An evaluation of the Pittsburgh Healthy Home Resources Environmental Asthma Intervention

Assessing primary caretaker changes of knowledge, attitudes and beliefs concerning their ability to care for their asthmatic child

2009 APHA Conference; Paper Number; 204200

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Presenter Disclosures

Suzanne Mamrose-Hunt

(1) The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

“No relationships to disclose”
Objectives

- Determine if educational interventions have a positive effect on primary caretaker’s knowledge, attitudes and beliefs (KAB) from Pre-Intervention to 1 month Post-Intervention.

- Determine if there was a persistence of effect of KAB increases from 1 month Post-Intervention to 6 months Post-Intervention.

- Evaluate if educational interventions show significant KAB changes in several subpopulation of caretakers.

- Identify vulnerable subpopulations of primary caretakers who will need supplementary educational intervention in future public health applications of this program design.
Background

Healthy Homes Resources At Home program was designed to positively influence the health of the asthmatic child by reducing environmental triggers found in the home.

- Study recruitment consisted of children from low income North-Side communities of the City of Pittsburgh through:
  - Clinics associated with Allegheny General Hospital
  - Alliances with Community Outreach

- Children determined to have environmentally induced asthma via skin tests and pulmonary function tests.

- Pre-evaluation outcome measurements included:
  - Use of rescue inhaler
  - Lost school days
  - Emergency Room Visits related to asthma
  - Number of asthma related symptom days

- Educational interventions identifying environmental triggers in the home were given to primary caretakers. Interventions included:
  - Asthma friendly cleaning tips
  - Smoking as a trigger
  - Environmental assessment of home
  - Walk-thru inside and outside of home
  - Fungi, Dust Mites and pet dander allergen information and testing
  - Air quality tests, lead, asbestos
  - Abatement of assessed triggers

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Knowledge, Attitudes and Beliefs Survey (KAB)

- The exact KAB Questionnaire was given to primary caretaker of the child with asthma three times over the course of the study.

- Survey used as an instrument to measures knowledge, attitudes and beliefs.

- The KAB surveys were scored using a Likert Scale.

- Each question was measured using a 1-to-5 rating scale.

- 500 total points possible on survey.

- Survey consisted of questions about asthma basics, asthma and the environment, actions in the house, and thoughts, feelings and beliefs on caring for the child.
KAB Survey

The Three KAB surveys included:

- **Pre-Intervention KAB**
  - Given on 1st home visit on recruitment into study before any educational sessions were initiated.

- **1 Month Post-Intervention KAB**
  - Given within 1 month following educational interventions.

- **6 Month Post-Intervention KAB**
  - Administered 6 months following conclusion of in-home educational and remediation program.
  - Determine persistence of effect of educational interventions.

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Sample Questions from KAB Survey

1. Dirty air can make my child’s Asthma worse?
   - Strongly Agree
   - Agree
   - Disagree
   - Strongly Disagree
   - Don’t Know

2. Different people are sensitive to different triggers?
   - Strongly Agree
   - Agree
   - Disagree
   - Strongly Disagree
   - Don’t Know

3. Keep furry and feathered pets out of the child’s room.
   - Strongly Agree
   - Agree
   - Disagree
   - Strongly Disagree
   - Don’t Know

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Flow of Participants through the Study

Potentially eligible children identified through Recruitment Sources
N = 286

Pre-Intervention KAB Administered to Primary Caregivers
N = 114

Intervention of educational sessions about environmental asthma given to Primary Caretakers

