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GOT WORMS?: Planning and Evaluation of a Culturally Appropriate Health Education Pilot Program for the Control of Soil-Transmitted Helminth Infections in Rwandan Village Children

Pier Hart
Thomas Jefferson University
July 2011
Global Health

Neglected Tropical Diseases (NTDs)
- 13 types of bacterial and parasitic infections
- Affect poor people in Africa, South America and Asia
- Prevalence is 1.4 billion people
- Low mortality
- High morbidity
**Soil-transmitted Helminthes (STH)**

- Parasitic worms colonize the intestines
- Three types of STH Infections
  - Ascariasis: roundworm (*Ascaris lumbricoides*)
  - Trichuriasis: whipworm (*Trichuris trichiura*)
  - Hookworm infection: hookworm (*Ancylostoma duodenale* and *Necator americanus*)
STH Epidemiology

- Incidence of STH infections
  - Roundworm: 1.2 billion new cases per year
  - Whipworm: 800 million new cases per year
  - Hookworm: 700 million new cases per year
**STH Transmission**

- **Fecal-to-oral transmission of eggs** (roundworm & whipworm)
  - Consumption of trace amounts of contaminated soil

- **Penetration of skin by larvae** (hookworm)
  - Exposed skin contact with contaminated soil

- **More common among children**
  - Hand-to-mouth behaviors

[Diagram of STH Transmission](http://www.dpd.cdc.gov/dpx)
**STH Symptoms and Morbidity**

- **Low intensity infections**
  - Relatively harmless
- **High intensity infections**
  - Malnutrition
  - Anemia
- **Chronic, high intensity infections cause long-term morbidity in children**
  - Cognitive developmental problems and learning disabilities
  - Stunted physical growth and wasting
  - Fatigue
STH Prevention

- Hygiene and Sanitation
  - Hand washing
  - Bathroom habits
  - Wearing shoes
  - Food preparation
  - Water treatment
  - Latrine maintenance
  - Farming practices
**STH Treatment**

- Anthelmintic “deworming” drugs
  - Cheap
  - Safe
  - Effective
  - Easily administered
  - Chemoprophylactic

- WHO Guidelines for Mass Drug Administration (MDA)
  - Once per year for 20-50% pediatric prevalence
  - Twice per year for 50%+ pediatric prevalence
Epidemiological Assessment
Conducted by The Access Project in 2007

- Prevalence of STH infections in Rwanda
  - 66% of all 10- to 16-year-olds
  - 70%+ in 15 of the country’s 30 districts
  - Simultaneous infection with multiple types of STH common

- UNICEF 2003-2008 findings
  - 51% Rwandan children had stunted growth
  - 18% of under 5-year-olds severely underweight
Community Assessment
Conducted by Priscilla Sepe and JeffHEALTH in 2009

“Knowledge, attitudes and practices related to soil-transmitted helminthes in Rwandan villages”
- Misconceptions about transmission
- Limited knowledge of long-term morbidity
- Willingness to take deworming drugs
- Limited water poses barrier to prevention
- Poor sense of self-efficacy

Recommendations for interventions
- Small group seminar lessons
- Educate mothers and/or children
- Visual aids
STH Control in Rwanda
The Access Project in collaboration with Rwanda Ministry of Health

- Mass drug administration (MDA) in Rwanda
  - Ongoing: 2008-present, twice per year
  - Administration via health center and health workers
  - Successful

- MDA in Rwanda is cost-effective
  - $0.12 per child treated averts $4.22 per anemia case

- Sensitization campaign in Rwanda
  - Implemented: 2008-2009
  - Health education in schools and health centers
  - Unsuccessful
Goals and Objectives

Goal 1: Plan and implement culturally appropriate health education pilot program based on findings of Sepe 2009
  - Objective 1: Increase knowledge of STH infections and transmission
  - Objective 2: Improve attitudes toward prevention and treatment
  - Objective 3: Support changes in health behaviors relevant to transmission
Goals and Objectives

Goal 2: Evaluate pilot health education program

Objective 1: Improve planning and implementation of future health education programs in Rwanda

Objective 2: Determine effectiveness of community-based approach to program planning and evaluation
**Materials and Methods**

- **Inclusion criteria and rationale**
  - Women only
  - Have children or take care of children

