

ABSTRACT

Soil-transmitted helminth (STH) infections, also known as soil-transmitted helminthiasis, are highly prevalent among Orang Asli communities in Peninsular Malaysia. This study was carried out to develop a health education package for 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.

To identify the key risk factors of STH in Orang Asli communities, we applied an extensive mixed methods approach which relied on PRECEDE-PROCEED and Health Belief models and involved an intensive literature review, as well as community-based discussions with children, their parents, teachers and health personnels, whilst also placing the children under direct observation. To evaluate the package, children from two schools (Sekolah Kebangsaan Pos Batau; SKPB and Sekolah Kebangsaan Kuala Koyan; SKKK) 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 by pre-tested questionnaires at baseline and after 3 months. Demographic, socioeconomic, environmental and personal hygiene information were also collected by using a pre-tested questionnaire.

Overall, fecal samples were collected from 498 schoolchildren (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. Overall, 98.4% of the children were found to be infected by at least one parasite species. Of these, 71.4% had polyparasitism (the concurrent infection with multiple intestinal parasite species) while 28.6% had monoparasitism. The overall prevalence of trichuriasis, ascariasis, hookworm infection, giardiasis, amoebiasis and cryptosporidiosis were 95.6%, 47.8%, 28.3%, 28.3%, 14.1% and 5.2%, respectively. For the evaluation of the package, 317 students were involved (172 from SKPB and 145 from SKKK). The developed package was named "HELP". It consisted of a half-day workshop for teachers, a teacher's guide book to STH, posters, a comic book, music videos, a puppet show, drawing activities and an aid kit. The package was well-received with effective contributions from the 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.

A school-based health education learning package (HELP) was developed and 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. Integrating HELP with school curriculum targeting rural areas could bring promising effects on the health status of the children that can help in the overall efforts to improve the quality of life in these communities. However, a further study using cluster randomized trial in large sample set nationally is recommended to evaluate the impact of HELP on STH among rural communities.

ABSTRAK

Keprevalenan jangkitan helmin tularan tanah (STH) adalah tinggi di kalangan komuniti Orang Asli di Peninsular Malaysia. Kajian ini dijalankan untuk mengembangkan satu pakej pendidikan kesihatan mengenai jangkitan STH, dan untuk mengkaji impak pakej tersebut dari segi pengurangan insiden dan intensiti jangkitan STH di kalangan murid sekolah Orang Asli in Pahang, Malaysia.

Untuk mengenalpasti faktor risiko utama jangkitan STH di kalangan komuniti Orang Asli, kami telah mengaplikasikan pelbagai kaedah dan pendekatan yang berasaskan model PRECEDE-PROCEED dan Health Belief yang melibatkan kajian literatur yang luas. Ia juga merangkumi perbincangan dengan murid, ibubapa, guru dan pegawai kesihatan dan pemerhatian langsung terhadap murid. Untuk penilaian pakej, murid dari dua sekolah (Sekolah Kebangsaan Pos Betau; SKPB and Sekolah Kebangsaan Kuala Koyan; SKKK) di Lipis, Pahang disaring untuk jangkitan STH, dirawat dengan albendazole selama 3 hari dan dibuat tindakan susulan selepas 6 bulan yang berikutnya. Ilmu pengetahuan guru, ibubapa dan murid terhadap jangkitan STH dikaji melalui soal-selidik pada garis asas dan selepas 3 bulan. Data demografi, sosioekonomi, persekitaran dan kebersihan diri dikumpul melalui soal-selidik.