Household environmental triggers identified

Remediation of environmental triggers from home

Post Intervention KAB Administered to Primary Caregivers
N = 114

6 months Later – Final KAB administered to Primary Caregivers
N = 30

Primary Caregivers who did not continue with study
N = 172

Did not continue study for entire 6 months
N = 34

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### Demographic Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child’s Age (Mean Years)</td>
<td>9.1</td>
</tr>
<tr>
<td>Child’s Gender (%)</td>
<td>Male 51.8, Female 45.6</td>
</tr>
<tr>
<td>Caregiver’s Ethnicity (%)</td>
<td>African American 63.2, White 23.7, Hispanic 1.8, Other 4.4</td>
</tr>
<tr>
<td>Age of Caretaker (Mean Years) (%)</td>
<td>≤30 Years 36.7, &gt;30 Years 69.3</td>
</tr>
<tr>
<td>Caretaker of Record (%)</td>
<td>Mother 87.7, Father .9, Grandmother 7.0, Aunt 2.6</td>
</tr>
<tr>
<td>Caretaker has Asthma (%)</td>
<td>Yes 36.8, No 59.6</td>
</tr>
<tr>
<td>Caretaker Smokes (%)</td>
<td>Yes 24.6, No 71.9</td>
</tr>
<tr>
<td>Parents Have Asthma (%)</td>
<td>Yes 43.9, No 49.1</td>
</tr>
<tr>
<td>Which Parents Have Asthma</td>
<td>Mother 26.3, Father 11.4, Both 5.3, Grandmother 2.6</td>
</tr>
<tr>
<td>Child’s Age of Onset of Asthma (Mean Years)</td>
<td>3.15</td>
</tr>
<tr>
<td>Other Children in Home with Asthma (%)</td>
<td>Yes 35.1, No 63.2</td>
</tr>
</tbody>
</table>
Population and Subpopulations of Primary Caretakers Evaluated

- Overall Caretaker Group
- Caretakers who Smoke vs. Non-smokers
- Caretakers Race or Ethnicity
- Caretakers with Asthma vs. Caretakers without Asthma

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Methodology

- **KAB surveys given to primary caretaker**
  - Scored using Likert Scale
  - Sums of scores from ratings tallied for a total score
  - Data entered into SPSS 16.0 Database
  - Data analyzed using Minitab 15 and SPSS 16.0 software

- **Comparison of educational interventions given to each subpopulation of primary caregivers to assess improvement within groups and between groups**
  - Basic statistics performed for each KAB survey time
    - Paired t-tests within each group
    - 2-Sample t-tests between groups
    - 2-sample t-test paired differences between groups

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## Primary Caretakers – KAB Scores

<table>
<thead>
<tr>
<th>Primary Caretakers Paired T-Test</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>AS*</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Intervention</td>
<td>114</td>
<td>275.7</td>
<td>38.1</td>
<td>$P &lt; 0.0001$</td>
<td>(12.5, 26.8)</td>
</tr>
<tr>
<td>1 Month Post Intervention</td>
<td>114</td>
<td>295.4</td>
<td>31.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Month Post-Intervention</td>
<td>30</td>
<td>298.0</td>
<td>30.9</td>
<td>$P = 0.606$</td>
<td>NS*</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>30</td>
<td>302.2</td>
<td>37.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Intervention</td>
<td>30</td>
<td>274.5</td>
<td>39.1</td>
<td>$P = 0.004$</td>
<td>(9.7, 45.7)</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>30</td>
<td>302.2</td>
<td>37.4</td>
<td></td>
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</tr>
</tbody>
</table>

*AS = Achieved Significance  
*NS = Not Significant
Comparison of KAB Scores of Primary Caretakers

Normal

Data

Frequency

Variable
- PreKAB
- PostKAB1
- PostKAB6

Mean  StDev  N
- 274.5  39.17  30
- 298.0  30.99  30
- 302.2  37.42  30

PreKAB = Pre-Intervention
PostKAB1 = 1 Month Post-Intervention
PostKAB6 = 6 Month Post-Intervention

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Results For Primary Caretakers

- Primary Caretakers show significant increase in survey scores from Pre-Intervention KAB to 1 Month Post-Intervention KAB with p < 0.0001
  - Primary Caretakers show no significant changes in survey scores from 1 Month Post-Intervention KAB to 6 Month Post-Intervention KAB survey scores with p = 0.606
  - Overall, Primary Caretakers show persistence of effect based on Pre-Intervention KAB to 6 Month Post-Intervention KAB scores with p = 0.004

