Health Promotion and Wellness: How Can We Integrate in Orthopedic Physical Therapy?

Pradip K. Ghosh, PT, PhD, DMS
and
Jack Bennett, PT, DPT, SCS, M.Ed., CCSC
Associate Professor,
Physical Therapy Program, Maryville University, St, Louis

What is Wellness ?

- *Wellness is an approach to recognize the risk factors of different diseases and to reduce them in preventing diseases.*
- *Therefore, wellness implies a constant and deliberate effort to stay healthy with positive lifestyle habits to*
  - Improve health and quality of life
  - Prolong life
  - Achieve total well-being

Wellness Continuum

Seven Dimensions of Wellness

Seven Dimensions of Wellness

- Physical wellness involves aspects of health related directly to the body.
- Social wellness involves interacting with people and the environment and having satisfying relationships.

Seven Dimensions of Wellness

- *Emotional wellness* involves a sense of self-worth and an acceptance for things that are different.
- *Intellectual wellness* involves your ability to use the knowledge that you acquire.
- *Spiritual wellness* means working to achieve spiritual potential and find harmony in living.

What is Health Promotion?

- *Health promotion* is the science and art of helping people change their lifestyle to move toward a state of optimal health.
- *Optimal health* is defined as a balance of physical, emotional, social, spiritual, and intellectual health.

What is Health Promotion?

- Major goals of health promotion are to:
  - *Eliminate health disparities*
  - *Maintain normal body functions*
  - *Improve quality of life*
  - Increase years of healthy life
  - *Decrease premature mortality caused by chronic and acute diseases.*

Health Promotion and Disease Prevention

- It is the aggregate of all purposeful activities designed to improve personal and public health through a combination of strategies
  - *competent implementation of behavioral change strategies*
  - *health education*
  - *risk factor detection*
  - *health protection measures,*
  - *health maintenance and enhancement .*

Prevention

- **Primary Prevention**:
  - Preventive measures that forestall the onset of illness or injury during the prepathogenesis period.
- **Secondary Prevention**:
  - Preventive measures that lead to early diagnosis and prompt treatment of a disease, illness, or injury to limit disability, impairment, or dependency and prevent more severe pathogenesis.
- **Tertiary Prevention**
  - Preventive measures aimed at rehabilitation following significant pathogenesis.

Normal Values

Physical

Blood Pressure : 120 – 140 / 70 – 90 mm Hg
Pulse: 60 - 80 per min

Biochemical

Blood Sugar(f): 70 - 110 mg / dl
Blood Sugar(pp): 110 – 140 mg / dl
Serum Cholesterol: 150 - 220 mg/ dl
HDL Cholesterol: 35 - 50 mg/ dl
LDL Cholesterol: 60 – 140 mg/ dl
Serum Triglyceride: 50 - 150 mg/ dl

Ideal Weight

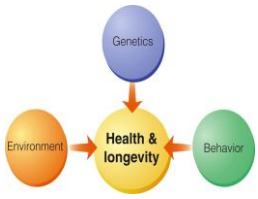
Height (cm) – 100 = Ideal Weight

Physical Fitness and Wellness

- A negative lifestyle threatens health and hastens the deterioration rate of the human body
  - **Sedentary** living, alcohol, fatty foods, excessive sweets, tobacco, drugs
- Increases the incidence of **chronic diseases**
  - Cardiovascular disease, cancer, diabetes, osteoporosis, and chronic respiratory diseases

Physical Fitness and Wellness

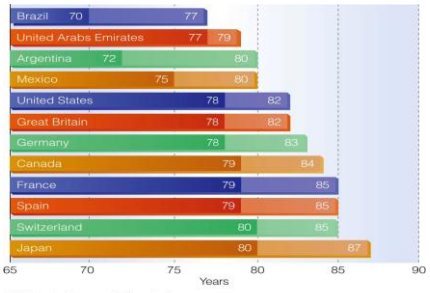
- Prevention is the best medicine
  - Self-control
  - Positive lifestyle habits
- 3 factors determine health and longevity:
  - Genetics
  - Environment
  - Behavior



Life Expectancy

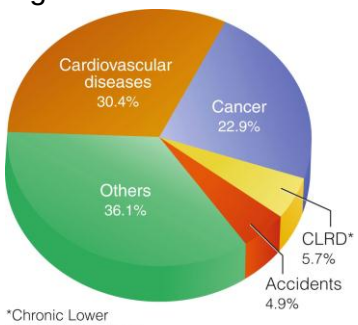
- US life expectancy
  - Men 75.7 years; women 80.8 years
  - US ranks #38 in world
  - Time lived with illness and disability increasing
- Biggest factors accounting for ranking:
  - Obesity, low physical activity, tobacco use
- Average lifespan may be decreasing

Countries and Life Expectancies



*Dark color is men; light color is women.

