



Effectiveness of selling fruits in pieces or in bulk in improving fruit consumption of high-school students: A cluster randomized controlled trial in urban setting of Ethiopia

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Introduction

- ❑ Fruit and vegetable (F&V) are important components of a healthy diet. Reduced F&V consumption is linked to poor health and increased risk of NCDs.

(WHO, 2016)

- ❑ Despite their health promoting constituents, F & V consumption is low globally and very low in developing country.

(WHO, 2009) (FAO, 2017)

Con't...

- ❑ In Ethiopia F & V consumption is very low. In 2011, the average household consumed 45 kg of F&V per adult equivalent.

(Worku et al., 2017).

- ❑ This level is among the lowest in sub-Saharan Africa and is far from meeting the WHO recommendation of 146 kg per year.

(Ruel et al., 2005)

Con't...

- ❑ Several studies have shown that children's intake of F&V tracks into adolescence. Food preferences and eating habits established in childhood and adolescence tend to be maintained into adulthood.

(Gosliner w, 2014) (Taylor J. et al, 2013) (WHO, 2017)

Con't...

- ❑ The barriers and enablers affecting consumer behavior towards F&V consumption including **price, preference, quality, safety and access** are largely undocumented.

(Ariun I. et al, 2016)(Melaku et al, 2016)

- ❑ However, one key barrier could be the way fruits are sold around the city. For example, fruits are sold around some schools, but the minimum amount that one can buy is half a kilogram.
- ❑ Therefore...

Methodology

❑ Setting, design and period

- ❖ This cluster randomized controlled trial was conducted among adolescents in the school from January through June 2019, Addis Ababa Ethiopia.
- ❖ The study was conducted in two randomly selected sub cities.

Sample size determination and sampling technique

- ❖ SZ was calculated for the main outcome "***fruit consumption***"
- ❖ Double population proportion for RCT was employed (Necessary assumption was taken) $n=368$.

Intervention

- ❖ **Intervention arm:** Fruits were sold in piece.
 - Sellers were trained to advertise their mobile shop that they only sell in piece.
 - Labeled the price of each single fruit.
- ❖ **Control arm:** The sellers were allowed to only sale in bulk (in kilograms or half).

Data collection procedure

- ❖ Data were collected after the intervention. To see if there was any progress over time, repeated measure was taken (3 times).
- ❖ The following information were collected.
 - Socio-demographic characteristics
 - Barriers and enablers for fruits consumption
 - Dietary information (Focus on fruit)
 - Volume of fruits sold/day
 - **All ethical aspects were clearly maintained**

Data management and analysis

- ❖ EPI data, SPSS and SAS
- ❖ To measure the main outcome variables (fruit consumption), those respondent who ate fruit was given a yes (a score of 1) and those who didn't consume was given no (a score of 0). After that, we added the score to compute FCS. Then mixed effect linear regression analysis was used to see the impact of the intervention
- ❖ Mixed effect linier regression model
- ❖ All tests were two-sided and $P < 0.05$ was considered statistically significant. We report the parameter estimates with 95% CI and standard errors (SE).

Result

Fruit consumption based on 24-hour recall

- ❑ Based on 24 hour recall data, fruit consumption were not significantly different between I&C arms.

Table 1. Mixed effect linear regression output table for 24 hour fruit consumption score among intervention and control group, 2019.

| Effect | Estimate | SE | 95%CI | P-Value |
|---------------------------|----------|---------|------------------|---------|
| Intercept | 1.567 | 0.213 | 1.151-1.988 | <0.0001 |
| Intervention | 0.0811 | 0.3089 | -0.526-0.689 | 0.793 |
| Control | 0 | | | |
| Pocket money | -0.264 | 0.136 | -0.531- -0.0037 | 0.053 |
| Intervention 1*visit | -0.243 | 0.101 | -0.441-0.046 | 0.016 |
| Intervention 2*visit | -0.085 | 0.101 | -0.283-0.112 | 0.396 |
| Intervention 3*visit | 0 | | | |
| Control 1*visit | -0.298 | 0.0949 | -0.485- -0.119 | 0.0018 |
| Control 2*visit | -0.2105 | 0.09493 | -0.3936 -0.02412 | 0.027 |
| Control 3*visit | 0 | | | |
| Pocket money*Intervention | 0.176 | 0.211 | -0.238-0.597 | 0.403 |
| Pocket money*control | 0 | | | |

