Prevalence and risk factors for gender based violence among class 6 learners in the informal settlements of Nairobi, Kenya: baseline analysis from the IMpower & SoS cluster randomized controlled trial

Michael Baiocchi, Rina Friedberg, Mary Amuyunza, Gabriel Oguda, Dorothy Otieno, Amit Pasupathy, and Clea Sarnquist
the teams

BY MANY HANDS
the organizations
the organizations

UJAMAA

NO MEANS NO WORLDWIDE
the organizations

UJAMAA

NO MEANS NO WORLDWIDE

Stanford University
the Kenyan intervention team
stakeholders: schools and MoE
the intervention

BY MANY MEANS
the intervention: girls program

Four pathways:

- Empowerment,
- Situational awareness,
- Verbal skills, and
- Physical self-defense skills.
the intervention: boys program

Three pathways:

- Healthy gender norms
- Positive masculinity
- Bystander intervention (limited)
the study

RANDOMIZED TRIAL
informal settlements
informal settlements
informal settlements
the study

Completed baseline data collection

- Quantitative data:
  - ~4,000 girls surveys
  - ~1,000 boys surveys
Completed baseline data collection

- Quantitative data:
  - ~4,000 girls surveys
  - ~1,000 boys surveys

- Qualitative data
  - 20 girls qualitative interviews
  - 11 boys qualitative interviews
the study: timeline
the study: timeline

2016
the study: timeline

2016
the study: timeline

2016

Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec
the study: timeline

2016

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

C1: data collection
the study: timeline

2016

Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

- C1: data collection
- C1: teaching
the study: timeline

Three cohorts, each with $\approx 30$ schools.
the study: timeline

Three cohorts, each with $\approx 30$ schools.
the study: timeline

Three cohorts, each with ≈30 schools.
the study: timeline

Three cohorts, each with \( \approx 30 \) schools.
the study: timeline

Three cohorts, each with \(\approx30\) schools.
the study: timeline

Three cohorts, each with $\cong 30$ schools.
Three cohorts, each with ≈30 schools.
comparison group: standard of care

Kenyan Ministry of Education curriculum
- Life-skills class covering: hygiene, sexual health, finances, etc.
- Part of national requirement, but taught by NMNW trainers to ensure consistency.
the baseline

PRELIMINARY FINDINGS
baseline: randomization table
baseline: randomization table

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Schools</td>
<td>57</td>
<td>53</td>
</tr>
<tr>
<td>Total Girls</td>
<td>2086</td>
<td>2045</td>
</tr>
<tr>
<td>Relationships</td>
<td>0.21 (0.20, 0.23)</td>
<td>0.22 (0.20, 0.23)</td>
</tr>
<tr>
<td>Rape</td>
<td>0.11 (0.10, 0.12)</td>
<td>0.11 (0.09, 0.12)</td>
</tr>
<tr>
<td>Partner rape</td>
<td>0.06 (0.04, 0.08)</td>
<td>0.04 (0.03, 0.06)</td>
</tr>
<tr>
<td>All IPV</td>
<td>0.17 (0.14, 0.20)</td>
<td>0.16 (0.13, 0.19)</td>
</tr>
</tbody>
</table>

Table 1: Covariate balance between treatment and control schools. Note relationships (1) tracks whether a girl has had a boyfriend; all IPV (2) tracks physical, verbal, and sexual intimate partner violence.
**baseline: randomization table**

<table>
<thead>
<tr>
<th></th>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Schools</td>
<td>57</td>
<td>53</td>
</tr>
<tr>
<td>Total Girls</td>
<td>2086</td>
<td>2045</td>
</tr>
<tr>
<td>Relationships $^1$</td>
<td>0.21 ($0.20, 0.23$)</td>
<td>0.22 ($0.20, 0.23$)</td>
</tr>
<tr>
<td>Rape</td>
<td>0.11 ($0.10, 0.12$)</td>
<td>0.11 ($0.09, 0.12$)</td>
</tr>
<tr>
<td>Partner rape</td>
<td>0.06 ($0.04, 0.08$)</td>
<td>0.04 ($0.03, 0.06$)</td>
</tr>
<tr>
<td>All IPV $^2$</td>
<td>0.17 ($0.14, 0.20$)</td>
<td>0.16 ($0.13, 0.19$)</td>
</tr>
</tbody>
</table>

