Efficacy and Cost Effectiveness of Multiple Risk Factor Tailored Interventions

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Society for Behavioral Medicine
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NC STRIDES Intervention

- North Carolina Strategies for Improving Diet, Exercise and Screening
- 33 counties in North Carolina
- Randomized health communications study
Study Aims

To test the effectiveness and cost-effectiveness of two health communication strategies to promote population-based health behavior change:

- Tailored Print Communications (TPC)
- Tailored Motivational Interviews (TMI)
Health Behaviors

- Fruit and vegetable intake
- Physical activity
- Screening for colorectal cancer
North Carolina Colon Cancer Study

- Population-based Case-Control Study
  - Incident Colon and Rectal Cancer (CRC) Patients
  - 33 counties in eastern/central NC

- 1850 adults age 40-79
  - 50% Female
  - 50% African American, 50% White
  - 38% Cases, 62% Controls
NC STRIDES Sample

922 participants recruited from NCCCS

- Excluded CRC survivors who were diagnosed at late stage and/or were not well enough to make health behavior changes
- 37% had CRC
- 825 of recruited individuals completed baseline (89.5%)
- 735 completed 1-year follow-up surveys (89.1% of baseline)
Research Design

- 2x2 Factorial Design
  - TPC only
  - TMI only
  - TPC + TMI (COMBINED)
  - CONTROL

- Random assignment
  - Stratified by case status

- 1 year Intervention
Tailored Health Communications

- Designed to meet the informational needs of one individual
  - Provide personalized feedback and information to promote desired change
  - Minimize irrelevant information
- Useful for Multiple Behaviors
  - Focus on behaviors of interest
  - Address areas with most potential for improvement
Tailored Print Communication Intervention

- Four tailored newsletters
- Message created based on results from pre-intervention focus groups
- Tailored messages based on:
  - Demographics
  - Behavior
  - Psychosocial variables (stage of change, self-efficacy, barriers, social support, etc)
  - Community-Specific Resources
Healthy Eating

Try it, try eating more vegetables…
I was a country kid in the hills of North Carolina and we had vegetables, fruits, and on occasion, meats. There never was a history of colon cancer in my family. Basically, my family they still eats right and are very healthy people.
I was always skinny and I was teased about it. When I got married I decided I wanted to put on weight. I shouldn’t have done it because now I am trying to lose it. I wanted to be a big man and I over did it.
I eat my vegetables and fruits, I am exercising, and I am losing weight. You have to take it one step at a time. First, start concentrating on your diet. Then exercise, I don’t eat too much of what I shouldn’t eat and I am going to lose all this weight I’ve put on and I’ll be fine.
You may be older, you may be tired of trying, but you have got to give it another try for the sake of your health or the ones you love, for the sake of your own desire to live.
Try it, try eating more vegetables. Then what you do is try to eat even more vegetables. Try to do the very best you can. It is going to be hard, you are going to fall, but when you fall you have to pick yourself up and try again.

Ahhh…
Open wide. Chew slowly. Take the time to taste and enjoy the goodness of your next meal. “AHHHH!” the pleasure of good food. Food gives us, It gives us pleasure. It helps us stay well. Experts agree the food we eat is important, it’s what keeps us alive.
Eat well. Live well. Find out how you can add to your health by adding fruits and vegetables to your meals.

Meal Makeovers
Getting at least 5 A Day is easier than you think. See how a few additions to each meal can increase your number of servings of fruits and vegetables from 2 (before) to 7 (after). And try it tomorrow!

