1 Never                             | <input type="checkbox"/> 2 Rarely                         |  |
|                                     |  | <input type="checkbox"/> 3 Sometimes                         | <input type="checkbox"/> 4 Always                         |  |
| 28                                  | Do your children wash their hands with soap after playing with soil?   | <input type="checkbox"/> 1 Never                             | <input type="checkbox"/> 2 Rarely                         |  |
|                                     |  | <input type="checkbox"/> 3 Sometimes                         | <input type="checkbox"/> 4 Always                         |  |
| 29                                  | Do your children wash their hands after defecation ?   | <input type="checkbox"/> 1 Never                             | <input type="checkbox"/> 2 Rarely                         |  |
|                                     |  | <input type="checkbox"/> 3 Sometimes                         | <input type="checkbox"/> 4 Always                         |  |
| 30                                  | During the past 7 days did your children cut their nails?  | <input type="checkbox"/> 1 Yes                               | <input type="checkbox"/> 2 No                             |  |
|                                     |  | <input type="checkbox"/> 3 I do not know                     |   |  |
| 31                                  | Do your children eat using their hands?  | <input type="checkbox"/> 1 Never                             | <input type="checkbox"/> 2 Rarely                         |  |
|                                     |  | <input type="checkbox"/> 3 Sometimes                         | <input type="checkbox"/> 4 Always                         |  |
| 32                                  | Do your children eat soil?   | <input type="checkbox"/> 1 Never                             | <input type="checkbox"/> 2 Rarely                         |  |
|                                     |  | <input type="checkbox"/> 3 Sometimes                         | <input type="checkbox"/> 4 Always                         |  |
| 33                                  | Do your children wear shoes when going outside?  | <input type="checkbox"/> 1 Never                             | <input type="checkbox"/> 2 Rarely                         |  |
|                                     |  | <input type="checkbox"/> 3 Sometimes                         | <input type="checkbox"/> 4 Always                         |  |

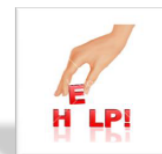
|   |  |   |                                     |
|---|--|---|-------------------------------------|
| 47  | What are the signs and symptoms of intestinal worms infections?  | 1 _____   | 2 _____                             |
|   |  | 3 _____   | 4 _____                             |
|   |  | 5 _____   | 6 _____                             |
| 48  | How do people acquire intestinal worms?  | 1 _____   | 2 _____                             |
|   |  | 3 _____   | 4 _____                             |
| 49  | Have you had intestinal worm infection?  | 1 Yes   | 2 No                                |
| 50  | If yes, when was the last time?  | 1 Less than 3 months ago  | 2 Six months ago                    |
|   |  | 3 One year ago  | 4 I do not remember                 |
| 51  | How can we prevent intestinal worm infections?   | 1 _____   | 2 _____                             |
|   |  | 3 _____   | 4 _____                             |
|   |  | 5 _____   | 6 _____                             |
| <b>Interviewer will ask again about what was used by respondents to prevent worm infections (Mark with ✓ on the number of the practice/s)</b> |  |   |                                     |
| 52  | Do you think human feces can be a source of infection for intestinal worms?  | 1 Human feces can not be a source of infection for intestinal worms |                                     |
|   |  | 2 Human feces can be a source of infection for intestinal worms     |                                     |
|   |  | 3 I don't know  |                                     |
| <b>E TREATMENT AND TREATMENT-SEEKING BEHAVIOUR</b>  |  |   |                                     |
| 53  | Was your child on treatment for intestinal worm during the last 6 months?  | 1 Yes   | 2 No                                |
|   |  |   | 3 I don't know                      |
| 54  | If your child suffers diarrhea or abdominal pain what do you do?   | 1 Nothing   | 2 Take traditional medicinal plants |
|   |  | 3 Go to traditional healer  | 4 Go to clinic                      |
| 55  | If you use herbal medicine, give the names of these herbs  | 1 _____   | 2 _____                             |
|   |  | 3 _____   | 4 _____                             |
| <b>F QUESTIONS ABOUT MEDIA</b>  |  |   |                                     |
| 56  | During the past 3 months, did you read, hear or watch any information about intestinal worm treatment or prevention? | 1 Yes   |                                     |
|   |  | 2 No  |                                     |
|   |  | 3 I do not remember   |                                     |
| 57  | If yes; what type of media did you read, hear or watch talking about intestinal worms?                               | 1 I didn't notice any media talking about intestinal worms          |                                     |
|   |  | 2 Poster  | 3 Newspaper                         |
|   |  | 4 Radio   | 5 Television                        |
| <b>Thank you for your cooperation</b>   |  |   |                                     |



## APPENDIX K

## QUESTIONNAIRE SURVEY FOR TEACHERS

No. Rujukan:.....