- The finding was in line with study conducted in **Brazil, South Africa and Kenya**.
- Absence of effect in the 24-hour recall FCS could be due to the fact that fruits are not consumed on a daily base, for this reason considering 24-hour recall to asses' fruit consumption doesn't give a representative data.
- But it 24 hr F&V score was high in I arm in **LIC in North Carolina** (F & V was measured together)

One week Fruit consumption score

- ❑ The one week recall FCS showed significant difference. The mixed effect linear regression output showed fruit consumption was higher in intervention arm ($\beta=0.853$, $p=0.001$).
- ❑ Meaning one unit change in the I arm results in 0.853 on the FCS of a single participant.

Table 2. Mixed effect linear regression output table for one week fruit consumption score among intervention and control group, 2019.

| Effect | Estimate | SE | 95%CI | P-Value |
|---------------------------|---------------|--------|----------------|---------------|
| Intercept | 2.27 | 0.273 | 1.733-2.807 | <0.001 |
| Intervention | 0.859 | 0.397 | 0.0786-1.639 | 0.0311 |
| Control | 0 | | | |
| Pocket money | -0.345 | 0.178 | -0.695-0.0046 | 0.0531 |
| Intervention 1*visit | -0.138 | 0.0928 | -0.320-0.044 | 0.1371 |
| Intervention 2*visit | -0.048 | 0.0928 | -0.182- 0.182 | 1.000 |
| Intervention 3*visit | 0 | | | |
| Control 1*visit | 0.122 | 0.0875 | -0.0490- 0.294 | 0.1610 |
| Control 2*visit | 0.046 | 0.0875 | -0.179- 0.179 | 1.0000 |
| Control 3*visit | 0 | | | |
| Pocket money*Intervention | 0.145 | 0.275 | -0.396- 0.69 | 0.5985 |
| Pocket money*control | 0 | | | |

- This concludes that this new approach increase fruit consumption of school adolescents.
- This is majorly due to fact that school intervention (that consider cost) and focuses on children/adolescent to change eating habit are effective because
 - Keen to adapt new change
 - Rare access to money to prefer food

