IMPACT OF LIFESTYLE BEHAVIORS OF MORTALITY AND MORBIDITY

Lifestyle changes and Mortality

Leading causes of death are heart disease and cancer, both of which can be reduced through lifestyle modification: 46.7% of all deaths are preventable by changes in lifestyle.

Heart disease
2. May be reduced through adequate water consumption (Chan 2002)
3. May be reduced through adequate vitamin D/sunshine by lowering blood pressure and reducing inflammation (Giovannucci 2008)
4. Can be reduced through exercise (Giada 2008)
5. Can be reduced through stress reduction (Williams 1999)
6. Is negatively correlated with social support (Williams 1999)
7. "While life-event stress and poor social supports [appear to be independent] risk factors, the exact mechanism by which they impact on heart disease is not as yet well elicited, although disturbance in mood [e.g., depression] would appear to be the most likely intervening variable." (Tennant)
8. May be associated with problems revolving around toxicity and infections, which can be reduced and/or eliminated through lifestyle (Hagele 2007) (Matsuura 2008)

Cancer
1. Smoking is responsible for 30% of cancers and not smoking or stopping smoking dramatically cuts cancer risks (US DHHS)
2. Can be reduced by another 1/3 by proper exercise, diet and maintaining appropriate body weight. (American Cancer Society)
3. Some types may be reduced through appropriate sun exposure (Ali 2007)

4. May be influenced by emotions, stress and social support (Gidron 2008\textsuperscript{14})

**Leading causes of preventable death in the U.S. (Mokdad 2004\textsuperscript{15})**

1. Tobacco use (smoking) resulted in 435,000 deaths or 18.1% of the total deaths.
2. Poor diet and physical inactivity lead to 365,000 deaths or 15.2% of the total deaths.
3. Alcohol consumption resulted in 85,000 deaths or 3.5% of the total deaths.
4. Microbial agents resulted in 75,000 deaths or 3.1% of the total deaths.
5. Toxic agents resulted in 55,000 deaths or 2.3% of the total deaths.
6. Motor vehicle crashes resulted in 43,000 deaths or 1.8% of the total deaths.
7. Incidents involving firearms resulted in 29,000 deaths or 1.2% of the total.
8. Sexual behaviors resulted in 20,000 deaths or 0.8% of the total.
9. Illicit use of drugs resulted in 17,000 deaths or 0.7% of the total deaths.

**Additional selected studies**

When middle age adults adopted four health targets, eat at least 5 fruits and/or vegetables a day, regular exercise (at least 2.5 hrs/wk walking), BMI between 18.5 and 29.9 and no smoking, the risk of all cause mortality over the ensuing four years dropped by 40%. (King 2007\textsuperscript{16})

**Lifestyle changes and Morbidity**

**Top ten causes of lost years of healthy life**

In developed countries, the top ten causes of lost years of healthy life at ages 15-44 (WHO\textsuperscript{17})

1. Major Depressive Disorder
2. Alcohol Use
3. Road Traffic Accidents
4. Schizophrenia
5. Self-Inflicted Injuries
6. Bipolar Disorder
7. Drug Use
8. Obsessive-Compulsive Disorders
9. Osteoarthritis

**Leading disabilities among all age groups (WHO):**

Almost all the reasons for loss of healthy life years (especially between the ages of 15-44) are related to mental illness and addiction.

1. Unipolar major depression
2. Anemia
3. Falls
4. Alcohol use
5. Chronic obstructive pulmonary disorder


6. Bipolar disorder
7. Congenital anomalies
8. Osteoarthritis
9. Schizophrenia
10. Obsessive compulsive disorder.

Depression
1. Can be reduced through exercise (van Gool 200718)
2. Can be reduced through diet (Torres 200819) (Orr 200820) (Bourre 200621)
3. Can be reduced through social networks
4. May be reduced through sunshine/vitamin D (Hoogendijk 200822)
5. Can be reduced through mental/emotional strategies
6. 85% of individuals with depression responded to lifestyle treatment, including adequate sleep, sunshine, omega-3 fats, social networking and exercise. (Illardi 200623)

Additional selected studies
Exercise and/or alcohol consumption either predicted or protected against depressed mood. Adopting or maintaining healthy lifestyles might be a starting point in preventing or treating depressed mood over time. (van Gool 200716)

Findings show that a motivational approach is a powerful tool for achieving better blood pressure control and is an essential skill for all healthcare professionals. (Scala 200824)

Group-based lifestyle interventions over 6 years can prevent or delay diabetes for up to 14 years after the active intervention. (Li 200825)

"The present study was designed to examine the effects of lifestyle modification in 19 overweight children (age 8-17) who were placed on a high-fiber, low-fat diet in a 2-week residential program where food was provided ad libitum and daily exercise (2-2.5h) was performed. The results indicate amelioration of several traditional as well as novel factors associated with atherosclerosis after lifestyle modification, even in youth without documented disease." (Roberts 200726)

We examined the effects of lifestyle modification on key contributing factors to atherogenesis, including oxidative stress, inflammation and cell adhesion. Diabetic men (N=13) were placed on

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22 Hoogendijk WJ, Lips P, Dik MG, Deeg DJ, Beekman AT, Penninx BW. Depression is associated with decreased 25-hydroxyvitamin D and increased parathyroid hormone levels in older adults. Arch Gen Psychiatry. 2008 May;65(5):508-12.
23 Illardi S. http://reporting.journalism.ku.edu/fall06/bradford-noland/2006/10/lifestyle_changes_cure_depress.html
a high-fiber, low-fat diet in a 3-week residential program where food was provided ad libitum and daily aerobic exercise was performed. A combination of diet and exercise ameliorates oxidative stress, inflammation, and monocyte-endothelial interaction. Intensive lifestyle modification may improve novel CAD risk factors in men with diabetes. The protocol reversed diabetes and metabolic syndrome in 50% of participants” (Roberts 2006).^{24,27}

We conducted a pilot study to examine changes in prostate gene expression in a unique population of men with low-risk prostate cancer who...participated in an intensive nutrition and lifestyle intervention... (We) detected 48 up-regulated and 453 down-regulated transcripts after the intervention. Pathway analysis identified significant modulation of biological processes that have critical roles in tumorigenesis, including protein metabolism and modification, intracellular protein traffic, and protein phosphorylation (all P < 0.05). Intensive nutrition and lifestyle changes may modulate gene expression in the prostate (Ornish 2008).^{28} Moreover, “comprehensive lifestyle changes significantly increase telomerase activity and consequently telomere maintenance capacity in human immune-system cells. Given this finding and the pilot nature of this study, we report these increases in telomerase activity as a significant association rather than inferring causation” (Ornish 2008).^{29}

“A population-based multi-factorial lifestyle intervention [for individuals at high risk of ischemic heart disease] promoted significant greater beneficial long-term dietary changes compared to the control group, especially the intake of vegetables and saturated fat was improved.” (Toft, 2008).^{30}