Reducing obesity and chronic disease in food deserts in Baltimore City, USA through educational, environmental and policy approaches

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Topics
- Baltimore City, Maryland, USA
- Changing the Food Environment
- Part 1. Working with small food stores
- Part 2. Working with prepared food sources
- Part 3. Multi-institutional intervention
- Part 4. Ongoing study

Baltimore City Food Environment

Corner stores
A larger cornerstore

Behind the glass

Carryouts
Food Environment and Obesity

- Fewer supermarkets = more obesity, more chronic disease (Morland 2006; Bodor JN 2010)

- Greater distance to grocery stores = more obesity (Inagami et al 2006)

- More small stores and prepared food sources = more obesity and chronic disease (Bodor JN 2010 Maddock, 2004)

Ways to Change the Food Environment (1)

- Changing access to foods within retail food stores & prepared food sources by:
  - Decreasing availability of less healthy foods
  - Increasing availability of healthy foods in small stores
  - Changing the physical location of foods (e.g., store layout)
  - Store renovations (e.g., adding FV coolers)
  - Manipulating price

Ways to Change the Food Environment (2)

- Changing access to foods within neighborhoods by:
  - Building new supermarkets
  - Developing farmer’s markets
  - Improving transportation

- Changing setting for provision of information (e.g., POP promotions)

Ways to Change the Food Environment (3)

- Policy
  - Setting store standards/requirements
  - Menu labeling
  - Rezoning
  - Taxes (E.g., SSB tax)

- Work in multiple settings/ institutions at the same time
  - Integrating interventions in food stores, restaurants, schools, worksites, etc.
Ways to Change the Food Environment (4)

- Other approaches:
  - Improving food networks (distributors, producers, retailers)
  - Improving local production (producers)
  - Increasing nutrient content of foods (manufacturers)
  - Changing packaging of foods (manufacturers)

Part 1. Working in Small Stores

Baltimore Healthy Stores

- East Baltimore: intervention area
- West Baltimore: comparison area
- Store sample
  - 2 supermarkets/area
  - 6-7 small stores/area
- Consumer sample
  - ~87 respondents/area

Key Issues from Interviews

- From Store Customers: “I would love to buy/eat healthy foods but they are…”
  - Too expensive
  - Not available in the stores I shop in
  - Are of poor quality in the stores I shop in
- From Store Owners/Managers: “I would love to stock healthy foods but…”
  - No one buys them
  - The last time I stocked (xxxxx) it just sat on the shelves

Community workshops

- 1-3 new foods per store per phase
- Start with “low-hanging fruit”
- Incentives
  - Stocking guidelines
  - Promotional materials to create demand
  - Incentive card to wholesaler
  - Provide small supply

Increasing Demand: Visual Materials

Increasing supply: Corner stores stock healthier foods
Interactive Sessions in large and small food stores

Materials and training for Korean American store owners
- Nutrition Education Booklet (Korean)
- Cultural Guidelines (Korean)

Impact on Stocking and Sales

<table>
<thead>
<tr>
<th>Stocking Score (range 0-10)</th>
<th>Sales Score (range 0-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Comparision</td>
</tr>
<tr>
<td>Baseline</td>
<td>5.9 ± 2.0</td>
</tr>
<tr>
<td>Post-phase</td>
<td>8.3 ± 1.0</td>
</tr>
<tr>
<td>Post-intervention</td>
<td>7 ± 2.0</td>
</tr>
</tbody>
</table>

Song et al, Public Health Nutrition, 2009

Consumer Results
- N=85 respondents measured pre and post
- After adjustment for baseline value, age, sex and SES:
  - Significant impact on food preparation methods and frequency of purchase of promoted foods
  - Positive trend for healthy food intentions

Gittelsohn et al, Health Education and Behavior, 2009

Baltimore Food Policy Advisory Committee (Food PAC)
- Early 2009: Baltimore City Food Policy Task Force develops report with recommendations
- Late 2009: Holly Freishtat, MS, CN, named Baltimore City Food Policy Director
- Early 2010: Baltimore Food PAC forms, begins to implement recommendations of the task force
- BCHD Received grant to support Baltimarket program
  - 18 corner stores
  - 3 supermarkets
  - 75 youth mentors

Lessons Learned
- We can get small stores to increase stocking of healthier foods, and show impact on consumer food choices
- Sustainability of small store interventions possible in Baltimore
- BUT: people in Baltimore’s low income food environments get food from many places
Part 2. Changing the prepared food source environment:

Baltimore Healthy Carryouts

Prepared Food Sources in Baltimore
- A total of 144 Prepared Food Sources (PFSs) were observed (ground-truthing method) in low-income neighborhoods of Baltimore (Lee et al. 2010)
  - 72% carryouts (n=104)
  - 15% corner stores with deli/take-out
  - 10% Fast food restaurants
  - 5% Sit-down restaurants

Carryouts: Food establishments selling ready-to-eat food and beverage for off-premises consumption (Zoning Code of Baltimore City, 1-123.1)

