American Public Health Association Annual Meeting

Malnutrition Rehabilitation and Prevention in Rwandan Children: Examining Impact and Sustainability of a Rural Intervention

Session 3139: Maternal and Child Health Issues in the U.S. and Around the World: A Showcase of Students' Papers

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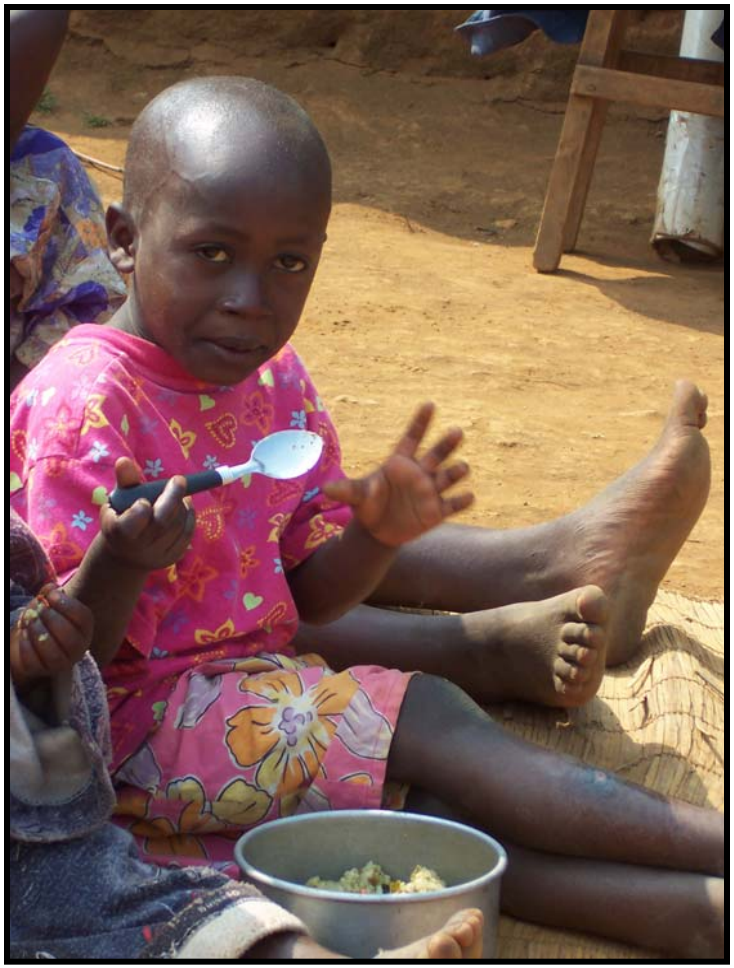
An alarming paradox…



Child obesity in developed nations is reaching epidemic proportions….

…while 5 million children are needlessly dying in developing nations because they are underweight

UN, 2005

UN Development Goals

- In 2000, 189 nations supported a pledge to reduce child mortality by two-thirds by 2015: Millennium Development Goal #4
- Identifying how malnutrition co-presents with fatal conditions in children is critical in achieving this goal (Black, Morris, & Bryce, 2003)
- Fatal conditions include pneumonia, diarrhea, and infectious diseases (essentially preventable conditions, exacerbated by malnutrition)
- Effective nutrition programs need to be identified that reduce under-nutrition in children in order to reach the UN goal (Jones, Steketee, Black, Bhutta, & Morris, 2003)

Positive Deviance / Hearth

- Community-based, volunteer-driven education program
- Targets children who are moderately malnourished
- Identify “positive deviant” mothers in region who have nourished children
- Identify region-specific foods & behaviors
- Teach mothers feeding and hygiene practices for their households

Positive Deviance/Hearth

- Positive Deviance/Hearth has been or is currently being used in 35 countries (McNulty, 2005)
- Commonly used by USAID/CORE and partners
- Agencies such as Save the Children have studied and attempted to quantify the overall effectiveness of the model
- There is a continual need to add to the on-going dialogue about PD/Hearth and its country-specific influence