*Table 1: Covariate balance between treatment and control schools. Note relationships (1) tracks whether a girl has had a boyfriend; all IPV (2) tracks physical, verbal, and sexual intimate partner violence*
baseline: distribution of counts
baseline: distribution of counts

Number of rapes among all girls
baseline: distribution of counts

Number of rapes among all girls
baseline: distribution of counts

Number of rapes among all girls

Number of rapes

0.0 0.2 0.4 0.6 0.8

0 1 2 3 4 5+

Number of rapes
baseline: distribution of counts by perpetrators
baseline: distribution of counts by perpetrators

- **Boyfriend**
  - Number rapes

- **Relative**
  - Number rapes

- **Authority Figure**
  - Number rapes

- **Stranger**
  - Number rapes
baseline: predictive models
baseline: predictive models

Two types of models:
baseline: predictive models

Two types of models:
• Individual level models
baseline: predictive models

Two types of models:
- Individual level models
- School level models
baseline: individual models
baseline: individual models

What kind of girls are at risk?
baseline: individual models

What kind of girls are at risk?
baseline: individual models

What kind of girls are at risk?

None vs. >1
baseline: individual models

What kind of girls are at risk?

None vs. >1

<4 vs. >5
baseline: individual models

What kind of girls are at risk?

None vs. >1

<4 vs. >5

Predicting high/low Frequency among Girls who have been Raped
baseline: boyfriends

Count of perpetrator among all girls

- boyfriend
- relative
- authority
- unsure
baseline: school level
baseline: school level

Which schools should we reach out to first?
baseline: school level

Which schools should we reach out to first?
baseline: school level

Which schools should we reach out to first?

![Relative Dropout Rate Graph]

- 47.67% to 89.7%
- 89.7% to 104.52%
- 104.52% to 127.64%
- 127.64% to 325%
impact model

INTERMEDIATE EFFECTS
Complete Model

\[ Y_1 = \text{unplanned pregnancy} \]
\[ Y_2 = \text{rape} \]
\[ Y_3 = \text{STI} \]
\[ Y_4 = \text{Bullying} \]
\[ Y_5 = \text{IPV} \]
Reduced Model

\[ Y = \text{rape} \]

I → SE → GN → SA → PE → Y
Reduced Model

\[ I \rightarrow SE \rightarrow Y = \text{rape} \]

\[ I \rightarrow GN \rightarrow Y \]

\[ I \rightarrow SA \rightarrow Y \]

\[ I \rightarrow PE \rightarrow Y \]
Reduced Model

\[ Y = \text{rape} \]
Reduced Model

\[ Y = \text{rape} \]
baseline: principal stratification modeling
baseline: principal stratification modeling
baseline: principal stratification modeling
baseline: principal stratification modeling
baseline: principal stratification modeling
baseline: principal stratification modeling
baseline: principal stratification modeling
baseline: principal stratification modeling

Treatment

Control
baseline: principal stratification modeling

2016

- Jan: C1 data collection
- Feb: C1 data collection
- Mar: C2 data collection
- Apr: C2 data collection
- May: C3 data collection
- Jun: C3 data collection
- Jul: C3 data collection
- Aug: C3 data collection
- Sep: Oct: Nov: Dec:
baseline: principal stratification modeling
baseline: principal stratification modeling
baseline: principal stratification modeling

Example: impact of no male guardian?
baseline: principal stratification modeling

Example: impact of no male guardian?
baseline: principal stratification modeling

Example: impact of no male guardian?
baseline: principal stratification modeling

Matched-exposed

Matched-unexposed

Unmatched

Example: impact of no male guardian?
Example: impact of no male guardian?
baseline: principal stratification modeling

