Weight Management, Lifestyle and Cancer Risk

Cynthia Buffington PhD

LIFESTYLE

“Cancer is 30-50% preventable over time, by appropriate food and nutrition, regular physical activity and avoidance of obesity.”
WCRF/AICR

GOOD LIFESTYLE

Appropriate Diet/Nutrition
Physical Activity
Stress Management
Sufficient Sleep
Weight Management
OBJECTIVES

1. To discuss the link between obesity and cancer
2. To identify lifestyle contributors to cancer risk
3. To study the anthropometrics (body size and composition) and lifestyles of BRCA mutation carriers

BMI (KG/M²)

OBESITY-CANCER RISK

Endometrial Cancer  Thyroid
Ovarian  Liver
Breast Cancer  Kidney
Prostate (aggressive)  Esophagus
Colorectal Cancer  Gallbladder
Pancreatic  Hematopoietic System
Gallbladder  Non-Hodgkin's Lymphoma
Hematopoietic System  Multiple Myeloma
Leukemia
Why is there a ‘Link’ Between Obesity and Cancer?

Cancer Risk Factors
- Hormone Changes
- Products of Adipose Tissue
- Metabolic Conditions

Initiation, Growth, Progression, Metastasis

BEHAVIOR
- Obese less likely go doctor
- Cancers go undetected in obese until late stage
- Obesity is surrogate for other cancer risk factors such as:
  - Poor diets
  - Low physical activity
  - Sleep Loss
  - Psychosocial distress
**SUBOPTIMAL TREATMENT**

- Obese may receive suboptimal doses of chemotherapy
- Obese may be less responsive to chemotherapy
- Aromatase Inhibitors (BC) less effective

**SUBOPTIMAL TREATMENT**

- Surgery is more technically challenging and has higher rate complications and risk for unclean margins
- Radiation (external beam) may not be as accurate in hitting the target organ with obesity

**OBESITY AND CANCER**

Cancer Risk → Overweight Obesity Wt. GAIN → Disease Relapse Secondary Cancer

Overweight Obesity
WEIGHT GAIN POST-DIAGNOSIS

Nurses Health Study
Median gain 6 lbs. = 35% ↑ risk for relapse
Median gain 17 lbs. = 64% ↑ risk for relapse

North Central Oncology Group
5.9 kg (13 lb.) 50% relapse

Weight gain Breast Cancer
50-96%

5-14 lb
> 20 lb

Body Composition

Adipose Tissue ↑
Muscle Mass ↓

Harvie MN et al. Breast Cancer Res Treat 2004
**TREATMENT EFFECTS**

Chemotherapy  
- Dosage  
- Duration  
Radiation  
Hormones  
Multi-treatment

**PHYSICAL EFFECTS**

- Reduced Physical Activity  
- Poor Physical Function  
  Neuropathy  
  Pain  
  Anemia  
  Feeling Sick

**RECOMMENDATIONS PHYSICAL ACTIVITY**

WCRC/AICR, ACS, ASCO, ACSM:  
- Encourage activity at diagnosis and regular physical activity for life  
- Avoid inactivity even in patients undergoing difficult treatment (modify activity)
BENEFITS DURING TREATMENT

Physical Function

Body Composition

EXERCISE DURING CHEMO

May Improve Efficiency of Chemo

Exercise during chemotherapy improves breast cancer disease-free survival

EXERCISE AND CANCER PREVENTION

Number of studies find physical activity before or after cancer diagnosis reduces cancer occurrence/recurrence (risk reduction 20 to 50%).

180 minutes per week
50% Reduction Recurrence
Nurses Health Study

Holmes MD et al. JAMA 2005
SLEEP LOSS AND OBESITY

↓ Sleep

↑ Overweight, Obesity

Systematic Review and/or Meta-analyses
Chen X et al. Obesity 2008
Cappuccio FP et al. Sleep 2008
Patel SR et al. Obesity 2008

SLEEP LOSS AND OBESITY

SLEEP LOSS

< 7 hr

Hormone Changes that:

↑ Appetite
↓ Metabolic Rate
↑ Fat Accumulation

Leger D et al. Mol Cell Endocrinol 2015
Chaput JP et al. Obesity 2014
Vargas PA. Curr Obes Rep 2016

SLEEP LOSS AND CANCER

Sleep Loss ↑ Risk
Breast Cancer Occurrence/Recurrence
(Independent of Body Size)

Malina et al. Gynecol Obstet Fertil 2013
Wang et al. Scand J Work Environ Health 2012
PSYCHOLOGICAL DISTRESS

Stress and Stress
Initiation, Growth, Progression, Metastasis
(Independent of Body Size)

STRESS/DISTRESS AND OBESITY

Appetite
Food Cravings (Sugar)
Fat Accumulation

Up to 24 pound weight gain 3 y post-diagnosis
Befort CA et al. Psychooncology, 2010

COMFORT FOODS
### DIET

**Avoid/Reduce:**
- Sugar
- Processed Grains
- Added Salt
- Processed Meat
- Red Meat
- Saturated Fat
- Alcohol

**Consume:**
- Plant Foods
- Cruciferous Veg
- Allium Veg
- Dark Green Leafy
- Colorful Fruits/Veg
- Berries, Grapes, Whole Grains
- Nuts/Seeds
- Legumes
- Fish, Quality Protein

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### Lifestyle and Cancer Risk

- Obesity/Overweight increase cancer risk before and after cancer diagnosis
- Lifestyle issues that increase obesity and CANCER risk include:
  - Poor physical function and low activity
  - Insufficient Sleep (<7 hr)
  - Psychological Distress
  - Poor Diet and Dietary Choices

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### BRCA Gene Mutations

- 50-80% Breast Cancer
- 40-60% Second Primary Breast Cancer
- 15-45% Ovarian Cancer
OBJECTIVES