Leading Causes of Death in the US



*Chronic Lower Respiratory Disease

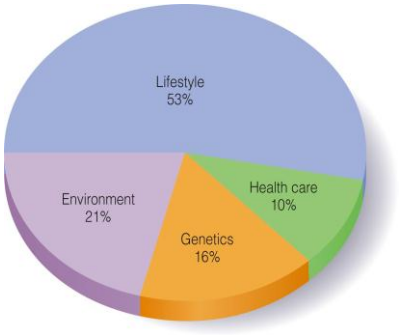
"Big Five" Risk Factors

- Leading **risk factors** in the US are related to lifestyle choices
  - ***Smoking***
  - ***High blood pressure***
  - ***Overweight and obesity***
  - ***Physical inactivity***
  - ***High blood glucose***

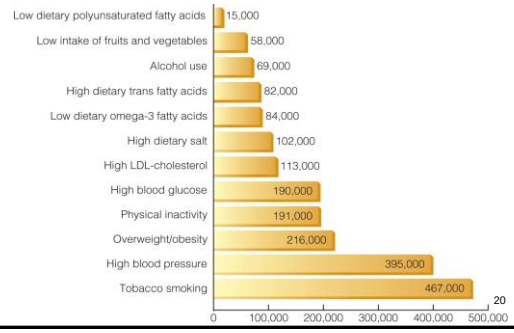
Lifestyle Behaviors and Potential Health Problems

- Other lifestyle behaviors, including stress, poor nutritional choices, and poor-quality sleep have an impact on individual's potential for developing following:
  - Ischemic heart disease
  - Cancer
  - Hypertension
  - Stroke
  - Diabetes
  - Metabolic syndrome

Lifestyle as a Health Problem



Deaths From Lifestyle-related Risk Factors



Construct of Health and Wellness

- As per WHO in 2008, health is not merely the absence of impairment or disease; rather it refers to social, mental as well as physical well-being.
- Throughout the 20th century, biomedicine was the dominant model of medical care and almost all of them focused on an impairment model.

Construct of Health and Wellness

- Outcome of biomedicine model has been reported to be effective in controlling infection, relieving acute signs and symptoms of impairments while it's outcome in prevention and cure has been less impressive
- A positive association exists between lifestyle practices and prevention of diseases.

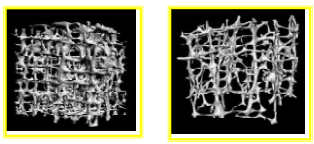
Health and Wellness: Role of Physical Therapists

- Physical therapists have good understanding of health and well-being with respect to the multiple dimensions consistent with the determinants of health.
- Physical therapists are competent in promoting self-efficacy and positive health behavior choices.
- Therefore, chronic conditions that are hallmarking in 21st century could be effectively prevented by physical therapists.

Osteoporosis

Osteoporosis is defined as a skeletal disorder characterized by compromised bone strength predisposing to an increased risk of fracture.

NIH Consensus Development Conference, March 2000



Osteoporosis

- It is a silent metabolic bone disease characterized by low bone mass density (BMD) caused by imbalance between osteoblastic and osteoclastic cells of bone.
- Two types of bone: cortical and trabecular.
- Trabecular bone is more sensitive to metabolic influences and more affected in individual with osteoporosis

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Bone Remodeling

- Both calcium, phosphorus, and vitamin D are essential to maintain bone health.
- Maintaining sufficient calcium intake is one of the most important factors in maintaining bone health.
- Vitamin D helps in bone health through regulating calcium metabolism.

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Osteoporosis: Women vs Men

- Women are four times more likely to develop osteoporosis than men.
- In men, osteoporotic levels are reached at an older age than females (Kenny et.al, 2000)
- One in four men over 50 will have an osteoporotic fracture in their life (Shepard, 2004)
- Incidence of factures increases with age.

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Osteoporosis: Age

- As age increases, the risk for osteoporosis increases.
- With increased age, the body is less efficient at absorbing calcium and other nutrients essential to bone health.
- Bone loss occurs at about 10% each 10 years after the age of 30.
- Osteoporosis affects nearly half of the persons over the age of 75; both men and women.

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Osteoporosis: Race and Ethnicity

- Osteoporotic fractures are most common to Caucasians, Hispanics, and Asians (Cumming et.al, 1995).
- Asian women have lower bone mass density than Caucasian women.
- African Americans tend to have a higher bone mineral density creating less incidence of fracture.
- Hip fractures occur about twice as frequently in white women as compared to black women.