## SOAL-SELIDIK UNTUK GURU

PENGETAHUAN DAN SIKAP TERHADAP  
CACING USUS

Nama Sekolah: Sekolah Kebangsaan Pos Betau

|    |  |  |   |
|----|--|--|---|
| 1  | Jantina  | <input type="checkbox"/> 1 Lelaki  | <input type="checkbox"/> 2 Perempuan  |
| 2  | Tarikh lahir: ____/____/____   |  |   |
| 3  | Taraf perkahwinan  | <input type="checkbox"/> 1 Pujang  | <input type="checkbox"/> 2 Berkahwin <input type="checkbox"/> 3 Other: _____  |
| 4  | Bilangan anak (jika ada): _____  |  |   |
| 5  | Tahap pendidikan tertinggi:  | <input type="checkbox"/> 1 Kolej/Universiti  | <input type="checkbox"/> 2 Lain-lain (Sila jelaskan): _____   |
| 6  | Bidang Pendidikan tertinggi  | <input type="checkbox"/> 1 Sains   | <input type="checkbox"/> 2 Agama <input type="checkbox"/> 3 Bahasa <input type="checkbox"/> 4 Pendidikan                            |
|    |  | <input type="checkbox"/> 5 Lain-lain (Sila jelaskan): _____  |   |
| 7  | Adakah anda pernah dengar tentang cacing usus sebelum ini?                               | <input type="checkbox"/> 1 Ya  | <input type="checkbox"/> 2 Tidak  |
| 8  | Jika ya, dari manakah anda dengar tentang cacing usus?                                   | _____  |   |
| 9  | Apakah cacing usus?  | _____  |   |
| 10 | Jenis-jenis atau nama cacing:  | <input type="checkbox"/> 1 _____   | <input type="checkbox"/> 2 _____  |
|    |  | <input type="checkbox"/> 3 _____   | <input type="checkbox"/> 4 _____  |
| 11 | Pada pendapat anda, adakah cacing ini bagus atau tidak untuk kesihatan manusia?          | <input type="checkbox"/> 1 saya rasa cacing bagus untuk kesihatan manusia<br><input type="checkbox"/> 2 saya rasa cacing tidak berbahaya untuk kesihatan manusia<br><input type="checkbox"/> 3 Saya rasa cacing sangat berbahaya untuk kesihatan manusia |   |
| 12 | Apakah penyebab cacing usus?   | <input type="checkbox"/> 1 _____<br><input type="checkbox"/> 3 _____<br><input type="checkbox"/> 5 _____   | <input type="checkbox"/> 2 _____<br><input type="checkbox"/> 4 _____<br><input type="checkbox"/> 6 Saya tidak tahu                  |
| 13 | Apakah tanda dan gejala cacing usus?   | <input type="checkbox"/> 1 _____<br><input type="checkbox"/> 3 _____<br><input type="checkbox"/> 5 _____   | <input type="checkbox"/> 2 _____<br><input type="checkbox"/> 4 _____<br><input type="checkbox"/> 6 _____                            |
| 15 | Pernahkah anda atau anak anda mendapat jangkitan cacing usus?                            | <input type="checkbox"/> 1 Ya  | <input type="checkbox"/> 2 Tidak (ke no. 17)  |
| 16 | Jika ya, bilakah kali terakhir?  | <input type="checkbox"/> 1 Kurang dari 3 bulan yang lalu<br><input type="checkbox"/> 3 Satu tahun yang lalu  | <input type="checkbox"/> 2 Enam bulan yang lalu<br><input type="checkbox"/> 4 Lebih daripada satu tahun lalu                        |
| 17 | Apakah yang anda lakukan jika anda atau anak anda mendapat cirit-birit atau sakit perut? | <input type="checkbox"/> 1 Tidak berbuat apa-apa<br><input type="checkbox"/> 3 Menggunakan ubat herba sebagai aktiviti utama<br><input type="checkbox"/> 5 Lain-lain (Sila jelaskan): _____  | <input type="checkbox"/> 2 Pergi ke klinik sebagai aktiviti utama<br><input type="checkbox"/> 4 Pergi ke pengamal tradisional/bomoh |

- 18 Jika anda menggunakan ubat herba, berikan nama herba ini?  1  2  3  4
- 19 Bagaimanakah kita boleh mencegah jangkitan cacing usus?  1  2  3  4  5  6 Saya tidak tahu
- 20 Dalam masa 6 bulan lepas, adakah anda ada membaca, mendengar atau melihat sebarang informasi tentang rawatan atau pencegahan?  1 Saya tidak membaca, mendengar atau melihat sebarang informasi  2 Sekali dalam 6 bulan lepas  3 2 kali dalam 6 bulan lepas  4 Lebih dari 3 kali dalam 6 bulan lepas
- 21 Dalam masa 6 bulan lepas, apakah jenis media yang anda baca, dengar atau lihat tentang jangkitan cacing?  1 Tidak tahu  2 Televisyen  3 Radio  4 Surat khabar  5 Poster  6 Lain-lain (Sila jelaskan) \_\_\_\_\_
- 22 Adakah ia merbahaya untuk merawat kanak-kanak yang tidak dijangkiti?  1 Ya, ubat cacing boleh menyebabkan kesan sampingan seperti sakit kepala dan cirit-birit  2 Tidak, ubat cacing adalah selamat  3 Tidak, tetapi beberapa kanak-kanak akan mengadu kesan sampingan seperti ketidakselesaan perut atau loya
- 23 Terdapat kira-kira 600 murid di SK Pos Betau, berapa ramai daripada mereka mungkin mendapati jangkitan cacing usus?  1 Semua (100%)  2 50%  3 25%  4 Semua tiada (0%)  5 Tidak tahu

\*Terima kasih di atas kerjasama anda\*



APPENDIX L  
HELP POSTERS

# Basuhlah tangan

- ☒ sebelum makan.
- ☒ selepas bermain di tanah.
- ☒ selepas ke tandas.



**Health Education Learning Package**  
**to control Soil-Transmitted Helminthiasis among Orang Asli Schoolchildren**

Project team: Assoc. Prof. Dr. Hesham M. Al-Mekhlafi  
Professor Dr. Rohela Mahmud  
Assoc. Prof. Dr. Yvonne Al Lim  
Dr. Ahmed K. Al-Delaimy

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In collaboration with:  
 **JAKOA**  
JABATAN KEMAJUAN ORANG ASLI