Keseluruhannya, sampel tinja dikumpul daripada 498 murid sekolah (50.6% lelaki dan 49.4% perempuan) dan diperiksa menggunakan teknik calitan langsung, kepekatan formalin-eter, pewarnaan trikrom, pewarnaan Ziehl Neelsen, Kato Katz and Harada Mori. Secara keseluruhan, 98.4% murid dijangkiti dengan sekurang-kurangnya satu spesies parasit. Dari jumlah ini, 71.4% adalah jangkitan poli-parasitisme (kehadiran jangkitan pelbagai spesies parasit usus) manakala 28.6% adalah mono-parasitisme. Keprevalenan keseluruhan trikuriasis, askariasis, jangkitan cacing kait, giardiasis, amebiasis dan kryptosporidiosis masing-masing adalah 95.6%, 47.8%, 28.3%, 28.3%, 14.1% and 5.2%. Untuk penilaian pakej, 317 murid telah menyertai (172 daripada SKPB and 145 daripada SKKK). Pakej yang dikembangkan dinamakan "HELP". Ia terdiri daripada bengkel separuh hari untuk guru, buku panduan jangkitan STH untuk guru, poster, buku komik, video muzik, persembahan boneka, aktiviti melukis dan kelengkapan bantuan. Pakej tersebut telah disambut baik dengan sumbangan yang berkesan diberi oleh guru, murid dan ibubapa. Kadar insiden jangkitan cacing kait pada titik penilaian yang berlainan adalah rendah di kalangan murid di sekolah intervensi berbanding dengan murid di sekolah kawalan ($P < 0.05$). Begitu juga untuk intensiti trikuriasis, askariasis and jangkitan cacing kait didapati adalah rendah di kalangan murid dalam kumpulan HELP berbanding dengan murid dalam kumpulan kawalan group ($P < 0.05$). Selain itu, pakej ini meningkat secara signifikan ilmu pengetahuan, sikap dan amalan (KAP) Orang Asli dan ilmu pengetahuan guru terhadap jangkitan STH.

Pakej pendidikan kesihatan sekolah mengenai jangkitan STH (HELP) telah berkembang dan ia telah mempamerkan satu impak yang signifikan terhadap pengurangan intensiti ketiga-tiga jangkitan STH, di samping mengurangkan keprevalenan jangkitan cacing kait. Selain itu, tahap pengetahuan kedua-dua cikgu dan Orang Asli terhadap STH meningkat dengan signifikan, satu fakta yang akan membantu meningkatkan penglibatan komuniti, di samping meningkatkan tahap pengetahuan asas mengenai jangkitan tersebut. Pengintegrasian HELP dalam kurikulum sekolah mensasarkan kawasan luar bandar akan member manfaat yang berkesan kepada status kesihatan kanak-kanak dan ini akan membantu dalam usaha keseluruhan untuk meningkatkan kualiti hidup komuniti tersebut. Walau bagaimanapun, kajian lanjutan menggunakan ujian rawak-rambang untuk jumlah sampel yang lebih besar di peringkat kebangsaan adalah disyorkan untuk mengkaji impak HELP terhadap STH dalam kalangan komuniti luar bandar.

DEDICATION

**To my family who have always
been there to provide me the
necessary motivation, support,
guidance and love.**

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

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LIST OF SYMBOLS AND ABBREVIATIONS

STH	Soil-transmitted helminth
HELP	Health Education Learning Package
NTDs	Neglected tropical diseases
IPI	Intestinal parasitic infection
KAP	Knowledge, attitude and practices
CI	Confidence interval
OR	Odds ratio
SD	Standard deviation
χ^2	Chi-square
IQR	Interquartile range
%	percentage
g/dL	Gram per deciliter
Hb	Hemoglobin
WHO	World Health Organization
UNICEF	United Nations Children's Fund
DALYs	Disability-adjusted life years
IDA	Iron deficiency anemia
VAD	Vitamin A deficiency
°C	Degree Celsius
mm	millimeter
JAKOA	Jabatan Kemajuan Orang Asli
SKKK	Sekolah Kebangsaan Kuala Koyan
SKB	Sekolah Kebangsaan Batau
SPSS	Statistical Package for Social Sciences
EPG	Eggs per gram
RM	Malaysian Ringgit
cm	centimeter
g	gram
mg	milligram