

Prevalence of intestinal parasitic infections among primary schoolchildren in areas devoid of sanitation in northwestern Kingdom of Swaziland, Southern Africa

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Introduction

Intestinal parasitic infections (IPIs) including helminths and protozoa are estimated to affect around 3.5 billion people globally and 450 million are ill as a result of these infections, the majority being children. Several studies have indicated that geohelminth and/or some protozoa infections may result in impairments in physical, intellectual and cognitive development. Like other developing countries, IPIs are a major health problem in the Kingdom of Swaziland (KS). This study intends to explore IPIs status of primary schoolchildren living in areas devoid of sanitation in northwestern KS so as to improve Swazi children health. In total, 267 fresh stool samples (boys: 115 stool samples, girls: 152 stool samples) were obtained for examination of IPIs by using merthiolate-iodine-formalin concentration method. The present study found that 32.2% (86/267) of schoolchildren in northwestern KS are infected predominantly by intestinal protozoan parasites, e.g. pathogenic (20.6%, 55/267) and non-pathogenic (11.2%, 30/267) protozoa instead of soil-transmitted helminths and all of these pathogenic protozoa, e.g. amoeba, *B. hominis* and *G. lamblia* can cause gastrointestinal illness of varying severity and consequence. Polyparasitism, e.g. dual (7.5%, 20/267) and triple infections (2.6%, 7/267) particularly on different pathogenic and non-pathogenic protozoan co-infections in KS schoolchildren living in High-, Middle or Lowveld areas is very common, reflecting the very possibility that those schoolchildren lack home sanitation and thus have greater opportunities to contact contaminated soil and infected water when taking care of body hygiene and domestic activities.

SUBJECTS AND METHODS

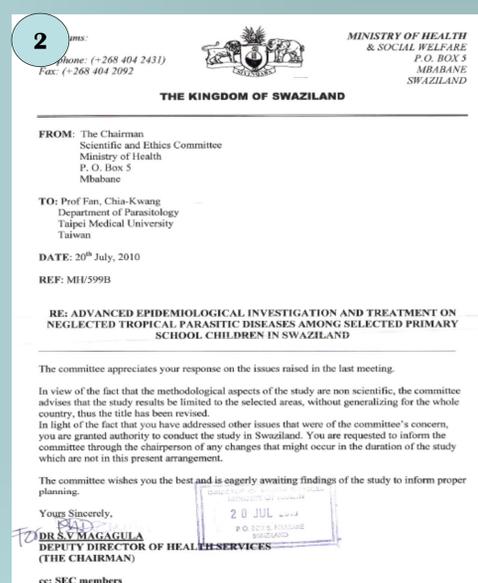
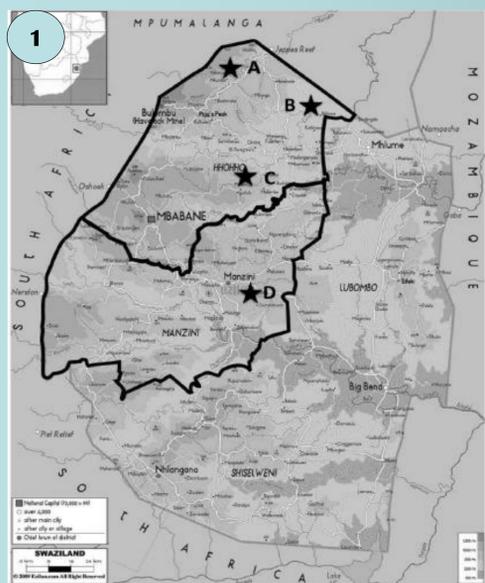


Fig. 1. Geographical locations of primary schools studied in the Kingdom of Swaziland, Southern Africa. Reprinted with permission from Ezilon Company; 2. Certificate of IRB obtained from Department of Social Welfare & Health, Swaziland. ; 3. The procedure of merthiolate-iodine- formalin method



Figures 4-6 . Stool samples collection , from primary schools in Hhohho and Manzini Provinces in northwestern Swaziland. ; 5. The part results of the intestinal parasites from stools: *Ascaris ova*, *T. trichiura ova*, *G. lamblia* trophozoite, *H. diminuta ova*, *E. histolytica/dispar* cyst, Hookworm ova .; 8. The photo of the primary schoolchildren participated in the survey.

Results

Table 1.

Prevalence of intestinal parasitic infections among primary schoolchildren in northwestern Kingdom of Swaziland, Southern Africa.

Subjects	Age	No. of examined	No. of positive (%)	Infection status			Protozoan					
				Single (No., %)	Dual (No., %)	Triple (No., %)	Helminth	Pathogenic* (No., %)	Non-pathogenic† (No., %)			
Province												
Manzini	10.8±2.5	66	19 28.8 [§]	12 18.2	5 7.6	2 3.0	0 0.0	12 18.2	7 10.6			
Boys	11.1±2.5	25	8 32.0	6 24.0	2 8.0	0 0.0	0 0.0	5 20.0	3 12.0			
Girls	10.7±2.5	41	11 26.8	6 14.5	3 7.3	2 4.9	18.2	0 0.0	7 17.1	4 9.7		
Hhoho	10.5±2.6	201	67 33.3 [§]	47 23.4	15 7.5	5 2.4	1 0.5	43 21.4	23 11.4			
Boys	1.7±2.9	90	35 38.9	26 28.9	7 7.8	2 2.2	0 0.0	25 27.8	10 11.1			
Girls	10.5±2.4	111	32 28.8	21 18.9	8 7.2	3 2.7	1 0.9	18 16.2	13 11.7			
Altitude												
Highveld	11.0±2.7	100	31 31.0 ^{**}	28 28.0	2 2.0	1 1.0	1 1.0	20 20.0	10 10.0			
Middleveld	9.9±2.2	36	23 63.9 ^{**}	12 33.4	8 22.2	3 8.3	0 0.0	15 41.7	8 22.2			
Lowveld	10.6±2.6	131	32 24.4 [†]	19 14.5	10 7.6	3 2.3	0 0.0	20 15.3	12 9.2			
Total	10.6±2.6	267	86 32.2	59 22.1	20 7.5	7 2.6	1 0.4	55 20.6	30 11.2			
Boys	10.8±2.8	115	43 37.4 [‡]	32 27.9	9 7.8	2 1.7	0 0.0	30 26.1	13 11.3			
Girls	10.5±2.4	152	43 28.3 [‡]	27 17.8	11 7.2	5 3.3	1 0.7	25 16.4	17 11.2			

**Giardia lamblia*, *Entamoeba histolytica/dispar*, *Blastocystis hominis*.
 †*Entamoeba coli*, *Endolimax nana*, *Chilomastix mesnelli*, *Iodamoeba bu tschlii*.
 ‡odd ratios (ORs)51.51, 95 confidential interval (CI)50.9–2.5, P50.1.
 †ORs51.2, 95CI50.7–2.3, P50.5.
 ††ORs55.5, 95CI52.5–12.0, P,0.001.
 †††ORs53.9; 95CI51.8–8.8; P,0.001.

Conclusion

A more sensitive merthiolateiodine- formalin method was recommended to replace direct wet smear method to be used as the detection system for IPIs in KS to greatly improve the detection rate of IPIs.

Reference

1. World Health Organization. Partners for parasite control: geographical distribution and useful facts and stats. Geneva: WHO, 2007.
2. Hsieh MH., Kaohsiung J Med Sci., 2010