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Servings = 2</td>
<td>Total Servings = 7</td>
</tr>
<tr>
<td>Breakfast - 0 servings</td>
<td>Breakfast - 1 serving</td>
</tr>
<tr>
<td>• Cereal and milk</td>
<td>• Cereal and milk, with banana</td>
</tr>
<tr>
<td>• Toast</td>
<td>• Toast</td>
</tr>
<tr>
<td>• Coffee</td>
<td>• Coffee</td>
</tr>
<tr>
<td>Lunch - 1 serving</td>
<td>Lunch - 3 servings</td>
</tr>
<tr>
<td>• Sandwich</td>
<td>• Sandwich</td>
</tr>
<tr>
<td>• With lettuce and two slices of tomato</td>
<td>• With lettuce and two slices of tomato</td>
</tr>
<tr>
<td>• Chips</td>
<td>• Cut up carrots</td>
</tr>
<tr>
<td>• Soda</td>
<td>• 100% orange juice</td>
</tr>
<tr>
<td>Dinner - 1 serving</td>
<td>Dinner - 2 servings</td>
</tr>
<tr>
<td>• BBQ chicken</td>
<td>• BBQ chicken</td>
</tr>
<tr>
<td>• Macaroni and cheese</td>
<td>• Macaroni and cheese</td>
</tr>
<tr>
<td>• Collard greens</td>
<td>• Collard greens</td>
</tr>
<tr>
<td>• Cornbread</td>
<td>• Toasted salad</td>
</tr>
<tr>
<td></td>
<td>• Cornbread</td>
</tr>
<tr>
<td>Snack - 0 servings</td>
<td>Snack - 1 serving</td>
</tr>
<tr>
<td>• Cookies</td>
<td>• Cookies</td>
</tr>
<tr>
<td>• Soda</td>
<td>• Apple</td>
</tr>
</tbody>
</table>
Info to Go

Marlyn Allread-Hudson is our fitness specialist. She is also the Project Coordinator for another study, Williams for African Americans Through Churches.

Q

I retired five years ago and a group of my women friends are thinking about starting an exercise group. Is it really worth our time to exercise at our age?

A

Yes. Staying healthy is important as you age. You can reduce the ache, pains, and illnesses that can come with growing older. Walking is a wonderful gift that you can give yourself to help stay healthy—it benefits both the body and the brain. Regular walking can help older adults sharpen their mental skills. For example, walking briskly for at least 30 minutes 3–5 times weekly helps improve concentration and your ability to switch quickly from one mental task to another. If you don’t have 30 minutes then do as much as you can. Every little bit counts. The idea is to keep moving.

Q

I know I should be more physically active, but I’m having a hard time getting motivated. Any suggestions?

A

Your problem may not be so much a lack of motivation but rather lack of planning. Just as you plan everything else in your day, schedule physical activity into your day. Think about why physical activity is important to you. Is it to feel better, look better, for weight control, overall health, or for other reasons? Once you know why you want to be more active here are some ideas to actually get you started:

1. Start small. Don’t overdo then give up.
2. Choose an activity like walking that can fit into your life easily.
3. Don’t make exercise a chore. Choose activities that you will really enjoy.
4. Find someone to buddy up with.
5. Set some rewards for yourself for becoming more and more active.

Don’t:

1. Overdo then give up. Start small.
2. Choose to do things you know you dislike doing.

Community Resources for Physical Activity

Keeping Active in Alamance County

Here are places around Alamance County that have activities you may find you enjoy:

John Robert Kernodle Senior Activity Center
1535 South Main Street, Burlington
336-222-5135
For people 55 and over...

The Center has exercise rooms as well as classes including aerobics, strength training, tai chi, yoga, line dancing...

Cost: For Burlington residents $100/year, for others $200/year, plus the cost of classes.

Free Activities for Non-members: Call and get the Center’s calendar for workshops and seminars on health and wellness topics. These are aimed at teaching you what you can do at home to be fit and healthy. Also, check out the walking classes held at the Colonial Mall.

YMCA
1346 South Main Street, Burlington
336-227-2081
The YMCA has a wide variety of classes for all age groups. The staff is friendly and helpful. Call them for information or stop by and pick up free information.

Cost: There is a membership fee but costs can be adjusted depending on your income level. Talk to a staff member about this.

If you know of other County Resources we should know about, please use that toll-free number to call us!

NC STRIDES is a research project funded by the National Cancer Institute. We are located at the University of North Carolina at Chapel Hill. Our toll-free phone number is 1-877-297-7746.
Healthy Tips for John Doe

Cancer Screening

The healthier I am the more I can do for those I love...