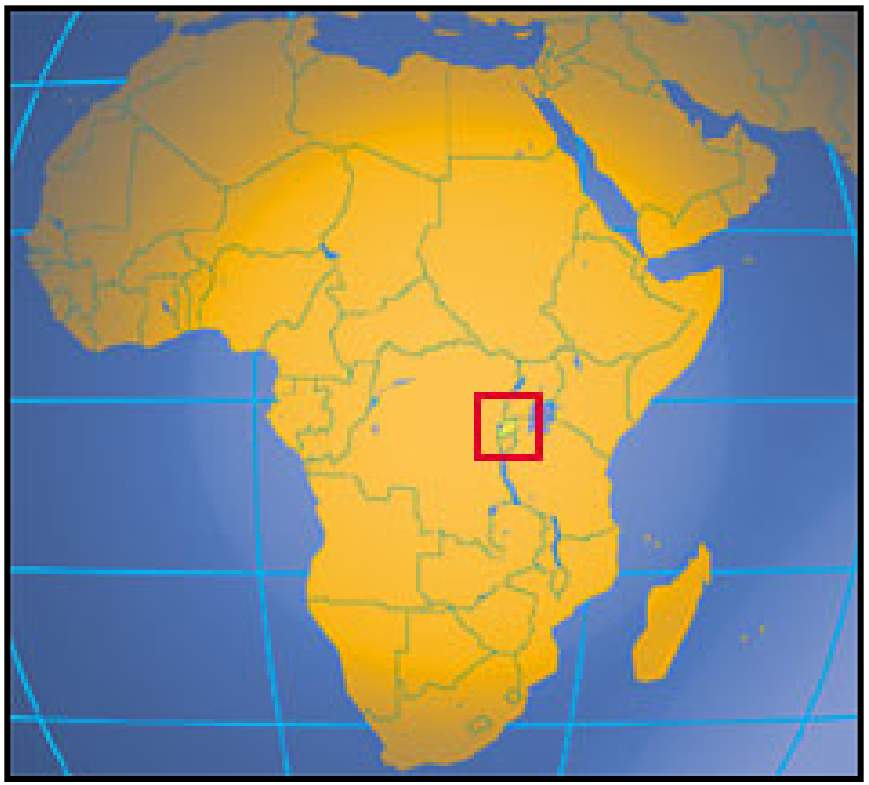
Thesis: Statement of Purpose

- Using quantitative and qualitative data, I conducted a concurrent mixed-methods study to make observations about the PD/Hearth model's effectiveness in southwest Rwanda

PD/Hearth in Rwanda

- In 2001, World Relief began a five-year, USAID-supported child survival program in southwest Rwanda
- PD/Hearth was the approach chosen by the in-country agency to address malnutrition (nearly 35% malnutrition rate in target community - Perry *et al*., 2004)
- PD/Hearth was implemented in 2003 and concluded in 2006 in the context of the CSP