- Overall the goals of the study were met
  - Suggest there were positive changes in knowledge, attitudes and beliefs of primary caretaker that they retained over the course of the study
<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>AS</th>
<th>Confidence Interval</th>
</tr>
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<tbody>
<tr>
<td><strong>Smokers</strong></td>
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<td></td>
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<tr>
<td>Paired T-Test</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Intervention</td>
<td>30</td>
<td>274.1</td>
<td>34.6</td>
<td>P = 0.231</td>
<td>NS</td>
</tr>
<tr>
<td>1 Month Post Intervention</td>
<td>30</td>
<td>282.6</td>
<td>35.2</td>
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<tr>
<td>1 Month Post-Intervention</td>
<td>5</td>
<td>295.4</td>
<td>37.1</td>
<td>P = 0.203</td>
<td>NS</td>
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<tr>
<td>6 Month Post-Intervention</td>
<td>5</td>
<td>299.2</td>
<td>36.8</td>
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<tr>
<td>Pre-Intervention</td>
<td>5</td>
<td>278.8</td>
<td>29.0</td>
<td>P = 0.237</td>
<td>NS</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>5</td>
<td>299.2</td>
<td>36.8</td>
<td></td>
<td></td>
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<td><strong>Non-Smokers</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Paired T-Test</td>
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<td></td>
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</tr>
<tr>
<td>Pre-Intervention</td>
<td>82</td>
<td>277.7</td>
<td>39.6</td>
<td>P &lt; 0.0001</td>
<td>(14.4, 31.5)</td>
</tr>
<tr>
<td>1 Month Post Intervention</td>
<td>82</td>
<td>300.6</td>
<td>28.3</td>
<td></td>
<td></td>
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<tr>
<td>1 Month Post-Intervention</td>
<td>25</td>
<td>298.5</td>
<td>30.4</td>
<td>P = 0.979</td>
<td>NS</td>
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<tr>
<td>6 Month Post-Intervention</td>
<td>25</td>
<td>298.8</td>
<td>37.4</td>
<td></td>
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<tr>
<td>Pre-Intervention</td>
<td>25</td>
<td>273.6</td>
<td>41.3</td>
<td>P = 0.033</td>
<td>(2.2, 48.3)</td>
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<td>6 Month Post-Intervention</td>
<td>25</td>
<td>298.8</td>
<td>37.4</td>
<td></td>
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</tbody>
</table>
Results of Smokers vs. Non-Smokers

- Smokers did not show significant changes from Pre-Intervention KAB to 1 month Post-Intervention KAB survey scores with $p = 0.231$
  - Smokers show persistence of no change continued through conclusion of study based on Pre-Intervention KAB to 6 Month Post-Intervention KAB survey scores with $p = 0.237$
  - Limitations of small numbers who finished study – group did learn, just not as much as the non-smoking group
  - Smokers appear to be a vulnerable subpopulation of caretakers

- Non-Smokers show significant increase in survey scores from Pre-Intervention KAB to 1 Month Post-Intervention KAB survey scores with $p < 0.0001$
  - Non-Smokers show persistence of effect based on Pre-Intervention KAB to 6 Month Post-Intervention KAB scores with $p = 0.033$
  - Positive changes in knowledge, attitudes and beliefs of non-smokers

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## White vs. *Non-White*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>AS</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>White Paired T-Test</strong></td>
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<tr>
<td>Pre-Intervention</td>
<td>27</td>
<td>277.0</td>
<td>47.4</td>
<td>P = 0.117</td>
<td>NS</td>
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<tr>
<td>1 Month Post Intervention</td>
<td>27</td>
<td>292.5</td>
<td>27.6</td>
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</tr>
<tr>
<td>1 Month Post-Intervention</td>
<td>8</td>
<td>293.9</td>
<td>29.9</td>
<td>P = 0.961</td>
<td>NS</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>8</td>
<td>294.6</td>
<td>29.14</td>
<td></td>
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<tr>
<td>Pre-Intervention</td>
<td>8</td>
<td>266.3</td>
<td>53.9</td>
<td>P = 0.244</td>
<td>NS</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>8</td>
<td>294.6</td>
<td>29.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-White Paired T-Test</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Intervention</td>
<td>79</td>
<td>274.1</td>
<td>34.4</td>
<td>P &lt; 0.0001</td>
<td>(13.4, 29.1)</td>
</tr>
<tr>
<td>1 Month Post Intervention</td>
<td>79</td>
<td>295.4</td>
<td>32.4</td>
<td></td>
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</tr>
<tr>
<td>1 Month Post-Intervention</td>
<td>21</td>
<td>300.7</td>
<td>32.2</td>
<td>P = 0.536</td>
<td>NS</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>21</td>
<td>307.1</td>
<td>38.5</td>
<td></td>
<td></td>
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<tr>
<td>Pre-Intervention</td>
<td>21</td>
<td>277.2</td>
<td>34.2</td>
<td>P = 0.008</td>
<td>(8.8, 51.0)</td>
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<tr>
<td>6 Month Post-Intervention</td>
<td>21</td>
<td>307.1</td>
<td>38.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* *Non-White* includes African American, Hispanic and Asian Populations
Results of White vs. Non-White Caretakers