Matched-exposed

Matched-unexposed

Example: impact of no male guardian?
baseline: principal stratification modeling
Reduced Model

$$Y = \text{rape}$$

Diagram with nodes labeled I, SE, GN, SA, PE, and Y.
baseline: principal stratification modeling
baseline: principal stratification modeling

Example: impact of self-efficacy on probability of rape.
baseline: principal stratification modeling

Example: impact of self-efficacy on probability of rape.
baseline: principal stratification modeling

Example: impact of self-efficacy on probability of rape.
baseline: principal stratification modeling

Example: impact of self-efficacy on probability of rape.
baseline: principal stratification modeling

Example: impact of self-efficacy on probability of rape.
baseline: principal stratification modeling

Example: impact of self-efficacy on probability of rape.
baseline: principal stratification modeling

Example: impact of self-efficacy on probability of rape.

High-dose group

Low-dose group

Non-informative

spectrum of exposure (a.k.a. “dose”)
baseline: principal stratification modeling

Example: impact of self-efficacy on probability of rape.

High-dose group

Low-dose group

spectrum of exposure (a.k.a. “dose”)
baseline: principal stratification modeling

Example: impact of no male guardian?

Matched-exposed

Matched-unexposed
baseline: principal stratification modeling
# Load the data
data <- read.csv("sample-dataset")
head(data)

# Cast the data to a data frame.
df <- data.frame(data)
n <- nrow(df) # number of rows; here this is the total number of girls

Now we identify treatment and control schools. In our sample dataset, schools 1 and 2 are control schools, and schools 3 and 4 are treatment schools. In the real dataset, we similarly have a list of school IDs that correspond to each treatment and control. The ifelse command in R works as follows: ifelse(statement, result if True, result if False). Also, note the expression df$assignment replaces the values of column assignment if they exist in dataframe df, and assigns them if they do not.

control<- 1:2
trt<- 3:4
df$assignment <- sapply(df$schoolid, function(id){ifelse(id%in%trt,1,0)})

# Isolate treatment and control rows.
treat.rows<- which(df$assignment == 1)
control.rows<- which(df$assignment == 0)

Once we have identified the students in treatment and control groups, we can begin to examine their demographics.

*Exercise 1: find a command to print out the number of girls in school 3 (there are 107).*

This will allow us to check that the covariates across the groups are balanced, a crucial part of our analysis. If we lack covariate balance, we will need to account for that when evaluating outcome differences between control and treatment groups.
# Load the data
data <- read.csv("sample-dataset")
head(data)

# Cast the data to a data frame.
df <- data.frame(data)
n <- nrow(df)  # number of rows; here this is the total number of girls

Now we identify treatment and control schools. In our sample dataset, schools 1 and 2 are control schools, and schools 3 and 4 are treatment schools. In the real dataset, we similarly have a list of school IDs that correspond to each treatment and control. The `ifelse` command in R works as follows: `ifelse(statement, result if True, result if False). Also, note the expression `df$assignment` replaces the values of column assignment if they exist in dataframe `df`, and assigns them if they do not.

c control<- 1:2
trt<- 3:4
df$assignment <- sapply(df$schoolid, function(id){ifelse(id%in%trt, 1, 0)})

# Isolate treatment and control rows.
treat.rows<- which(df$assignment == 1)
control.rows<- which(df$assignment == 0)

Once we have identified the students in treatment and control groups, we can begin to examine their demographics.

Exercise 1: find a command to print out the number of girls in school 3 (there are 107).

This will allow us to check that the covariates across the groups are balanced, a crucial part of our analysis. If we lack covariate balance, we will need to account for that when evaluating outcome differences between control and treatment groups.
the reason we’re going to succeed
fin.
Thank you to:
DFID
SA-MRC
SPECTRUM
Stanford Population Health
Rosenkranz Family
Agency for Healthcare Research and Quality

Stanford Gender Based Violence Prevention Collaborative
contact information

Clea Sarnquist
cleas@stanford.edu

Mike Baiocchi
baiocchi@stanford.edu