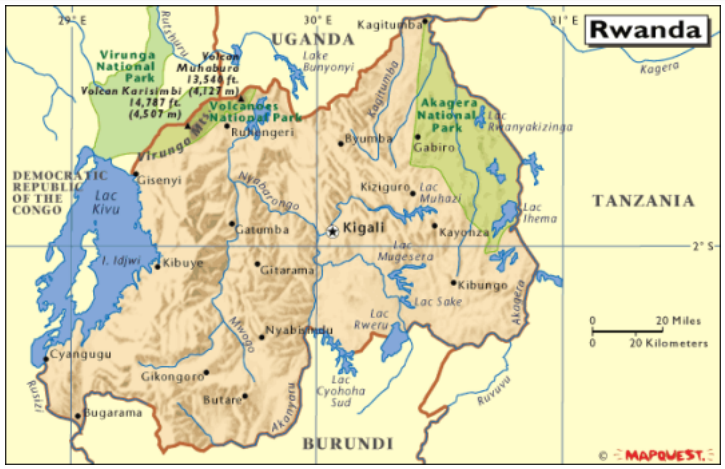
PD/Hearth in Rwanda

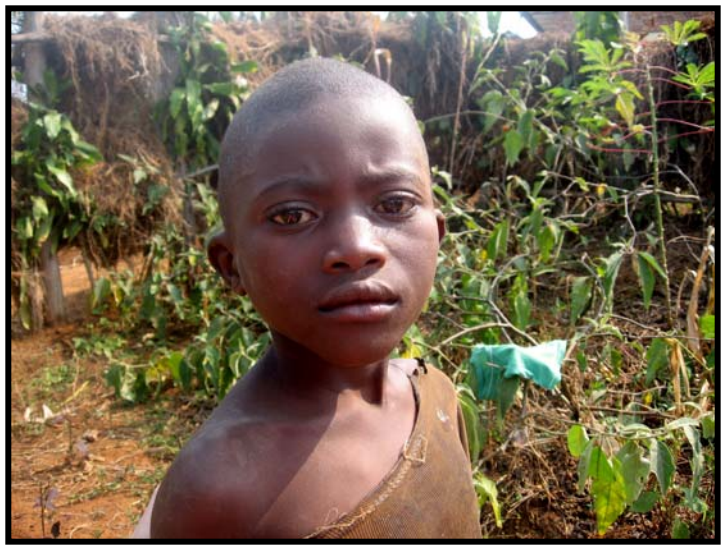


- Land-locked country the size of Rhode Island
- One of the most densely populated countries in Africa
- Population: 7.5 million
- Genocide: 1994
- 800,000 people died in less than 100 days
- Today, the country is politically stable and experiencing growth

-Perry *et al.,* 2004

Southwest Rwanda





- World Relief target area in the Nyamasheke District
- Located along the shores of Lake Kivu
- 5,000 feet above sea level
- Mountainous, hilly, tropical
- Subsistence farmers
- Cash crops: beans, cassava, rice
- 33,484 women
- 24,021 children

Perry *et al.,* 2004

Thesis Study Design

The study was conducted within the framework of addressing the three primary goals of PD/Hearth:

- Rehabilitation of malnourished children
- Prevention of malnutrition in the community
- Empowerment of families to sustain good nutritional status with local resources

Study Objectives/Study Design
PART ONE: Rehabilitation

PD/Hearth Goal & Present Study Outcomes	Objective	Study Design	Purpose
Malnutrition Rehabilitation	Calculate project-wide rehabilitation rates	Cohort study – all PD/H participants, *N = 4664*	Discern effectiveness of PD/H to rehabilitate children in project area
	Calculate differences between regional rehabilitation rates	Cohort study – all PD/H participants *N = 4664*	Identify regions with significantly high and/or low rehabilitation rates
	Examine variables associated with nutritional status in PD/H participants	Cross-sectional study, June 2006 *N = 128*	Identify variables significantly correlated to good nutritional status

Study Objectives/Study Design
PART TWO: Prevention

PD/Hearth Goal & Present Study Outcomes	Objective	Study Design	Purpose
Malnutrition Prevention	Compare nutritional status of younger siblings of PD/H participants and non-participants	Cross-sectional study, June 2006 *n = 128 (intervent.)* *n = 156 (control)*	Discern effectiveness of PD/H to prevent malnutrition in region
	Compare differences between characteristics of siblings of PD/H participants vs. non-participants	Cross-sectional study, June 2006 *n = 128 (intervent.)* *n = 156 (control)*	Identify variables significantly correlated to PD/H program participation

Study Objectives/Study Design
PART THREE: Sustainability/Empowerment

PD/Hearth Goal & Present Study Outcomes	Objective	Study Design	Purpose
Sustainability of PD/Hearth in Target Community	Categorize responses of focus groups in themes related to sustainability of PD/H in target area	Focus groups of PD/H program participants, June 2006 *N = 67 focus groups*	Discern effectiveness of PD/H to empower community and implement sustainable program and behavior change
	Categorize perspectives of interviewees on sustainability of PD/H	Interviews of PD/H program participants and health system workers, June 2006	

Statistical Analysis, Pt. 1 (Rehabilitation)

Rehabilitation / Prevention / Empowerment

- Mortality/drop-out/rehabilitation rates were calculated from retrospective cohort data set
- 1-tailed binomial distribution was used to calculate differences across regions
- Univariate (chi-square) and bivariate logistic regression analyses of variables that may have impacted rehabilitation were conducted using cross-sectional data set

Statistical Analysis, Pt. 1 (Rehabilitation)