 **animogis**



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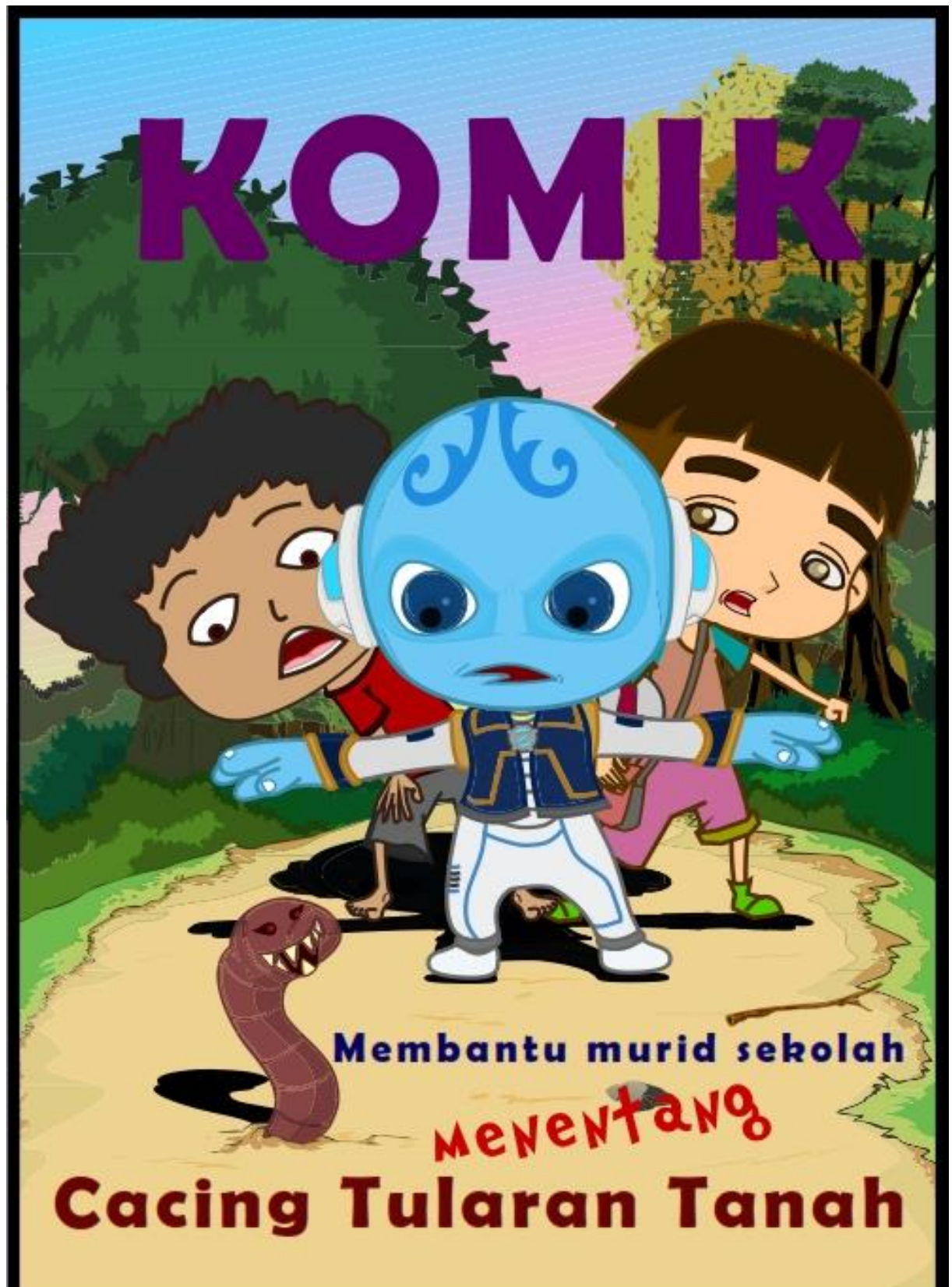
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APPENDIX M  
HELP COMIC BOOK





## Basuh Tangan Dengan Betul

Mari kawan-kawan kita amalkan,  
Guna cara betul untuk basuh tangan.  
Ada tujuh langkah perlu kita amal.  
Agar jauh dari penyakit dan kuman.

Pertama, guna sabun dengan secukupnya,  
barulah harum wangi tangan kita.

Kedua, gosokkan sabun di tapak tangan,  
biar sabun kena di semua bahagian.

Ketiga, gosok di setiap jari-jari kita,  
jangan lupa di celah kuku-kuku juga.

Keempat, gosok kuku di tapak tangan,  
supaya tanggal semua kotoran.

Kelima, gosok sabun di belakang tangan  
agar tangan bersih keseluruhan

Keenam, basuh dengan air secukupnya  
hindari semua kotoran dan bakteria

Terakhir, keringkan tangan guna kain bersih  
barulah selesai semuanya

Jagalah kebersihan tangan kita,  
sebab tangan guna untuk banyak perkara.  
Guna untuk pegang, untuk angkat,  
untuk makan.

Bila tangan bersih baru orang suka kita.

**Lagu dan Lirik oleh : Abu Zaharen**

































**Cacing Gelang**



**Cacing Cambuk**



**Cacing Kait**

CACING DAN TELUR MEREKA ADA DI MANA-MANA. SEBAB ITU KAMU PERLU BERHATI-HATI BILA BERMAIN DENGAN TANAH.