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Osteoporosis and Fracture

- Hip fractures occur much earlier in women than in men (Shepard, 2004)
- Menopause places women at a higher risk due to low estrogen levels (Shepard, 2004)
- One in two women will have a osteoporotic fracture in their lifetime (Sampson, 2002)

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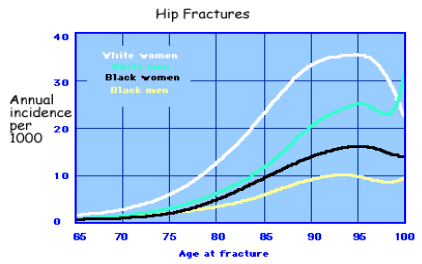
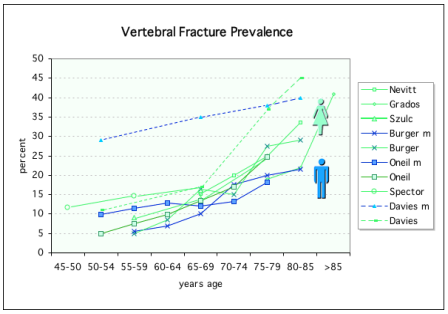
Hip Fracture: Women vs Men



Prevalence of Vertebral Fracture



Types of Osteoporosis

- Postmenopausal osteoporosis:
  - Characterized by increased bone resorption over bone formation.
- Age-related Osteoporosis:
  - Both bone formation and resorption are depressed and gradually resorption exceeds formation.
- Secondary Osteoporosis:
  - Endocrine disorders (eg. Hyperthyroidism, Hyperparathyroidism, Type II DM, Hypogonadism)
  - Malabsorption syndrome (GI disease, Hepatic disease).

Risk Factors

- Age 50 yr and older
- Female sex
- Post menopause
- Dietary deficiencies of calcium and vitamin D.
- Thin, small, bony body frame.
- Long periods of inactivity, immobilization.
- Long term intake of alcohol, caffeine, tobacco.
- Long term use of corticosteroids, heparin.

Simple Prevention Steps

The National Osteoporosis Foundation (NOF) recommends FIVE simple steps to bone health and osteoporosis prevention …

Simple Prevention Steps

1. Daily intake of 1200 mg/ day calcium and 800 mg vitamin D.
2. Engage in regular weight-bearing exercise.
3. Avoid smoking and excessive alcohol.
4. Consult with doctor about bone health.
5. Have a bone density test and take medication when appropriate.

Modification of Lifestyle Issues

- Tobacco - eliminate it
- Alcohol – moderate it
- Nutrition -adequate protein, magnesium, trace elements, *multivitamines*
- Exercise – strength, aerobic, flexibility, balance

Lifestyle Changes to Help Prevent Osteoporosis

Pyramid for Osteoporosis Prevention

Yoga, Meditation, and Relaxation

- Recent observation indicates that use of alternative approaches (yoga, meditation, tai chi etc.) can prevent osteoporosis and associated changes.
- A recent observation by Tingsen Xu at Emory University indicated that practicing tai chi can prevent osteoporosis induced changes in balance.

Yoga and Osteoporosis

- Yoga serves the body in several ways, especially by combating stresses.
- In response to stress, norepinephrine, epinephrine and glucocorticoids are elevated.
- Increased exposure to glucocorticoids can cause bones to get resorped and bones become osteoporotic.
- So, practicing yoga can reduce glucocorticoids and thereby reduces the risk of osteoporosis.

Yoga and Osteoporosis

- It has been observed that several yoga posture (weight bearing asana) can stimulate the bones to retain calcium, if sufficient calcium gets through food.
- Some particular yoga pose such as Sarvangasana (Shoulderstand) and Halasana (Plow pose) can regulate secretions from thyroid and parathyroid gland (PTH).
- Increased PTH (parathyroid hormone) promote bone formation.

Sarvangasana (Shoulderstand)

- Improves blood circulation through heart, thyroid gland, brain.
- Improves thyroid hormone and PTH secretion.
- Thus, it helps in preventing osteoporosis

Halasana (Plow pose): Benefits

- Muscles and ligaments of legs are stretched and relaxed, which results greater legs flexibility.
- Increases release of PTH and thereby prevents osteoporosis.
- Makes the spinal cord flexible and strong.

Meditation and Osteoporosis

- Meditation is one of the 8 steps of Yoga.
- Through meditation, we relax our body and concentrate our mind.
- During relaxation, our cortisol level drops and with practice the sensitivity of adrenal cortex to stress is reduced.
- As a result, we become resistant to stress induced changes in bone resorption (loss of bone mass)

Diet and Osteoporosis

- The food we eat is extremely important for maintaining bone mass.
- A recent study indicated that women who were vegitarians for 20 years had only 18% bone mass loss while their counterparts (who eat animal-derived proteins) suffered from 35% bone mass loss.
- This is possibly due to fact that animal protein can cause body to excrete high calcium through urine leading to less bone formation.
- So, eat less animal-derived protein.

Diet and Osteoporosis (Contd)

- Consuming milk and other dairy products will provide more calcium to our body.
  - It is found that supplementation of calcium (1200-1500 mg/day) & vitamin D (700-800 IU) reduces fractures in postmenopausal women by 50%.
- In addition to calcium, body needs copper, manganese and zinc that enhance calcium's ability to increase bone mass.
  - Nuts, berries, tofu, and tomatoes are good sources of copper and manganeese while seafood and pees are good sources of zinc.