Study Design: Baltimore Healthy Carryouts Pilot Trial

Intervention group
- 1st generation Korean American owned carryouts (N=2)
- African American owned carryouts (N=2)

Comparison group
- 1st generation Korean American owned carryouts (N=2)
- African American owned carryouts (N=2)

Matching variables: ethnicity, location, physical environment of the carry-out

Phase 1: Modified Menu Boards & Menu Labeling
- Owners were reluctant/concerned about changing what they sell
- Many do not have resources to change menu boards
- Allowed us to build rapport/trust with owners

Healthier options were highlighted with a leaf logo

Healthier menu options were also promoted with photos

Phase 2: Healthy Sides & Healthy Beverages
- Promoted currently available healthy sides & beverages
  - Collard greens, corn, salads, soups, water, diet soda, 100% fruit juice
- Introduced new healthy sides
  - Yogurt, fresh fruits, fruit cups, baked chips
- Provided initial stocks of healthy sides
Phase 3. Affordable Healthy Combo Meals

- Improving food preparation methods
  - Provide an indoor grill to implement grilled chicken

- Healthy combo meal promotion with price reduction
  - Owners agreed to reduce up to $2.50 per healthy combo meal without compensation
  - Combo meal with free baked chips

Evaluation Method

- Weekly sales receipt collection (February – September 2011, 32 weeks)
  - Trained data collectors visited carryouts every week
  - A total of 186,654 units of sales were collected

  - One intervention carryout did not follow the protocol – excluded from the analysis

Changes in percentage of healthy food sales from baseline by intervention phases

Changes in the ratio of healthy to less-healthy items sales from baseline

Application
Lessons Learned

- We can get small carryouts to change, and show impact on sales and consumer food choices
- Sustainability of carryout interventions possible in Baltimore
- BUT: Can we combine these approaches? How to reach children?

Part 3. Multi-institutional Approaches
Baltimore Healthy Eating Zones Pilot

- Creation of “healthy eating zones” in and around 6 Baltimore recreation centers (with 6 comparison)
- Worked with corner stores and some carryouts
- Increasing availability of healthy foods
- Point of purchase signage
- Interactive sessions

- Peer educators
- Cooking classes for kids in recreation centers
- Recreation center staff training
  
  Funded by RWJ HER, Round 2

Youth materials developed by Kids On The Hill

Interactive activities in recreation centers

Findings

- Intervention youth had greater exposure to the intervention than comparison youth.
- Intervention youth significantly improved food-related outcome expectancies (p=0.02) and knowledge (p<0.001).

Impact on Obesity

<table>
<thead>
<tr>
<th></th>
<th>By Direct Exposure</th>
<th>By Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in obesity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.74</td>
<td>-1.88</td>
</tr>
<tr>
<td>Med</td>
<td>1.44</td>
<td>0.34</td>
</tr>
<tr>
<td>High</td>
<td>-2.91</td>
<td>-0.78</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.34</td>
<td>-3.15</td>
</tr>
<tr>
<td>Comparison</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td>0.33</td>
<td>0.051</td>
</tr>
</tbody>
</table>

Shin et al, HEB, 2015
Lessons Learned

- Feasible to intervene in multiple venues simultaneously in Baltimore
- Some health impacts shown
- BUT: Can we sustainably impact the Baltimore food environment at multiple levels? What are the best approaches/levels for intervention? How can they be integrated effectively? How to engage policymakers?

Part 4. Ongoing Multi-level, multi-component Intervention Trial

- Funded as part of the Global Obesity Prevention Center at Johns Hopkins

BHCK Aims

1. To develop a community-based obesity prevention program, operating at multiple levels of the Baltimore City food system

2. To increase affordability, availability, purchase, and consumption of healthy foods in 15 low-income minority neighborhoods (with 15 comparison)

3. To evaluate impact on multiple levels: healthy food pricing and availability; adult food purchasing, preparation and obesity; and child obesity, diet and psychosocial factors

Study Design

- 28 Recreation Center Zones
- Wave 1: 14 Recreation Center Zones (Randomization)
- Wave 2: 14 Recreation Center Zones (Randomization)

Wave 1 Baseline Evaluation Sample

- Children’s BMI Status
  - Underweight: 1%
  - Normal: 56%
  - Overweight: 19%
  - Obese: 24%

- Caregiver’s BMI Status
  - Underweight: 0%
  - Normal: 14%
  - Overweight: 21%
  - Obese: 65%
Corner Stores

Other maintained features

- Gift card to wholesaler
- In-store interactive sessions
- Shelf labels

Carryouts

Store Level Intervention: Corner Stores

Carryout Intervention
Corner Store & Carryout Incentive Structure

- To increase stocking of healthier foods
- To motivate store owners to maintain BHCK shelf talkers, posters