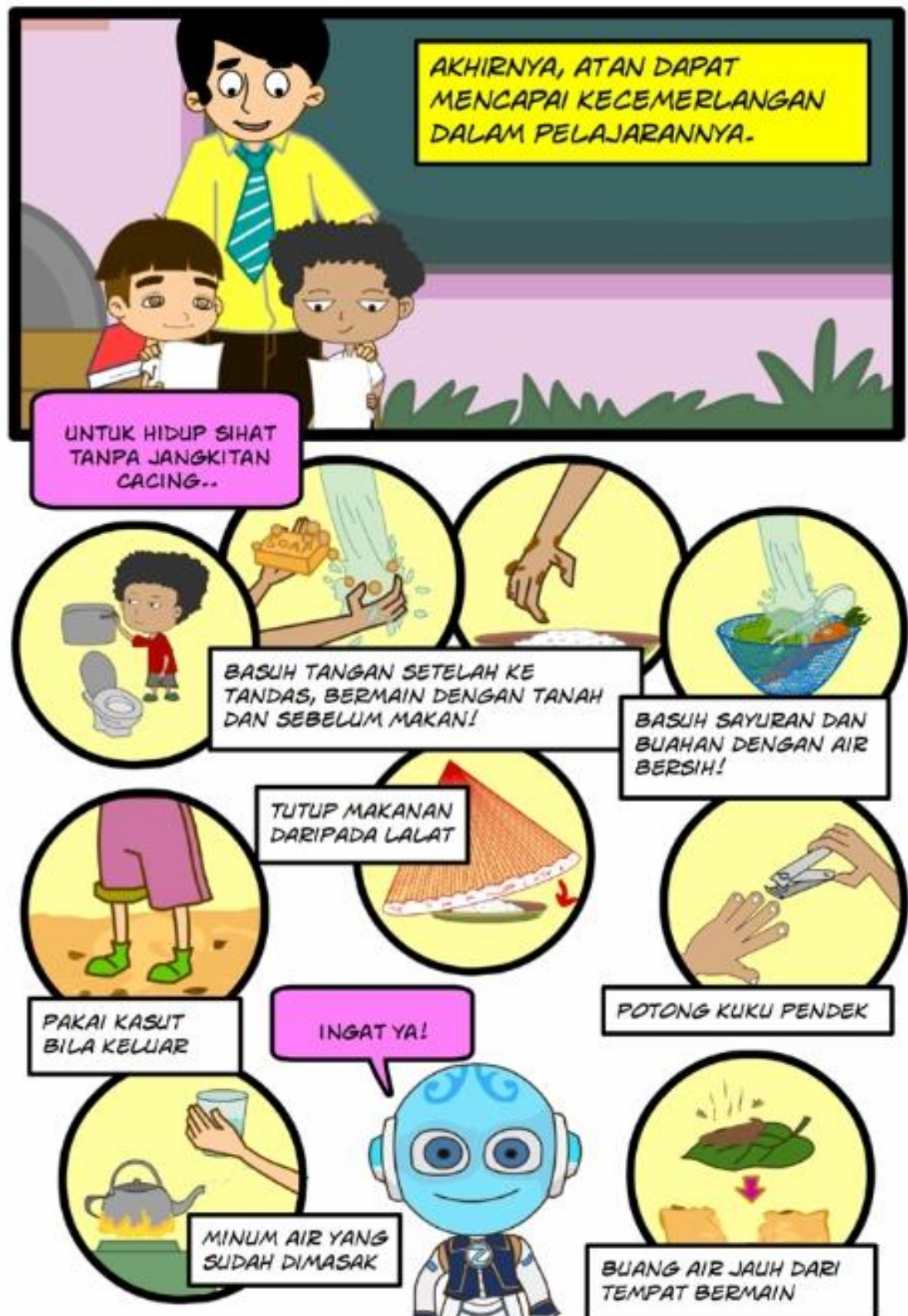












Tandakan (✓) pada amalan yang betul dan (X) pada amalan yang salah.





Warnakan Poster di bawah mengikut warna kesukaan adik-adik.

UNTUK MENGELAKKAN JANGKITAN  
**CACING TULARAN TANAH**  
**PAKAILAH KASUT**  
BILA BERMAIN DI  
LUAR.



# Jagalah Kebersihan Diri

Marilah kita semua  
jaga kebersihan diri kita  
badan sihat orang pun suka  
baru hidup kita ceria~  
bangun pagi gosok gigi  
mandi dgn air yang bersih  
guna sabun cucikan badan  
guna tuala bersih badan dikeringkan  
shampu rambut ketika mandi  
selepas itu sikat rambut dengan rapi  
pakai pakaian yang bersih  
pasti orang rasa kasih  
potong kuku sebelum panjang  
untuk hindari bakteria  
cuci tangan sebelum makan  
supaya tidak dijangkiti kuman  
makanlah buah dan sayuran  
dan cucikan sebelum makan  
supaya kita sihat dan kuat  
dan tidak dijangkiti penyakit  
pakai kasut yang bersih  
bila hendak keluar rumah  
untuk melindungi kaki kita  
dari cacing dan kotoran

(solo)

Amalkan cara hidup sihat  
menjaga tubuh dan penampilan  
baru hidup penuh berkat  
dan penuh senyuman  
dan penuh senyuman



lagu dan lirik : Abu Zaharen



## **Health Education Learning Package to control Soil-Transmitted Helminthiasis among Orang Asli Schoolchildren**



Project team: Assoc. Prof. Dr. Hesham M. Al-Mekhlafi  
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## APPENDIX N

## TEACHER'S GUIDEBOOK TO STH INFECTIONS

# Jangkitan Cacing Tularan Tanah (STH) Buku Panduan Untuk Guru



**PREVENTION IS ALWAYS BETTER THAN CURE..!**  
*Pencegahan adalah lebih baik dari mengubati..!*

1



Pendidikan sekolah rendah adalah sangat penting. Guru-guru menyampaikan maklumat dan nilai-nilai murni kepada kanak-kanak, serta membolehkan mereka untuk menyambung pelajaran ke peringkat lebih tinggi dan seterusnya bekerja.

2



## Kesihatan Sekolah



- Mewujudkan tingkah laku yang sihat semasa zaman kanak-kanak adalah lebih mudah dan lebih berkesan daripada cuba untuk mengubah tingkah laku yang tidak sihat pada zaman dewasa.
- Sekolah memberi kesan yang besar terhadap kesihatan kanak-kanak. Kanak-kanak yang bersekolah boleh diajar tentang kesihatan dan tingkah laku yang sihat.
- Sekolah memainkan peranan yang besar dalam mempromosikan kesihatan kanak-kanak dan membantu mereka untuk mewujudkan tingkah laku yang sihat sepanjang hayat.
- Bangunan sekolah dan persekitaran haruslah selamat dan menjadi tempat yang sihat untuk kanak-kanak.

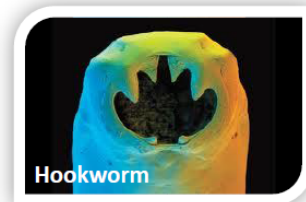
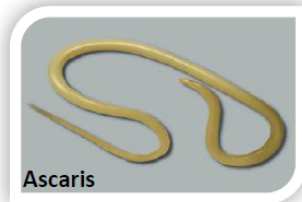
3