Calcium

- "Calcium has been singled out as a major health concern today because it is critically important to bone health and the average American consumes levels of calcium that are far below the amount recommended for optimal bone health." *(General's Report on Bone Health 2004)*
- Source of calcium:
  - ***Milk, yogert, diary products***
  - ***Cereal***
  - ***Raw broccoli***
  - ***Orange juice***
  - ***Baked beans***
  - ***Cold saltwater fish:*** **salmon, tuna, oysters and shrimp)**

Vitamin D

- Vitamin D is important for good bone health because it helps in the absorption and utilization of calcium.
- For adults over age 50 are at moderate risk of vitamin D deficiency.
- Supplementation with 800–1000 IU (20–25 µg) vitamin D3 daily is recommended.
- To achieve optimal vitamin D status, daily supplementation with more than 1000 IU (25 µg) may be required in some individuals.

Vitamin D and Sunlight Exposure

National Osteoporosis Foundation Web site at http://www.nof.org

- Vitamin D is manufactured in the skin following direct exposure to sun.
- Amount varies with time of day, season, latitude and skin pigmentation.
- 10–15 minutes exposure of hands, arms and face 2–3 times/week may be sufficient (depending on skin sensitivity).
- Clothing, sunscreen, and window glass reduce amount produced.

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Type of Food and Interference of Calcium Metabolism

- Fiber naturally present in food should not be a problem and is beneficial to health.
- Excessive fiber (such as from overusing fiber supplements) could interfere with calcium absorption.
- Excessive sodium can increase urinary calcium excretion (Food and Nutrition Board recommends limit of 2,300 mg daily)
- Unbalanced, excessively high protein diets could increase urinary excretion of calcium.

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What Are the Therapeutic Options?

- Exercise:
- Walking reduces hip fracture risk
  - 4 hours per week reduced hip fracture by 41% in a study of 61,200 women
    JAMA 2002
- Activity of any type reduces fracture risk- Balance, Strength, Flexibility, Aerobic

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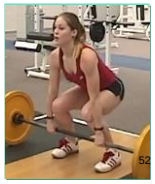
Exercise

- Exercises involving resistance training appropriate for the individual's age and functional capacity and/or weightbearing aerobic exercises are recommended for those who are at risk for osteoporosis





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Exercise

- Exercises to enhance core stability and thus to compensate for weakness or postural abnormalities are recommended for individuals who have had vertebral fractures.


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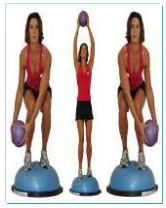
Exercise

- Exercises that focus on balance, such as tai chi, or on balance and gait training should be considered for those at risk of falls.





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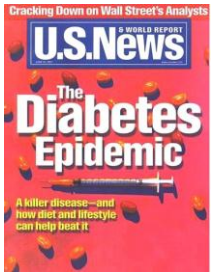

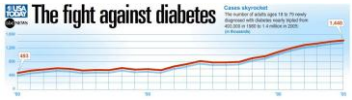

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Diabetes Mellitus

- It is a metabolic disorder characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both.

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Type of Diabetes

- **Type 1 diabetes (juvenile diabetes)**
  - Insulin-dependent diabetes mellitus (IDDM)
  - Pancreas produces little or no insulin
- **Type 2 diabetes (adult-onset diabetes)**
  - Non–insulin-dependent diabetes (NIDDM)
  - Insulin is not processed properly
- **Gestational Diabetes:**
  - High sugars in pregnancy

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Impaired Glucose Tolerance "Pre-diabetes"

- Impaired Fasting:
  - Level between >100 mg/dl and <126 mg/dl
- Impaired glucose:
  - During 2 hour glucose tolerance test
  - Level between >140 and <200 mg/dl

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Diagnosing diabetes

Fasting plasma glucose test (FPG) results

diabetes	**126 mg/dL or greater**
pre-diabetes	**125 mg/dL to 100 mg/dL**
normal	**less than 100 mg/dL**

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Etiology of Diabetes

- Increased weight
  - BMI:
    - overweight = 25.0 to 29.9 kg/m^2
    - obese > 30.0 kg/m^2
- Increased central (i.e., visceral) obesity
  - Waist circumference:
    - Men > 40 in
    - Women > 35 in
- Decreased activity

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Risk Factors For Type 2 Diabetes

- Overweight (with central obesity)
- Age 45 y.o or older.
- Physically inactive.
- Have a parent or sibling with type 2 diabetes.
- African American, Native American, Hispanic American, or Pacific Islander.
- High cholesterol levels.
- History of gestational diabetes, or given birth to a baby greater than 9 lbs.
- High blood pressure.