- Pre-Intervention KAB scores to 1-month Post-Intervention scores for White caretakers was not significant at $p = 0.117$ (low numbers may have affected significant outcome).
- Same interval for Non-White caretakers noted significant increase in KAB scores with $p < 0.0001$.
- White subgroup did not show significant change in their persistence of effect from Pre-Intervention to 6-month Post-Intervention with $p = 0.244$.
  - Suggest that White caretakers are a vulnerable subpopulation
- Non-white group showed persistence of effect that they retained information from Pre-Intervention to 6-month Post-Intervention with $p = 0.008$
  - Suggests real change in knowledge, attitudes and beliefs

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# Asthma vs. Non-Asthma

<table>
<thead>
<tr>
<th>Caretakers with Asthma Paired T-Test</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>AS</th>
<th>Confidence Interval</th>
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<tbody>
<tr>
<td>Pre-Intervention</td>
<td>42</td>
<td>277.9</td>
<td>34.4</td>
<td>P = 0.001</td>
<td>(7.64, 29.6)</td>
</tr>
<tr>
<td>1 Month Post Intervention</td>
<td>42</td>
<td>296.6</td>
<td>34.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Month Post-Intervention</td>
<td>10</td>
<td>289.6</td>
<td>33.2</td>
<td>P = 0.125</td>
<td>NS</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>10</td>
<td>315</td>
<td>36.3</td>
<td></td>
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</tr>
<tr>
<td>Pre-Intervention</td>
<td>10</td>
<td>287.9</td>
<td>43.8</td>
<td>P = 0.159</td>
<td>NS</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>10</td>
<td>315.0</td>
<td>36.3</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Caretakers without Asthma Paired T-Test</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>AS</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Intervention</td>
<td>68</td>
<td>275.7</td>
<td>39.5</td>
<td>P &lt; 0.0001</td>
<td>(12.45, 32.34)</td>
</tr>
<tr>
<td>1 Month Post Intervention</td>
<td>68</td>
<td>298.1</td>
<td>30.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Month Post-Intervention</td>
<td>20</td>
<td>302.3</td>
<td>29.8</td>
<td>P = 0.477</td>
<td>NS</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>20</td>
<td>295.9</td>
<td>37.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Intervention</td>
<td>20</td>
<td>267.8</td>
<td>35.9</td>
<td>P = 0.012</td>
<td>(6.8, 49.4)</td>
</tr>
<tr>
<td>6 Month Post-Intervention</td>
<td>20</td>
<td>295.9</td>
<td>37.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results of caretakers with Asthma vs. Non-Asthma

- Caretakers with/without asthma show significant increases in their Pre-Intervention KAB scores to their 1-month Post-Intervention scores with $p = 0.001$ and $0.002$, respectively.
- Caretakers with asthma noted no significant difference from Pre-Intervention to 6-month Post-Intervention with $p = 0.463$.
- Caretakers without asthma had significant improvement in same time frame with $p = 0.012$.
  - Suggest real change in knowledge and attitudes of parents without asthma.

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Study Limitations

- Retention of participants to 6 month follow-up KAB limits interpretation of results.
- Low numbers of participants in some groups teamed with retention problems limits interpretation of results.
Conclusions and Implications

- Information discovered in this study could be used as a starting point in similar research programs that focus on education and the primary caregiver from a lower income setting.
- These subpopulations could be targeted directly from the start of the study to save valuable time, input and monies.
- Extra visits to these subpopulations may be needed to provide additional education interventions.
- Several subpopulations of primary caregivers would benefit from the use of additional educational interventions to improve their KAB scores
  - Caretakers who smoke
  - Caretakers who are racially White

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Public Health Relevance

- Similar environmental asthma interventions early on in their studies can target vulnerable subpopulations of primary caregivers by providing additional educational interventions to aid in increasing their persistence of effect throughout the study.
- Suggest a positive change in the caretakers knowledge, attitudes and beliefs about caring for their children with environmental asthma.

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Acknowledgements
-The project principal investigator CDV was supported by grants from The Heinz Endowments (THE) and US Department of Housing and Urban Development (HUD) through HHR of Pittsburgh.
-Yan Liu, MPH, extracted data for this study as part of an MPH GSPH practicum served at HHR of Pittsburgh.
-Michael Tobin, PhD -Director of HHR of Pittsburgh and staff-past and present.

More Information
-Quarterly and Final Outcome Evaluation Reports for the period from January 2005 to project conclusion in December of 2007 can be accessed at the Center for Healthy Environments and Communities webpage http://www.chec.pitt.edu
- Contact Healthy Home Resources of Pittsburgh
64 South 14th Street
Pittsburgh, PA 15203
412.431.4449
info@healthyhomeresources.org or access their website at http://www.healthyhomeresources.org/templates/System/default.asp?id=39025