## Cacing Tularan Tanah (STH)

|   |   |
|---|---|
| Apakah itu helminth?  | Helminth bermaksud cacing   |
| Apakah yang dimaksudkan dengan Cacing Tularan Tanah (STH)?              | STH secara umumnya dikenali sebagai cacing usus. Ia juga disebut begitu disebabkan oleh sebahagian kitaran hidupnya adalah di dalam tanah.                      |
| Apakah jenis-jenis cacing ini?  | Spesies yang paling lazim di Malaysia ialah <i>Ascaris lumbricoides</i> (cacing gelang), <i>Trichuris trichiura</i> (cacing cambuk) dan hookworms (cacing kait) |
| Bagaimanakah manusia memperoleh jangkitan STH?                          | Manusia dijangkiti melalui penelanan telur cacing (cacing cambuk & cacing gelang) atau penembusan kulit oleh larva (cacing kait).                               |
| Adakah cacing-cacing ini menyebabkan masalah kesihatan yang serius?     | Jangkitan ringan tidak bersimptom, tetapi jangkitan yang teruk menyebabkan masalah kesihatan yang serius.   |
| Adakah cacing ini mengganggu kebolehan belajar dan prestasi di sekolah? | Ya. Ia dapat mengurangkan fungsi kognitif, kebolehan belajar dan pencapaian kanak-kanak sekolah.  |

4

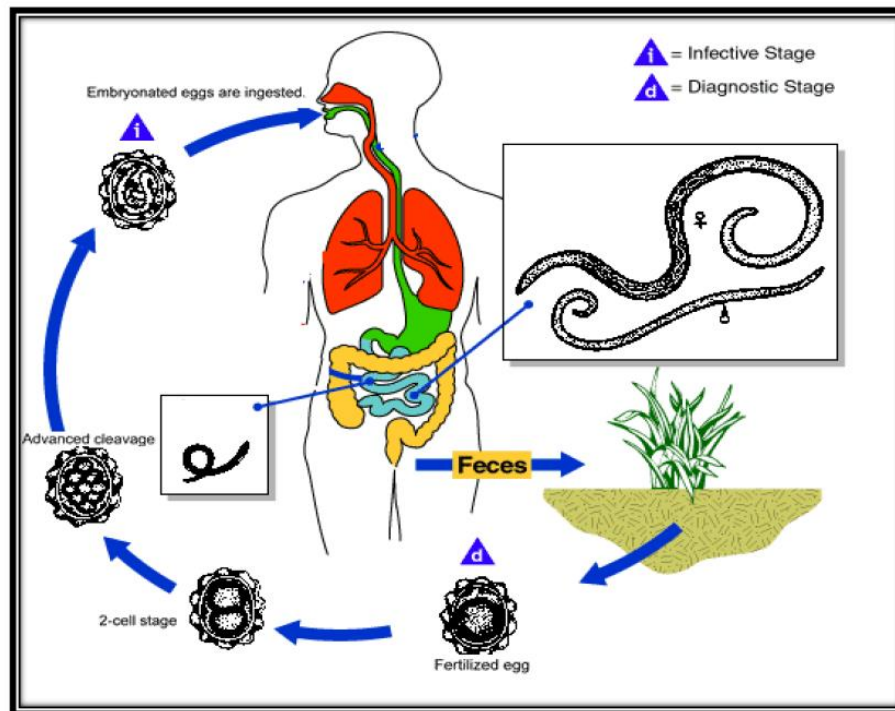
## Cacing Tularan Tanah (STH)



| Jenis cacing                        | Bilangan orang yang dijangkiti seluruh dunia | Kaedah penularan                     | Kesan                                 |
|-------------------------------------|--|--------------------------------------|---------------------------------------|
| <b>Ascaris</b><br>(Cacing gelang)   | 800 juta                                     | Penelanan telur cacing melalui mulut | Malnutrisi, penyumbatan usus          |
| <b>Trichuris</b><br>(Cacing cambuk) | 600 juta                                     | Penelanan telur cacing melalui mulut | Anemia, prolaps rektum                |
| <b>Hookworm</b><br>(Cacing Kait)    | 600 juta                                     | Penembusan kulit oleh larva          | Anemia, penurunan prestasi di sekolah |

5

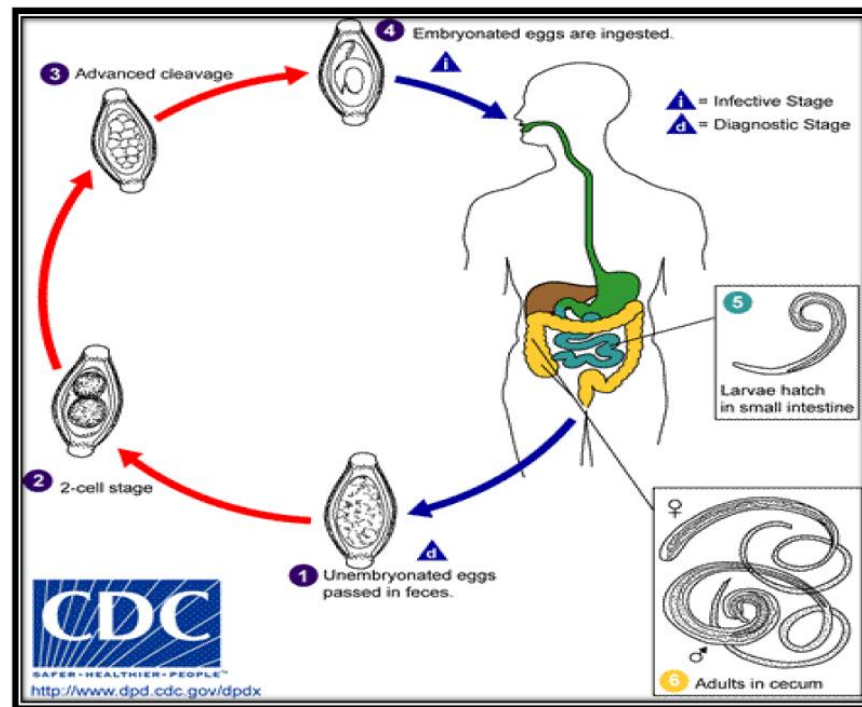
## Kitaran hidup Ascaris (Cacing gelang)