Volume of sale

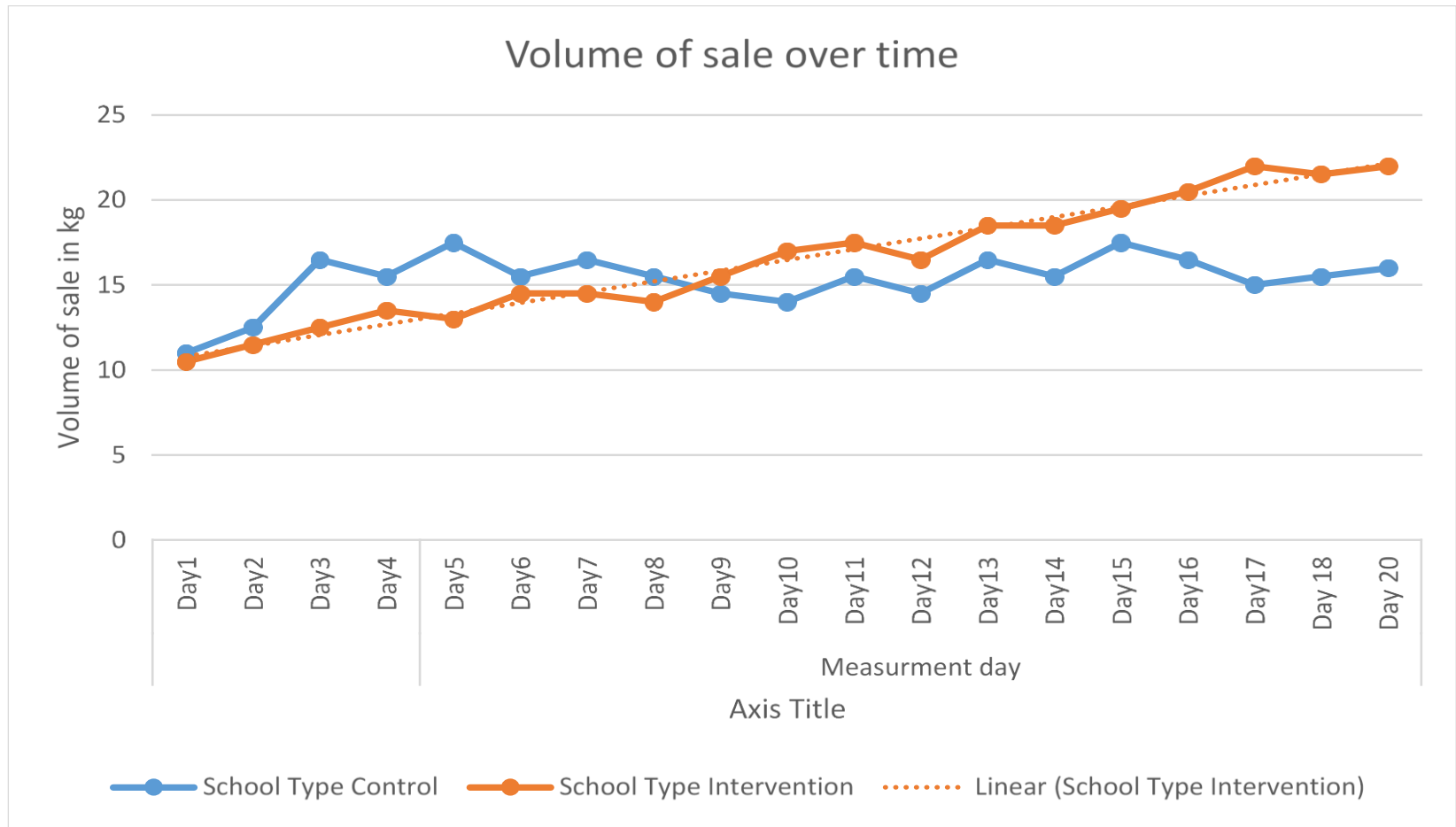


Figure 3. Trend in fruit volume of sale in intervention and control group in selected high school of Addis Ababa, Ethiopia, Addis Ababa, Ethiopia, 2019

Con't...

- The over all sell volume was higher in Intervention arm.
- This showed that the intervention encouraged more students to buy fruit with the limited pocket money they have which results in increase of total sell volume.

Generalizability

- Inference of the changes to the city of Addis Ababa is possible as most school in the town shares similar characteristics. Because, adolescents in AA are more sensitive to changes in practice due to access to different sources of information which might bring about higher effects.
- Nevertheless, similar intervention might bring about different results in rural Ethiopia, (economy, cost, culture)

Limitation

- Lack of standard to measure level of fruit consumption. Due to this reason we developed the concept of fruit consumption score which we assume is the best method.
- Outcome can be confounded by many external variables.
- Week recall fruit consumption assessment might be affected by recall biases.
- Other dimension like safety was not assessed.

Implication

- ❖ The study revealed that this approach has increased fruit consumption of school students. So policy makers need to consider this option to improve healthy eating among adolescents.
 - Legalization
 - Reduce tax
- ❖ Further studies to evaluate effect of the same intervention in other environment and duplication of the study in wider range in Addis Ababa.

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Thank You!!!