To study the anthropometrics (body size and composition) and lifestyles of BRCA mutation carriers

STUDY POPULATION

Study Population: FORCE 2012 Attendees National Meetings

BRCA mutation carriers
Survivors 44%
Previvors 52%

Controls
Matched for age, body size
No family history breast/ovarian cancer

THE STUDY POPULATION
BRCA Mutations

- Previvors: 44%
- Survivors: 48%
- BRCA 1: 56%
- BRCA 2: 48%
- BRCA 1,2: 2%
- BRCA 1: 2%
Anthropometrics
- Weight, Height
- Body Mass Index (BMI; kg/m²)
- Body Composition (Fat, Lean Tissue)

MEASUREMENTS
- Levels of Physical Activity
- Anxiety
- Quality of Life (emotional, physical)
- Demographics, Cancer Information, Personal Issues, Sleep
- Diet (3-day food records)

What Were the Findings?
RESULTS:
Anthropometrics

<table>
<thead>
<tr>
<th>Group</th>
<th>Wt. (lbs)</th>
<th>BMI (kg/m²)</th>
<th>Fat (%)</th>
<th>Lean: Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>157</td>
<td>24.6</td>
<td>31</td>
<td>2.37</td>
</tr>
<tr>
<td>Previvors</td>
<td>156</td>
<td>24.5</td>
<td>32</td>
<td>2.24</td>
</tr>
<tr>
<td>Survivors</td>
<td>159</td>
<td>26.9</td>
<td>37a</td>
<td>1.81a</td>
</tr>
</tbody>
</table>

*p<0.05 = NS Survivors vs. Previvors or Controls

RESULTs

<table>
<thead>
<tr>
<th>Lean-to-Fat Mass</th>
<th>Controls</th>
<th>Previvors</th>
<th>Survivors</th>
</tr>
</thead>
<tbody>
<tr>
<td>*p&lt;0.02 Controls vs. Survivors</td>
<td>p&lt;0.003 Previvors vs. Survivors</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Possible Effectors: TREATMENT
Survivors

<table>
<thead>
<tr>
<th>Chemotherapy</th>
<th>Lean/Fat</th>
<th>Radiation</th>
<th>Lean/Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>p=0.01</td>
<td>No</td>
<td>p=ns</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hormones</th>
<th>Lean/Fat</th>
<th>Radiation</th>
<th>Lean/Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>p=0.08</td>
<td>No</td>
<td>p=ns</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Physical Effectors: Physical Activity

- Lean-to-Fat Mass
- *p<0.01 Active vs. Inactive

Poor body composition associated with inactive lifestyle

% Physically Active

<table>
<thead>
<tr>
<th>Controls</th>
<th>Previvors</th>
<th>Survivors</th>
</tr>
</thead>
<tbody>
<tr>
<td>68%</td>
<td>77%</td>
<td>45%</td>
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</tbody>
</table>

Physical Effectors: Physical QoL

- Lean:Fat Mass
- *p<0.05 Lean:Fat Mass vs. Measures of Physical QoL

Found: Body composition associated with poor physical function
Psychosocial Stress
Anxiety
Emotional Quality of Life

Prevalence Values

Psychological Distress

Anxiety

Emotional QoL

p<0.01 Control Values

Fat, BMI
Anxiety only

Sugar
Poor Sleep Quality

Psychological Distress
% Quality Sleep

65% Controls
42% Previvors
25% Survivors

DIET

<table>
<thead>
<tr>
<th>Measure</th>
<th>Controls</th>
<th>Previvors</th>
<th>Survivors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tot Kcal</td>
<td>1699</td>
<td>1652</td>
<td>1646</td>
</tr>
<tr>
<td>% Fat</td>
<td>27</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>% Carbs</td>
<td>49</td>
<td>51</td>
<td>56</td>
</tr>
<tr>
<td>% Protein</td>
<td>22</td>
<td>20</td>
<td>17</td>
</tr>
<tr>
<td>Fiber g</td>
<td>17</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td>Sugar g</td>
<td>54</td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>Alcohol/wk</td>
<td>4.0</td>
<td>2.5</td>
<td>2.9</td>
</tr>
</tbody>
</table>

No Significant Differences
SUMMARY: Anthropometrics

- Most BRCA mutation carriers in this study were not obese.
- However, lean tissue mass was lower and body fat was higher for survivors than previvors or controls which may predispose this population to weight gain and increased cancer risk.

INTERVENTION
Improve Lifestyle.

SUMMARY: Physical Activity

- Poor body composition was associated with reduced physical activity and function.
- Less than 50% of survivors engage in physical activity and the majority scored low for physical function.

INTERVENTION
- Engage in regular physical activity.
- See a specialist for chronic pain and other physical limitations.

SUMMARY: Psychological Distress

Psychological distress was high for all BRCA mutation carriers and associated with:
- Sugar cravings
- Weight gain
- Poor sleep quality

INTERVENTION
- Learn/practice anti-stress techniques.
- See a behavioral therapist for counseling.
- Join a support group.
SUMMARY: SLEEP

- Sleep quality was poor for previvors and even worse for survivors.
- Poor sleep quality was associated with higher % body fat, poor physical quality of life, and psychological distress.

INTERVENTION

- Sleep 7-9 hrs daily.
- Learn/practice GOOD sleep hygiene.
- See a sleep specialist if suspect a disorder.

SUMMARY: DIET

Macronutrient intake looked good but no information concerning type of foods consumed.

INTERVENTION

Follow AICR (WCRF) guidelines for cancer-fighting vs. cancer-promoting foods.

CONCLUSION

PRACTICE HEALTHY LIFESTYLE AND WEIGHT MANAGEMENT FOR CANCER PREVENTION.