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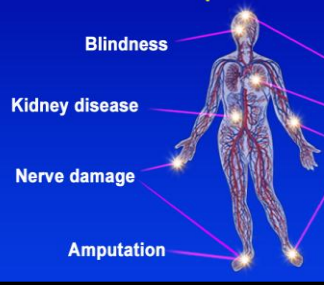
Hyperglycemia Can Cause Serious Long-Term Problems

Chronic complications of diabetes



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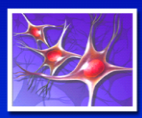
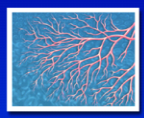
Diabetes Can Lead to Nerve and Small Blood Vessel Damage

Nerve damage (neuropathy)



Can cause problems in:
- Feet and hands
- Heart and circulation
- Stomach, bladder, and sex organs

Small blood vessel damage (microvascular complications)



Can cause:
- Blindness
- Kidney disease

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Prevalence of Diabetes

- **Total:** 25.8 million children and adults in the United States—8.3% of the population—have diabetes.
  - **Diagnosed:** 18.8 million people
  - **Undiagnosed:** 7.0 million people
- **Pre-diabetes:** 79 million people*
- **New Cases:** 1.9 million new cases of diabetes are diagnosed in people aged 20 years and older in 2010.

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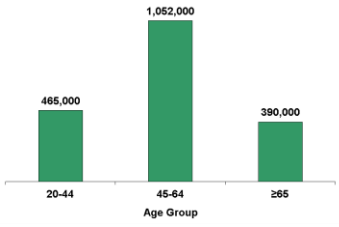
Estimated number of new cases of diagnosed diabetes among people aged 20 years or older, by age group, United States, 2010



Source: 2007–2009 National Health Interview Survey estimates projected to the year 2010.

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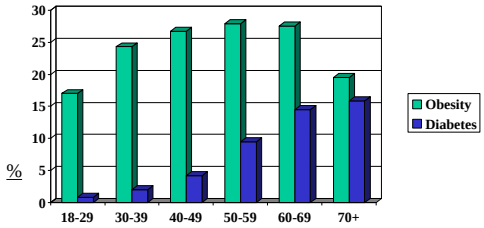
Obesity and Diabetes Prevalence by Age



Sullivan PW et al. Obesity, inactivity, and the prevalence of diabetes, and diabetes-related cardiovascular comorbidities in the U.S., 2000-2002. Diabetes Care 28;1599-1603, 2005.

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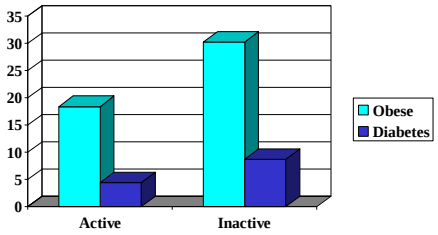
Obesity and Diabetes by Activity



Sullivan PW et al. Obesity, inactivity, and the prevalence of diabetes, and diabetes-related cardiovascular comorbidities in the U.S., 2000-2002. Diabetes Care 28;1599-1603, 2005

Cost of Diabetes

- In 2007, economic burden of pre-diabetes and diabetes reached $218 billion in USA.
  - $174 billion for diagnosed diabetes
- The average annual cost per case is $2,864 for undiagnosed diabetes, $9,975 for diagnosed diabetes

What Do We Know About Type 2 Diabetes Prevention?

- Type 2 diabetes is a major challenge to human health and can be prevented.
- Primary prevention is a suitable and affordable choice.
- There is a strong evidence that lifestyle interventions are effective in preventing diabetes.

Prevention Strategies: Approaches in the Design

- A population-based strategy: Involves altering the lifestyle and environmental determinants of type-2 diabetes
- A high-risk strategy: It applies preventative measures on individuals identified as high-risk for type-2 diabetes

Why is the Prevalence of Type 2 Diabetes Increasing?

- Aging of the population.
- Urbanization especially in the developing countries
  - More sedentary life
  - Food consumption patterns (more foods with high fat and more refined carbohydrates)

Why the Primary Prevention?

- As per Beaglehole, there is an urgent need to take the prevention of cardiovascular disease more seriously. The only sensible strategy is the population approach to primary prevention

Beaglehole, the Lancet 358: 661-663, 2001

Primary Prevention

- Most of the results on prevention come from studies on high risk individuals rather than populations.
- It has been observed that individual with IGT (impaired glucose tolerance) has a 2-7 higher risk of progression to type 2 diabetes than individuals with normal glucose tolerance.
- Among the factors that predicted progression were obesity, increased both fasting and 2-h blood glucose

Behavioral Interventions: Evidences

- Several researchers have demonstrated that diet and physical activity reduced the incidence of Type 2 diabetes.
- The Swedish Malmo study showed that diet and exercise for 5 years in men with IGT reduced the incidence of Type 2 diabetes by 50%

Eriksson et al, Diabetologia 34: 891-898, 1991

Evidences

- The DaQing Chinese study indicated that over 6 years there were significant reductions in the incidence of diabetes in individuals with IGT who were randomized to diet, exercise, or combined diet-exercise treatment group.