6

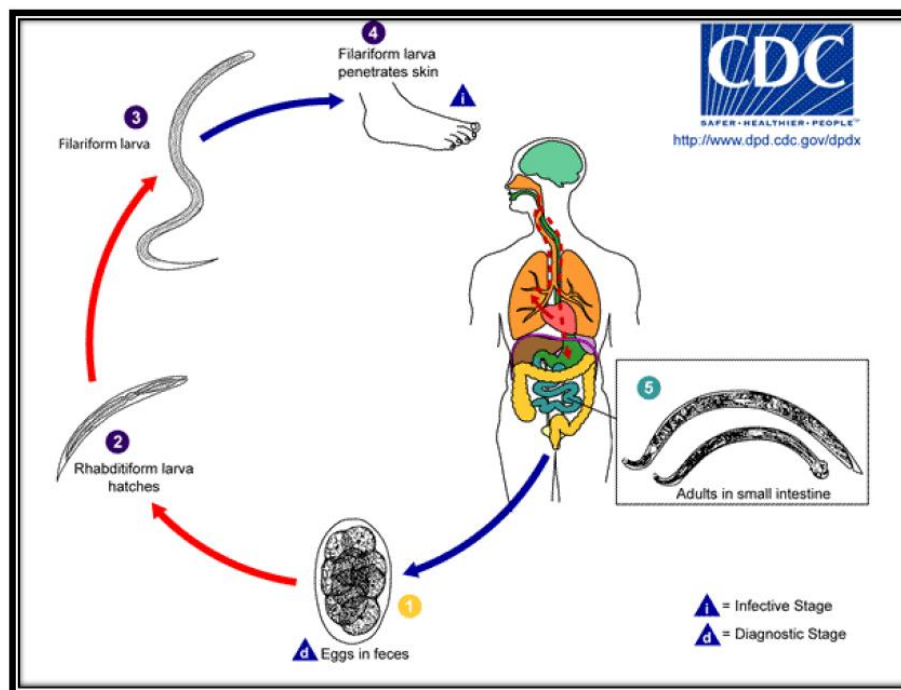


## Kitaran hidup Trichuris (cacing cambuk)



7

## Kitaran hidup Hookworm (cacing kait)

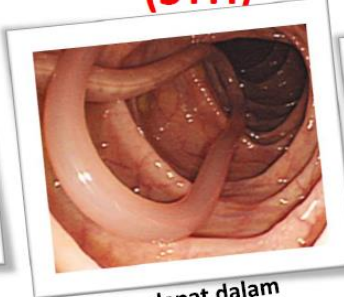


8

## Kesan negatif jangkitan Cacing Tularan Tanah (STH)



Ascaris keluar daripada mulut dan hidung



Ascaris terdapat dalam saluran pemakanan (usus)



Ascaris menyebabkan penyumbatan usus



Simbol cacing kait



Cacing kait dalam saluran pemakanan (usus)

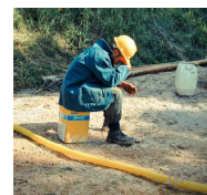


Trichuris dalam saluran pemakanan (usus)

9

## Kesan jangkitan Cacing Tularan Tanah

- Malnutrisi
- Anemia (kekurangan darah merah)
- Parasognisi yang rendah
- Kadar ketidakhadiran yang tinggi
- Prestasi Pembelajaran yang kurang baik
- Memendekkan hayat bekerja & mengurangkan keupayaan bekerja





## Faktor-faktor risiko Cacing Tularan Tanah



Tangan yang kotor



Tidak memakai kasut



Jari kuku yang panjang dan kotor



Kekurangan kebersihan dan tempat pembuangan tinja



Air yang tidak dirawat



Memakan sayur-sayuran tidak dibasuh



Memakan buah-buahan yang tidak dibasuh



Kehadiran lalat<sup>1</sup>

## Amalan kebersihan untuk mengelakkan jangkitan Cacing Tularan Tanah (STH)



Membasuh tangan sebelum makan dan selepas menggunakan tandas



Memakai kasut ketika keluar dari rumah



Memotong kuku mengikut masa



Menggunakan tandas curah dan elakkan pembuangan tinja yang tidak teratur



Membasuh sayur-sayuran dan buah-buahan sebelum dimakan



Memasak air minuman



Menutup makanan

## Penyahcacing (Deworming)

- Penyahcacing dilakukan melalui pengambilan 1 dos pil ubat Albendazole 200mg.
- Pengambilan pil Albendazole selama 3 hari berturut-turut sekiranya jangkitan yang dialami adalah serius.
- Antara kelebihan penyahcacing termasuklah:
  - Meningkatkan serta memperbaiki status nutrisi kanak-kanak
  - Meningkatkan serta memperbaiki fungsi kognitif dan perkembangan pendidikan.
  - Mengurangkan potensi untuk kanak-kanak tidak hadir ke sekolah.



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## PAKEJ PEMBELAJARAN PENDIDIKAN KESIHATAN (HELP) KE ATAS CACING TULARAN TANAH

- Pakej ini bertujuan untuk membantu mencegah jangkitan cacing di kalangan kanak-kanak sekolah.
- Setiap kanak-kanak akan melalui pemeriksaan tinja bagi mengesan jangkitan cacing tularan tanah ini.
- Semua kanak-kanak yang dijangkiti akan diberi rawatan yang sewajarnya.
- Mesej-mesej pendidikan kesihatan dan amalan-amalan bagi mempraktikan kehidupan seharian yang betul akan diajar kepada kanak-kanak.
- Tempoh kajian: 6 bulan

14



- **Kajian:**

Kesan pakej pembelajaran pendidikan kesihatan (HELP) dalam mengawal cacing tularan tanah di kalangan Orang Asli.