- **Subject recruitment**
  - Convenience sample

- **Format**
  - Small group seminars
    - 3 lessons in each village
    - 9-12 subjects per lesson
  - Oral with visual aids
  - Traditional storyline/drama teaching method

- **Content**
  - Tailored to Rwandan village population
    - Knowledge
    - Attitudes
    - Practices
**Materials and Methods**

- **Health Belief Model**
  - Perceived susceptibility
  - Perceived severity
  - Perceived benefits
  - Perceive barriers

- **Questionnaire**
  - Pre- and post-lesson
  - One-on-one
  - Kinyarwanda translation
  - 17 questions
    - 2 demographics questions
    - 4 Yes/no answer questions
    - 11 Multiple-choice questions
Results

Sample size and demographics

- Number of Participants: 61
- Number of Participants from Akarambi Village: 32
- Number of Participants from Rugerero Village: 29
- Percent Female: 100%
- Age Range: 17 to 60 years
- Average Age: 34.6 years
- Number of Children: 0 to 8
- Average Number of Children: 3.1
Results

- Perceived susceptibility & knowledge of transmission
  - Who in your village can have infection with inzoka? (Question 4)
    • Before: 90% Correct
    • After: 100% Correct
    • Percent Change: 11%
    • Chi-square (1, N=62) = 10.53, p = .001
  - Why do people become infected with inzoka? (Question 5)
    • Before: 92% Correct
    • After: 100% Correct
    • Percent Change: 8.7%
    • Chi-square (1, N=62) = 8.33, p = .004
Results

- Perceived severity & knowledge of symptoms and morbidity
  - Do people who have inzoka have symptoms? (Question 7)
    - Before: 3% Correct
    - After: 15% Correct
    - Percent Change: 400%
    - Chi-square (1, N=62) = 8.79, p = .003
  - Common symptoms of inzoka in children are? (Question 8)
    - Before: 100% Correct
    - After: 100% Correct
  - Repeated infections with inzoka in children can cause? (Question 9)
    - Before: 44% Correct
    - After: 62% Correct
    - Percent Change: 41%
    - Chi-square (1, N=62) = 6.50, p = .01
Results

- Knowledge of prevention
  - How can you prevent worm infection at home? (Question 11)
    - Before: 92% Correct
    - After: 97% Correct
    - Percent Change: 5.4%
    - Chi-square (1, N=62) = 2.41, p = .1
  - When is it most important for you and your children to wash your hands? (Question 12)
    - Before: 74% Correct
    - After: 87% Correct
    - Percent Change: 18%
    - Chi-square (1, N=62) = 5.38, p = .02
Results

Perceived barriers and knowledge of treatment

Is there medication available to treat inzoka? (Question 13)
• Before: 100% Yes

If yes (to Q13), is the medication to treat inzoka safe for your children to take? (Question 14)
• Before: 100% Yes

At what age can you start giving a child medication for inzoka? (Question 15)
• Before: 24% Correct
• After: 81% Correct
• Perfect Change: 240%
• Chi-square (1, N=62) = 65.14, p = 0
Results

Perceived benefits and intention to seek treatment

When should children take medication to treat inzoka? (Question 16)
- Before: 90% Correct
- After: 98% Correct
- Perfect Change: 8.9%
- Chi-square (1, N=62) = 5.67, p = .02

What should you do if you think that you or your child has inzoka? (Question 18)
- Before: 100% Correct
- After: 100% Correct
Results

Knowledge of prior treatment

To your knowledge, has your child been given medication for inzoka in the past? (Question 17)

Before: 93% Yes

Self-efficacy

Do you think it is possible to keep from getting inzoka? (Question 10)

Before: 98% Yes
Conclusions

Lesson content
- Good knowledge of transmission and high perceived severity
- Very limited knowledge of long-term morbidity and low perceived severity
- Good knowledge of treatment
- Sufficient perceived benefit to treatment
- Few perceived barriers to treatment
- Self-efficacy and perceived barriers to prevention unclear

Teaching methods
- Visual aids effective
- Traditional Rwanda teaching methods very effective
- Quantitative information easily understood
Recommendations for Future JeffHEALTH Interventions

- Utilize traditional Rwandan teaching method of drama
- Develop culturally appropriate visual aids
- Give hands-on instruction in preventive health behaviors
- Use other health behavior theories
- Teach older children who take care of younger children
- Recruit and train village “STH experts”
- Work with villagers to improve sanitation
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