Independent variables

(Smith, Ruel, & Ndiaye, 2005)

Frequency data	Socio-econ. factors	Proximal factors
• Gender (male/female) • Project region (eight regions)	• Mother's literacy • Mother's comfort level w/amount of food given to child • Latrine/toilet in household • Rubbish pit on property	• Age of mother • Breastfeeding practices • Frequency of meals • Appropriate weaning foods • Immunizations • IMCI (mom's knowledge) • Diarrhea - past 2 wks • Cough - past 2 wks • Fever/malaria - past 2 wks • Hand-washing knowledge • Soap in household

Statistical Analysis, Pt. 2 (Prevention)

Rehabilitation / Prevention / Empowerment

- Chi-square analysis was used to compare the nutritional status of siblings of PD/H participants vs. non-participants
- Chi-square and multivariate logistic regression analysis were employed to examine the association between nutritional status (dependent variable) and independent variables (same as Part 1)

Statistical Analysis, Part 3 (Sustainability)

- Focus group responses were counted and grouped according to frequency of response
- Follows study of qualitative data related to PD/Hearth in Vietnam (Hendrickson *et al.*, 2002)
- Themes related to empowerment and sustainability were graphed, reported in Results, and interpreted in Discussion
  - Application (or non-application) of health behaviors learned at PD/H meetings
  - Whether PD/H participants shared new behaviors with others
  - Whether PD/H meetings would continue after close of child survival program
  - What community support had been given to PD/H
  - Strengths & weaknesses of PD/H

Results: PD/H & Malnutrition Rehabilitation

- PD/H was a successful approach in rural Rwanda to rehabilitate children
- Mean rate: 67.8%
- Two regions significantly lower than mean; three regions significantly higher (highest: 81%)
- Yove (49% rehabilitation) was impacted by factors such as personnel turnover, poor geographical location, poor socio-economic conditions, poor education levels, and poor family structure (post-study interviews)

Results: PD/H & Malnutrition Rehabilitation

- No frequency data associated with rehabilitation (gender / region)
- Proximal and socio-economic variables associated with rehabilitation were supported by qualitative data (poverty and child illness)

Results: PD/H & Malnutrition Prevention

- No significant difference between intervention and control groups
- Results may have meaning, however
- 100% of intervention families had at least one malnourished child within the past three years
- Control group *likely* reflected whole community measures (35.2% to 20.5%)
- Findings showed very similar nutritional status between groups; this could indicate that PD/H helped prevent malnutrition in intervention group

Results: PD/H & Malnutrition Prevention

- Two socio-economic variables associated with PD/H participation: whether or not mother was comfortable with amount of food given to child; and latrine/toilet on property
- Both variables indicate that participant mothers had learned lessons taught at PD/H about food quantity and hygiene

Results: Empowerment & Sustainability

- Nearly 100% of PD/H participants applied health behavior changes learned at PD/H meetings
- 100% of PD/H focus groups reported sharing lessons learned at PD/H meetings with other community members
- Intrinsic motivation for health behavior change reported often
- Theme of participant ownership often surfaced
- Strong community support of PD/H

Results: Empowerment & Sustainability

- Divergent perspectives about sustainability of PD/H
- Program recipients and community volunteers: “Sustainable”
- Supervisors (current and expected): “Perhaps not sustainable”
- Time will tell…

Recommendations & Future Research

- Rehabilitation
  - Introduce microfinance programs simultaneously with PD/H
- Prevention
  - Further research into preventive effects of PD/H (taking familial history of malnutrition into account)
  - Research dispersion effect of PD/H

Recommendations & Future Research

- Empowerment/Sustainability
  - Return to project area in the future to conduct research on lasting effects of PD/H
  - Establish “exit strategy” for conclusion of PD/H agency oversight to transition community supervisors and participants alike

Future Research & Policy Recommendations

- Need longitudinal data for more sophisticated data analysis (system in place for tracking children)
- Established control and intervention groups, where ethical, need to be in place
- Policy changes may need to occur in order to effectively assess program impact in time to achieve Millennium Development Goal #4
- Advocate! APHA & UNICEF provide opportunities to advocate for global child survival

Acknowledgements

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Thank You!