Going for my colon cancer check-ups isn’t frightening to me. I know I want to know about myself. I want to know if I am all right.

The whole philosophy of the whole thing is, do you want to know that you are all right? It is just good assurance to know you are. What I do is I lie there and they are doing their work and I am singing to myself. When I come out of it then I know there was a little polyp and we took it out, or that everything was fine. I have had it and I know that I am okay for another year, two years, five years. Unless something happens or develops I am not coming back here. I am not a chronic running to the doctor but I will go when I need to. Because I enjoy good health and I want to keep it.

What we need to do is to tell men, look it is no sanctified thing to acknowledge that you need to go see a doctor if you need to go. If you are scared the thing of it is, you are going to let your fear kill you.

I am in good shape. I go every year for a physical. I never miss. I love to come out and say Oh, huh, come out good. Go on and see the doctor, when you come out you can wear that smile because you know you don’t have it.

My health is important to me, because the healthier I am, the more I can do for those I love.

Put others first and your fear last.

Secrets...

Secrets. Colon cancer is like one big secret until someone you care about has it. Until then no one knows what it really is, how to prevent it, how to know if you have it.

People shouldn’t lie because no one talks about colon cancer.

Knowledge is power. Learn what you can do to reduce your risk of ever having colon cancer. Read on, find answers, and help spread the word...more power to you!

When Harry Met Sally

The receptionist smiled pleasantly and waved to me. “Good morning, Harry. How are you doing today?” “Just fine, just fine.” “Well, we intend to keep it that way,” she replied. “Doctor Lewis will be with you in a few minutes.” Sally, the receptionist, is one of the friendly faces I see whenever I come to County Medical.

Since turning thirty, I make sure I get my regular checkups and screenings. It’s almost been two years since I’ve been coming to see Dr. Lewis. Sally has been here too. She has a wonderful way with people. Always asking about our families, encouraging us to keep our appointments, and reminding us to take care of ourselves. Sally knows more about the people that come here than we know of her.

As I waited for Dr. Lewis, I asked Sally what makes her enjoy her job so much. Her answer surprised me. Sally is a three-year colon cancer survivor. Her battle with the illness was a tough one but has given her a new appreciation for life.

Now her personal crusade is to advise patients who come to County
Tailored Motivational Interviewing intervention

- Four motivational calls (approx. 20 minutes each)
- Used Miller and Rollnick’s principles of motivational interviewing
- Trained interviewers followed roadmap protocol including:
  - Behavioral feedback
  - Importance
  - Confidence
  - Core values
  - Goals/plans
Evaluation

- Baseline Telephone Survey (30-40 minutes)
  - Demographics & Health status
  - Fruits and vegetables (35 item FFQ - past month)
  - 7-day physical activity recall
  - CRC screening (general population)

- Mid-term Telephone Survey at 6 months (10 minutes)
  - Update Contact Info
  - Up-date F&V data to re-tailor 4\textsuperscript{th} Newsletter

- Follow-up Telephone Survey at 1 year (45 minutes)
  - Baseline Questions
  - Process Evaluation
Cost Effectiveness

Effect size compared to:

- Costs of implementation
  - Personnel (including training)
  - Mailing, phones cal, etc.
- Costs to participants
  - Time spent reading TPC or participating TMI
  - Cost to buy fruits and vegetables
Results
Study Demographics

- Average age 67 yrs
- 49% female
- 35% African American
- Most (78%) had high school degree or some college
- 36% actively employed
Results: Fruits and Vegetables
## Results for 35-item Fruit and Vegetable FFQs among General Population and CRC Survivors