Wave 2: Incentive Chart for Corner Stores

<table>
<thead>
<tr>
<th>Tier I</th>
<th>Tier II</th>
<th>Tier III</th>
<th>Tier IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed all BHCK intro videos</td>
<td>Completed 3</td>
<td>50% of shelf talkers in the right location and at least 1 new products brought in from phase/s (1 or 2)</td>
<td>50% of shelf talkers in the right location and at least 1 new products brought in from phase/s (2 or 3)</td>
</tr>
<tr>
<td>Cutting Board</td>
<td>Sturdy 1,2,3</td>
<td>Bistro Set</td>
<td>Small Produce Refridgerator</td>
</tr>
<tr>
<td>Banana Holder</td>
<td>dump bins</td>
<td>Paint for exterior of store</td>
<td>Small Freezer Display</td>
</tr>
<tr>
<td>Jr. Portion</td>
<td>2 speed drink blender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control scale</td>
<td>Chalkboard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One-Line</td>
<td>Sidewalk sign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labeler</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Produce Basket</td>
<td></td>
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</tbody>
</table>

Wholesaler Intervention

- Developed stocking sheets with wholesalers’ managers
- Advertise healthy products in monthly circulars with BHCK logo and modest discounts
- Provide gift cards to storeowners to supply initial stock of promoted products
- Regular meetings with managers throughout intervention
Wholesale Stocking Sheets

Wholesalers

Recreation Centers

BHCK Youth-Leader Program

Example of a Session in the Rec:
Rethink your Drink

1. Information:
   - Why our bodies need water
   - Ways to make it easy to drink more water (and less sugary drinks)
2. Activities:
   - Rethink Your Drink Interactive Display
3. Taste test:
   - Water flavored with fruit
4. Promotional item:
   - Water bottle

BHCK Youth-Leader Program
• 45-60 minute sessions with the youth (ages 10 and up) conducted by youth-leaders
• Nutrition sessions focus on 4 topics:
  1. Healthy drinks
  2. Smart snacks
  3. Breakfasts
  4. Healthy cooking
• Sessions occur every other week for 6 months

Youth Leaders on Posters
• BHCK provides posters and materials to promote health in the recreation center
On Social Media...

Youth Leaders at Food Stores

Sustaining the BHCK Youth Leader Program

- BCRP is highly interested in taking over the youth-leader program
- Rec Centers have existing or planned Teen Councils
- Recruited 17 junior youth leaders
  - Rec Director recommendations
  - Social Media
  - High School Counselors
- Intensively trained by senior youth-leaders from wave 1
  - Support from SNAP-Ed Maryland

Social Media

Examples of Instagram posts

Thursday: photo related to another component
Tuesday: food + recipe (smart snack phase)
Facebook Wave 2 Weekly Posting Schedule

- Every day: Instagram linked picture
- Real time notification of interactive session/giveaway event
- Sunday:
  - News with discussion forum/promoting question
- Monday: recipe
- Tuesday: article link
- Wednesday: video + reminder post about Insta weekly challenge
- Thursday: picture related to another component (Biweekly YL feature)
- Friday: Fun fact Friday #funfactfridaybhck
- Saturday: link/recipe/video

Example of Facebook posts

<table>
<thead>
<tr>
<th>Thursday: YL Feature</th>
<th>Tuesday: Article</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Image]</td>
<td>[Image]</td>
</tr>
</tbody>
</table>

Example of Twitter Posts

- [Image]

Policy

- Working with key stakeholders to develop and build the evidence base to support policies for a healthier food environment in Baltimore City, and to sustain BHCK activities
- Held 9 meetings with City stakeholders since kick-off in July 2013
- Develop simulation models to aid stakeholder decision-making
BLIFE Model: Low income AA children after school food foraging

Bill Approved: Property Tax Credits for Urban Agriculture

- Provide 90% tax credit to owners of vacant lots if they will convert them to urban farms
- BLIFE model modified to provide evidence for the bill

Overall Summary and Lessons Learned

- Multi-level multi-component (MLMC) interventions have shown success in improving psychosocial factors, food-related behavior and reducing obesity among children in Baltimore

Overall Summary and Lessons Learned

- MLMC interventions involve developing relationships with communities and many key stakeholders over time
  - Community engagement and planning
  - Multi-phase programs needed
  - Academic/university partner working with local agencies and policy makers

Overall Summary and Lessons Learned

- Achieving adequate exposure is critical in environmental interventions
  - Many environmental interventions are not intensive
  - Need to combine strategies that work with different stakeholders/levels simultaneously

Overall Summary and Lessons Learned

- Exposure in MLMC interventions can be enhanced by:
  - Reinforcement of key messages
  - Social media
- Sustainability should be worked on from the beginning
  - Involve policymakers (support their initiatives as well as seeking support for yours)
Future work in Baltimore

- Expand work with wholesalers, distributors and other aspects of the food supply (community farms, gleaning projects, etc.)
- Work on physical activity
- Integrate with school programs
- Maintain work with policymakers

Thank you!

- The Policy Research Institute of the Ministry of Agriculture, Forestry and Fisheries (PRIMAFF) for their support of my trip

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