Pan et al, Diabetes Care, 20: 537-544, 1997

Evidences

- The Finnish Diabetes Prevention Study demonstrated that Type 2 diabetes can be prevented by changes in the lifestyle of high risk individuals (middle aged, overweight individuals with IGT).
- The risk of diabetes was reduced by 58% in the intervention group.
- The cumulative incidence was 11% in the intervention group compared to 23% in the control group

Tuomilehto et al. NEJM, 344: 1343-1350, 2001

Population-based Prevention

- It has been noted that encouragement in implementing healthy diet and exercise in the community may reduce the incidence of Type 2 diabetes

Prevention of Diabetes

- Diabetes Prevention Program
  - Lifestyle changes
    - Changes in eating habits
    - Increase in physical activity
    - 58% reduction in type 2 diabetes
  - Weight loss
    - 5% to 10% weight loss
    - Decrease of 300 to 500 kcal/day = 1/2 to 1 lb. weight loss/week

Prevention of Diabetes

- Physical Activity
  - Benefits:
    - Increases insulin sensitivity
    - Decreases weight
    - Decreases blood pressure and cholesterol
    - Decreases stress
    - DECREASES risk of type 2 diabetes

Prevention of Diabetes

- Healthy Nutrition Recommendations:
  - Decrease total fat intake
    - smaller amounts of high fat foods (because high fat food can reduce insulin sensitivity and can cause more abdominal obesity)
    - broiling/stir fry vs. frying
    - remove skin from chicken
    - substitute with low calorie/low-fat foods

Prevention of Diabetes

- Healthy Nutrition Recommendations:
  - Increase fruits and vegetables
  - High fiber diet (reduces the absorption of glucose from intestine)
  - Whole grains vs. processed
  - Include dry beans and lentils
  - Drink water & calorie free drinks
  - Cut back on high calorie snacks
  - Watch portion sizes
  - Eat slower

Osteoarthritis and Wellness

- Epidemiology
- Symptomatic OA
- Risk factors/co-morbidities
- Effects on Quality of Life
- Management

Epidemiology

(Am J Nurs 2012 Mar; Clin Geriatr Med 2010 Aug)

- 27 million adults with clinical dx
- 2009 OA 4th most common cause of hospitalization
- 2009 cost of surgical replacement (knee and hip) $42.3 billion
- Knee OA: > 60 yrs. of age: 10% men, 13% women

Osteoarthritis Financial Cost

- Insurers spent $149.4 billion of total medical costs for OA treatment
- Out of pocket expenses: $36.1 billion

Arthritis and Rheumatism, 2008 Dec

Prognosis: CDC estimates that by the yr. 2030, 25% of the adult US population will have physician diagnosed OA.

Symptomatic OA

Clin Geriatr Med 2010 Aug

- Presence of:
  - Pain
  - Aching
  - Stiffness/Diminished ROM
  - Radiographic evidence (Kellgren-Lawrence grading scheme)
  - Postural abnormalities

Risk Factors

- Obesity
- Age
- Gender
- Ethnicity
- Genetic
- Congenital conditions
- Diet

Obesity and OA

- People who are overweight or obese report doctor-diagnosed arthritis more often than people with a lower body mass index (BMI).
- 16.4% of under/normal weight adults report doctor-diagnosed arthritis.

  MMWR 2010;59(39);1261-1265. [Data Source: 2007–2009 NHIS]
- 21.4% of overweight and 31.1% of obese Americans report doctor-diagnosed arthritis.

  MMWR 2010;59(39);1261-1265. [Data Source: 2007–2009 NHIS]

Obesity and OA

- 66% of adults with doctor-diagnosed arthritis are overweight or obese (compared with 53% of adults without doctor-diagnosed arthritis).

  Am J Prev Med 2006;30(5):385–393. [Data Source: 2002 NHIS]
- Weight loss of as little as 11 pounds reduces the risk of developing knee osteoarthritis among women by 50%.

  Arthritis Rheum 1998;41(8):1343–1355. [Data source: Framingham Osteoarthritis Study]

Obesity and OA

- BMI > 30 significantly associated with knee OA but not hip OA

  BMC Musculoskelet Disord. 2008 Oct
- Lg population based study (follow-up 22 yrs.): risk for knee OA was 7X greater for people with BMI >30 compared to BMI < 25.

Toivanen AT, Heliovaara M, Impivaara O, Arokoski JPA, Knekt P, Lauren H, et al. Obesity, physically demanding work and traumatic knee injury are major risk factors for knee osteoarthritis e a population-based study with a follow-up of 22 years. **Rheumatology 2010**

Age

- OA increases with age
- Of persons ages 18–44, 7.6% report doctor-diagnosed arthritis.
- Of persons ages 45–64, 29.8% report doctor-diagnosed arthritis.
- Of persons ages 65 or older, 50.0% report doctor-diagnosed arthritis.