- **Objektif kajian:**

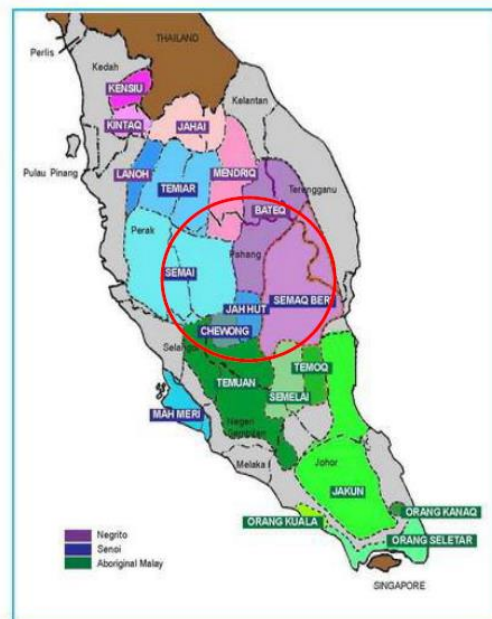
Kajian ini dijalankan untuk membangkitkan kesedaran orang ramai terhadap jangkitan cacing tularan tanah (STH) dan untuk memeriksa kesan pendidikan kesihatan ini dalam mengurangkan prevelens dan intensiti jangkitan cacing tularan tanah (STH) di kalangan kanak-kanak di kawasan pendalaman di Malaysia.

- **Kawasan kajian**

- Daerah Lipis dan Raub, Pahang

- **Populasi kajian**

- Kanak-kanak Orang Asli yang bersekolah



15

## Jadual harian / mingguan

- Periksa dan ingatkan kanak-kanak tentang mencuci tangan dan memotong kuku (Isnin & Jumaat).  
(Hadiah akan diberikan setiap bulan kepada pelajar terbaik)
- Aktiviti nyanyian selama 3 minit (HELP-OAWW) (Harian).
- Melukis mesej-mesej kesihatan yang berkaitan dengan cacing. (Mingguan)  
(Lukisan terbaik akan ditampalkan di papan kenyataan khas dalam setiap kelas dan hadiah akan diedarkan secara bulanan)
- Persembahan boneka oleh kanak-kanak senior kepada kanak-kanak junior (Bulanan).
- Pertunjukkan video dan spesimen cacing (Bulanan).
- Bacaan komik berunsurkan cacing (Mingguan).
- Melawat ke sekolah dan kampung-kampung untuk memeriksa kebersihan (Bulanan).



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## HEALTH EDUCATION LEARNING PACKAGE ON SOIL-TRANSMITTED HELMINTHS



### PROJECT TEAM:

- Assoc. Prof. Dr. Hesham Al-Mekhlafi
- Professor Dr. Rohela Mahmud
- Assoc. Prof. Dr. Yvonne Al Lim
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## LIST OF PUBLICATIONS AND PRESENTATIONS

### A. Publications during candidature, directly arising from this thesis

1. **Al-Delaimy AK**, Al-Mekhlafi HM, Nasr NA, Sady H, Atroosh WM, Nashiry M, Anuar TS, Moktar N, Lim YAL, Mahmud R. Epidemiology of intestinal polyparasitism among Orang Asli schoolchildren in rural Malaysia. *PLOS Neglected Tropical Diseases* 2014; 8(8): e3074.
2. **Al-Delaimy AK**, Al-Mekhlafi HM, Nasr NA, Sady H, Atroosh WM, Lim YAL, Mahmud R. **Developing and evaluating health education learning package (HELP) to control soil-transmitted helminth infections among Orang Asli children in Malaysia.** *Parasites and Vectors* 2014; 7:416.
3. **Al-Delaimy AK**, Al-Mekhlafi HM, Nasr NA, Sady H, Atroosh WM, Lim YAL, Mahmud R. **A rapid and high reinfection of soil-transmitted helminth infections among Orang Asli children in rural Malaysia.** *Parasites and Vectors* 2014; **UNDER REVIEW**.
4. **Al-Delaimy AK**, Al-Mekhlafi HM, Nasr NA, Lim YA, Mahmud R. Epidemiology of soil-transmitted helminths infections among aboriginal schoolchildren in rural Malaysia. **(Abstract)**. *American Journal of Tropical Medicine and Hygiene* 2013; 98(5 Suppl): 755.

### B. Publication during candidature, but not directly arising from this thesis

5. Al-Mekhlafi HM, Al-Zabedi EM, Al-Maktari MT, Atroosh WM, **Al-Delaimy AK**, Moktar N, Salam AA, Abdullah WA, Jani R, Surin J. Effects of vitamin A supplementation on iron status indices and iron deficiency anaemia: A randomized controlled trial. *Nutrients* 2014; 6: 190-206.
6. Al-Mekhlafi HM, Sady H, Mahdy MA, Nasr NA, **Al-Delaimy AK**, Surin J. An unceasing problem: prevalence and risk factors of schistosomiasis among children in Yemen **(Abstract)**. *American Journal of Tropical Medicine and Hygiene* 2013; 98(5 Suppl): 897.

### C. Conference presentations made during the candidature period (presenter)

1. **Al-Mekhlafi HM**, **Al-Delaimy AK**, Lim YAL, Mahmud R. Pattern of soil-transmitted helminth re-infections among Orang Asli schoolchildren in Malaysia. The British Society for Parasitology Spring Meeting 2014, Cambridge, UK, 6-9 April 2014.
2. **Ahmed K. Al-Delaimy**, Al-Mekhlafi HM, Lim YAL, Mahmud R. The impact of health education in controlling soil-transmitted helminthiasis. 1<sup>st</sup> International Conference on Tropical Medicine and Infectious Diseases, Royal College of Medicine, Perak, 4-7 Dec 2012.
3. **Ahmed K. Al-Delaimy**, Ahmed A, Al-Mekhlafi HM, Lim YAL, Mahmud R. Soil-transmitted helminth infections among schoolchildren in Orang Asli and Malay communities in rural Malaysia., JITMM 2012 Mahidol University, Bangkok, Thailand, 12-14 Dec 2012.



# Epidemiology of Intestinal Polyparasitism among Orang Asli School Children in Rural Malaysia



Ahmed K. Al-Delaimy<sup>1,2</sup>, Hesham M. Al-Mekhlafi<sup>1,3\*</sup>, Nabil A. Nasr<sup>1</sup>, Hany Sady<sup>1</sup>, Wahib M. Atroosh<sup>1</sup>, Mohammed Nashiry<sup>4</sup>, Tengku S. Anuar<sup>5</sup>, Norhayati Moktar<sup>6</sup>, Yvonne A. L. Lim<sup>1</sup>, Rohela Mahmud<sup>1</sup>

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## Abstract

**Background:** This cross-sectional study aimed to investigate the current prevalence and risk factors associated with intestinal polyparasitism (the concurrent infection with multiple intestinal parasite species) among Orang Asli school children in the Lipis district of Pahang state, Malaysia.