<table>
<thead>
<tr>
<th>Study Group</th>
<th>N</th>
<th>Baseline FV Mean (SD)</th>
<th>Follow-up FV Mean (SD)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Pop.</td>
<td>469</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>122</td>
<td>5.7 (2.6)</td>
<td>5.8 (2.2)</td>
<td>+0.1</td>
</tr>
<tr>
<td>TPC</td>
<td>111</td>
<td>5.4 (2.1)</td>
<td>5.8 (2.1)</td>
<td>+0.4</td>
</tr>
<tr>
<td>TMI</td>
<td>113</td>
<td>5.4 (2.4)</td>
<td>6.0 (2.7)</td>
<td>+0.6</td>
</tr>
<tr>
<td>Combined**</td>
<td>123</td>
<td>5.4 (2.8)</td>
<td>6.4 (2.8)</td>
<td>+1.0</td>
</tr>
</tbody>
</table>

- All Intervention conditions produced increased in F&V Consumption based on results from the 35-item FFQ.
- Only Combined Intervention was significantly different from Control (p<0.01)
## Results for Two-item Fruit and Vegetable FFQs among General Population and CRC Survivors

<table>
<thead>
<tr>
<th>Study Group</th>
<th>N</th>
<th>Baseline FV Mean (SD)</th>
<th>Follow-up FV Mean (SD)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRC Survivors</td>
<td>266</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>64</td>
<td>4.1 (2.0)</td>
<td>4.3 (2.0)</td>
<td>+0.2</td>
</tr>
<tr>
<td>TPC*</td>
<td>68</td>
<td>4.3 (1.8)</td>
<td>4.9 (1.6)</td>
<td>+0.6</td>
</tr>
<tr>
<td>TMI**</td>
<td>70</td>
<td>3.9 (1.8)</td>
<td>5.0 (2.0)</td>
<td>+1.1</td>
</tr>
<tr>
<td>Combined**</td>
<td>58</td>
<td>4.0 (1.5)</td>
<td>5.2 (2.4)</td>
<td>+1.2</td>
</tr>
</tbody>
</table>

- **CRC Survivor** results differed from 35-item FFQ
  - Significant Increased in all intervention groups (p<0.05)
  - Increases of greater than 1 serving in Tailored Motivational Interviewing and Combined Groups (p<0.01)
Physical activity and CRC Screening

- No significant differences by intervention condition
- High % meeting guidelines at baseline
  - 80% of gen. pop. met screening guidelines
  - 54% of survivors, 57% gen. pop meeting CDC physical activity guidelines
- More improvement in combined group among those not already meeting guidelines
### Cost-Effectiveness Results for General Population Participants

<table>
<thead>
<tr>
<th>General Population</th>
<th>Incremental Effectiveness</th>
<th>Incremental Costs</th>
<th>ICER</th>
<th>Cost-effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined vs. Control</td>
<td>92.313</td>
<td>10,479.090</td>
<td>113.5169</td>
<td>0.992</td>
</tr>
<tr>
<td>Combined vs. TPC</td>
<td>63.321</td>
<td>6,763.096</td>
<td>106.8065</td>
<td>0.946</td>
</tr>
<tr>
<td>TMI vs. Control</td>
<td>50.357</td>
<td>5,798.392</td>
<td>115.1457</td>
<td>0.915</td>
</tr>
<tr>
<td>Combined vs. TMI</td>
<td>41.956</td>
<td>4,680.694</td>
<td>111.5620</td>
<td>0.848</td>
</tr>
<tr>
<td>TPC vs. Control</td>
<td>28.992</td>
<td>3,715.990</td>
<td>128.1729</td>
<td>0.822</td>
</tr>
</tbody>
</table>
Summary

- Combination of TPC + TMI was most effective and cost effective for F&V for general population (1 serving increase)
- These interventions were not effective among colon cancer survivors
- Next steps:
  - Comparison using equal doses across groups
  - Dissemination research in VA population via NCI diffusion/dissemination supplement
  - More research re: interventions for survivors
Tailoring for Multiple Behaviors

- Address behaviors sequentially
  - People chose behavior they wanted to work on first
  - Fruit & Veg was not most common
  - Do they pick harder or easier behaviors?

- Make one behavior the priority
  - Different intervention dose
  - Implications for evaluation?

- Address all behaviors at once
  - Behaviors get equal treatment
  - Overwhelming?
Contributors

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- Study Participants
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