  MMWR 2010;59(39);1261-1265. [Data Source: 2007–2009 NHIS]

Gender

- 25.9% of women and 18.3% men report doctor-diagnosed arthritis.

  MMWR 2010;59(39);1261-1265. [Data Source: 2007–2009 NHIS]

- Women also have increased severity of OA

  Srikanth VK, Fryer JL, Zhai G, Winzenberg TM, Hosmer D, Jones G. A meta-analysis of sex differences prevalence, incidence and severity of osteoarthritis. Osteoarthritis Cartilage. 2005;13

Conflicting results that explain the difference in severity

Ethnicity

- 2.9 million Hispanic adults report doctor-diagnosed arthritis.

  Prev Chronic Dis. 2010 May;7(3):A64. [Data source: NHIS 2002, 2003, 2006]

- 4.6 million Non-Hispanic Blacks report doctor diagnosed arthritis.

  Prev Chronic Dis. 2010 May;7(3):A64. [Data source: NHIS 2002, 2003, 2006]

- 667,000 Asian/Pacific Islanders and 280,000 American Indians/Alaska Natives report doctor-diagnosed arthritis.

  Prev Chronic Dis. 2010 May;7(3):A64. [Data source: NHIS 2002, 2003, 2006]

Genetic

- Studies have estimated that a heritable component of OA is between 50-65%

  Spector TD, Cicuttini F, Baker J, Loughlin J, Hart D. Genetic influences on osteoarthritis in women: a twin study. BMJ. 1996

  Palotie A, Vaisanen P, Ott J, et al. Predisposition to familial osteoarthrosis linked to type II collagen gene. Lancet. 1989

  Felson DT, Couropmitree NN, Chaisson CE, et al. Evidence for a Mendelian gene in a segregation analysis of generalized radiographic osteoarthritis: the Framingham Study. Arthritis Rheum.1998

Congenital Conditions

- Congenital subluxation, LCP, SCFE have been associated with hip OA

  Harris WH. Etiology of osteoarthritis of the hip. Clin Orthop Relat Res. 1986

- Acetabular dysplasis and its' association with hip OA

  Lane NE, Lin P, Christiansen L, et al. Association of mild acetabular dysplasia with an increased risk of incident hip osteoarthritis in elderly white women: the study of osteoporotic fractures. Arthritis Rheum. 2000

Diet

- Subjects with low to middle serum 25-hydoxyvitamin D had a 3-fold increased risk for progressive knee OA

  McAlindon TE, Felson DT, Zhang Y, et al. Relation of dietary intake and serum levels of vitamin D to progression of osteoarthritis of the knee among participants in the Framingham Study. Ann Intern Med. 1996

- Low Vit D levels more likely to demonstrate with hip jt space narrowing but not osteophytic development

  Lane NE, Gore LR, Cummings SR, et al. Serum vitamin D levels and incident changes of radiographic hip osteoarthritis: a longitudinal study. Study of Osteoporotic Fractures Research Group.Arthritis Rheum. 1999

Study failed to confirm protective effect of Vit D on structural worsening of knee OA

  Felson DT, Niu J, Clancy M, et al. Low levels of vitamin D and worsening of knee osteoarthritis: results of two longitudinal studies. Arthritis Rheum. 2007

Diet

- Vitamin C: decreased risk of progression but not incidence for knee OA

  McAlindon TE, Jacques P, Zhang Y, et al. Do antioxidant micronutrients protect against the development and progression of knee osteoarthritis? Arthritis Rheum. 1996

Selenium

Vit K

Other Risk Factors

- Injury/surgery: One of the strongest risk factors

Lohmander LS, Ostenberg A, Englund M, Roos H. High prevalence of knee osteoarthritis, pain, and functional limitations in female soccer players twelve years after anterior cruciate ligament injury.Arthritis Rheum. 2004

Roos EM, Ostenberg A, Roos H, Ekdahl C, Lohmander LS. Long-term outcome of meniscectomy: symptoms, function, and performance tests in patients with or without radiographic osteoarthritis compared to matched controls. Osteoarthritis Cartilage. 2001

Hx of knee injury is a major risk factor for knee OA

Osteoarthritis and Cartilage. 2001

- Presence of meniscal damage was higher among subjects with radiographic knee OA than those without OA.