**Methods/Principal findings:** Fecal samples were collected from 498 school children (50.6% boys and 49.4% girls), and examined by using direct smear, formalin-ether sedimentation, trichrome stain, modified Ziehl Neelsen stain, Kato-Katz, and Harada Mori techniques. Demographic, socioeconomic, environmental, and personal hygiene information were collected by using a pre-tested questionnaire. Overall, 98.4% of the children were found to be infected by at least one parasite species. Of these, 71.4% had polyparasitism. The overall prevalence of *Trichuris trichiura*, *Ascaris lumbricoides*, hookworm, *Giardia duodenalis*, *Entamoeba* spp., and *Cryptosporidium* spp. infections were 95.6%, 47.8%, 28.3%, 28.3%, 14.1% and 5.2%, respectively. Univariate and multivariate analyses showed that using an unsafe water supply as a source for drinking water, presence of other family members infected with intestinal parasitic infections (IPI), not washing vegetables before consumption, absence of a toilet in the house, not wearing shoes when outside, not cutting nails periodically, and not washing hands before eating were significant risk factors associated with intestinal polyparasitism among these children.

**Conclusions/Significance:** Intestinal polyparasitism is highly prevalent among children in the peninsular Malaysian Aboriginal communities. Hence, effective and sustainable control measures, including school-based periodic chemotherapy, providing adequate health education focused on good personal hygiene practices and proper sanitation, as well as safe drinking water supply should be implemented to reduce the prevalence and consequences of these infections in this population.

**Citation:** Al-Delaimy AK, Al-Mekhlafi HM, Nasr NA, Sady H, Atroosh WM, et al. (2014) Epidemiology of Intestinal Polyparasitism among Orang Asli School Children in Rural Malaysia. PLoS Negl Trop Dis 8(8): e3074. doi:10.1371/journal.pntd.0003074

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**Competing Interests:** The authors have declared that no competing interests exist.

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## Introduction

Intestinal parasitic infections (IPI) are still public health problems in many communities, particularly among children in rural areas of developing countries. It is estimated that more than 2 billion people worldwide are infected with IPI and more than half of the world's population are at risk of infection [1,2]. These infections are caused by helminth parasites such as soil-transmitted helminths (*Ascaris lumbricoides*, *Trichuris trichiura*, *Strongyloides stercoralis*, and hookworm), *Taenia* spp. and *Hymenolepis nana* or by protozoa such as *Entamoeba histolytica*, *Giardia duodenalis*, and *Cryptosporidium* spp.

IPI are associated with high morbidity particularly among young children and women of childbearing age, and have been termed as 'the cancers of developing nations' by Egger et al.

[3]. IPI can occur in silence as chronic infections and infected individuals are either asymptomatic or suffering from mild diseases. However, acute and severe IPI, especially with pathogenic *Entamoeba* and *Giardia*, may cause fatal diarrhea especially among children and both are commonly associated with travellers' diarrhea [4,5]. Moreover, *Entamoeba* can cause invasive intestinal infection or disseminate to the liver (and rarely to the lung and the brain) causing amebic liver abscess with about 100,000 deaths annually, making amebiasis the second leading cause of death from protozoal diseases, after malaria [6,7]. On the other hand, opportunistic IPI such as *Cryptosporidium*, *Isospora belli*, Microsporidia, and *Strongyloides* infections are commonly reported among immunocompromised individuals with significant morbidity and mortality [8,9].



**RESEARCH**

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# Developing and evaluating health education learning package (HELP) to control soil-transmitted helminth infections among Orang Asli children in Malaysia

Ahmed K Al-Delaimy<sup>1,2</sup>, Hesham M Al-Mekhlafi<sup>1,3\*</sup>, Yvonne AL Lim<sup>1</sup>, Nabil A Nasr<sup>1</sup>, Hany Sady<sup>1</sup>, Wahib M Atroosh<sup>1</sup> and Rohela Mahmud<sup>1</sup>

## Abstract

**Background:** This study was carried out to develop a health education learning package (HELP) about soil-transmitted helminth (STH) infections, and to evaluate what impact such a package could have in terms of reducing the incidence and intensity of STH infections among Orang Asli schoolchildren in Pahang, Malaysia.

**Methods:** To identify the key risk factors of STH in Orang Asli communities, we applied an extensive mixed methods approach which involved an intensive literature review, as well as community-based discussions with children, their parents, teachers and health personnel, whilst also placing the children under direct observation. To evaluate the package, 317 children from two schools in Lipis, Pahang were screened for STH infections, treated by a 3-day course of albendazole and then followed up over the next 6 months. The knowledge of teachers, parents and children towards STH infections were assessed at baseline and after 3 months.

**Results:** The developed package consists of a half day workshop for teachers, a teacher's guide book to STH infections, posters, a comic book, a music video, a puppet show, drawing activities and an aid kit. The package was well-received with effective contributions being made by teachers, children and their parents. The incidence rates of hookworm infection at different assessment points were significantly lower among children in the intervention school compared to those in the control school. Similarly, the intensity of trichuriasis, ascariasis and hookworm infections were found to be significantly lower among children in the HELP group compared to those in the control group ( $P < 0.05$ ). Moreover, the package significantly improved the knowledge, attitude and practices (KAP) of Orang Asli people and the knowledge of teachers towards STH infections.

**Conclusion:** A school-based health education learning package (HELP) was developed which displayed a significant impact in terms of reducing the intensity of all three main STH infections, as well as in reducing the prevalence of hookworm infections. Moreover, the knowledge levels of both teachers and the Orang Asli population regarding STH was significantly improved, a fact which greatly helped in attracting community participation and thus raising the general level of awareness regarding these forms of infections.

**Keywords:** Soil-transmitted helminth, Health education learning package, Neglected tropical diseases, Reinfection, Orang Asli, Children, Malaysia

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