Englund M, Guermazi A, Gale D, et al. Incidental meniscal findings on knee MRI in middle-aged and elderly persons. N Engl J Med. 2008

Occupation

- Repetitive use is associated with increased risk of OA
  - farmers, repetitive carrying, kneeling, squatting

Croft P, Cooper C, Wickham C, Coggon D. Osteoarthritis of the hip and occupational activity. Scand J Work Environ Health. 1992

Felson DT, Hannan MT, Naimark A, et al. Occupational physical demands, knee bending, and knee osteoarthritis: results from the Framingham Study. J Rheumatol. 1991

Coggon D, Croft P, Kellingray S, Barrett D, McLaren M, Cooper C. Occupational physical activities and osteoarthritis of the knee. Arthritis Rheum. 2000

Postural Alignment

- Risk for knee OA or more of a marker for disease severity
- Existing knee OA: abnormal alignment was strongly associated with structural deterioration

Sharma L, Song J, Felson DT, Cahue S, Shamiyeh E, Dunlop DD. The role of knee alignment in disease progression and functional decline in knee osteoarthritis. JAMA. 2001

Cerejo R, Dunlop DD, Cahue S, Channin D, Song J, Sharma L. The influence of alignment on risk of knee osteoarthritis progression according to baseline stage of disease. Arthritis Rheum.2002

Felson DT, McLaughlin S, Goggins J, et al. Bone marrow edema and its relation to progression of knee osteoarthritis. Ann Intern Med. 2003

Brouwer GM, van Tol AW, Bergink AP, et al. Association between valgus and varus alignment and the development and progression of radiographic osteoarthritis of the knee. Arthritis Rheum.2007

- Malalignment and risk of knee OA is less clear: may not be a primary risk factor

Hunter DJ, Niu J, Felson DT, et al. Knee alignment does not predict incident osteoarthritis: the Framingham osteoarthritis study. Arthritis Rheum. 2007

Other Factors

- Number of co-morbidities

Arch Phys Med Rehabil. 2008 Jun

BMC Musculoskelet Disord. 2008 Jun

- Educational level/socioeconomic level

Arch Phys Med Rehabil. 2008 Jun

Aging Health. 2012 Aug

Conclusion: Multifactorial

Hip OA and Self Reported Pain and Physical Function

Arch Phys Med Rehabil 2008 Jun

- To determine the factors associated with self-reported pain and physical function in pts with hip OA
  - Ed. Level (r=.264, P<.001)
  - Comorbidities (r=.313, P<.005)
  - BMI (r=.252, P< .001)
  - Life satisfaction (r=.291, P,.001)

  Conclusion: educational level, life satisfaction and comorbidities were significant factors for both self reported pain and physical functioning

Effects on Quality of Life

- Decrease in ADL level
- Diminished QOL
  - WOMC
  - Medical Outcomes Study 36-item Health Survey
- People with doctor-diagnosed arthritis have significantly worse HRQOL than those without arthritis. Adults with arthritis report two to four times as many unhealthy days in the past month than those without arthritis.

Quality of Life: Limitations

- Among adults with doctor-diagnosed arthritis, many report significant limitations in vital activities such as:
  - walking 1/4 mile—6 million
  - stooping/bending/kneeling—8 million
  - climbing stairs—5 million
  - social activities such as church and family gatherings—2 million

Arthritis Rheum 2004;50(9, suppl):5641. [Data Source: 2002 NHIS]

Quality of Life: Emotional

- Arthritis is strongly associated with major depression (attributable risk of 18.1%), probably through its role in creating functional limitation.

Medical Care 2004;42(6):502–511. [Data Source: 1996 Health and Retirement Survey]

- 6.6% of adults with arthritis report severe psychological distress.

Int. J Public Health, 2009;S4:S75-83 [Data Source: 2007 Behavioral Risk Factor Surveillance System]

Management

- Exercise
  - Resistance
  - Aquatic
  - Proprioceptive
  - Aerobic
  - Stretching
- Almost 44% of adults with doctor-diagnosed arthritis report no leisure time physical activity compared with 36% of adults without arthritis.
  Am J Prev Med 2006;30(5):385-393.
- Among older adults with knee osteoarthritis, engaging in moderate physical activity at least 3 times per week can reduce the risk of arthritis-related disability by 47%.
  Arch Intern Med 2001;161(19):2309–2316. [Data Source: FAST Trial]

Exercise and OA

- Aerobic vs. resistance ex. In older adults with knee OA: modest improvements in measures of disability, physical performance, and pain from participation in either form of exercise
  JAMA. 1997 Jan
- Aerobic ex for prevention and symptom control of OA; positive outcomes for pain, physical function, and performance
  PMR. 2012 May

Management

- Nutrition/Diet
- Education
- Community based vs. home based
- Pharmacological

Where does Wellness and Health Promotion Fit In?

- Early management
- Encourage compliance
  - Encourage social interaction
  - Discuss impact of exercise on psycho/social wellness
- Sound nutritional choices
- Minimize effects of comorbidities
- Encourage safe habits

What Does It All Mean??

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Overall Objective

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Overall Objective

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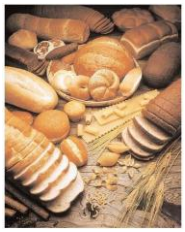
Conclusion



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Thank You

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