WHAT IS SLEEP-DISORDERED BREATHING (SDB)?
SDB describes a number of nocturnal breathing disorders
— Obstructive sleep apnea (OSA)
— Central sleep apnea (CSA)
— Nocturnal hypoventilation
— Cheyne–Stokes respiration (CSR)

WHAT IS OBSTRUCTIVE SLEEP APNEA (OSA)?
— Most common form of SDB
— A partial or complete collapse of the upper airway that causes muscles controlling the soft palate and tongue to relax
— Person experiences apneas, hypopneas and flow limitation
  — Apnea: a cessation of airflow for ≥10 seconds
  — Hypopnea: a decrease in airflow lasting ≥10 seconds with a 30% oxygen reduction in airflow and with at least a 4% oxygen desaturation from baseline
  — Flow limitation: narrowing of the upper airway and an indication of an impeding upper airway closure

CLASSIFICATION OF SLEEP APNEA
AHI (Apnea–Hypopnea Index)
— Number of apneas and/or hypopneas per hour of sleep (or study time)
— Reflects the “severity” of sleep apnea
  AHI = 0–4  Normal range
  AHI = 5–14  Mild sleep apnea
  AHI = 15–30  Moderate sleep apnea
  AHI > 30  Severe sleep apnea

PREVALENCE OF SLEEP APNEA
— Approximately 42 million American adults have SDB
— 1 in 5 adults has mild OSA
  — 1 in 15 has moderate to severe OSA
— 9% of middle-aged women and 25% of middle-aged men suffer from OSA
— Prevalence similar to asthma (20 million) and diabetes (23.6 million of US population)
— 75% of severe SDB cases remain undiagnosed

INCREASED RISK FACTORS FOR SLEEP APNEA
— Male gender
— Obesity (BMI >30)
— Diagnosis of hypertension
— Excessive use of alcohol or sedatives
— Upper airway or facial abnormalities
— Smoking
— Family history of OSA
— Large neck circumference (>17” men; >16” women)
— Endocrine and metabolic disorders

CARDIOVASCULAR LINKS
— 5.7 million people in the US have heart failure (American Heart Association)
— Approximately 76% of congestive heart failure patients have SDB
— Heart failure is the most expensive disorder to treat
— OSA noted in 49% of atrial fibrillation patients and 30% of cardiovascular patients
— OSA presents in 70% of heart attack patients with AHI ≥5 and 52% of heart attack patients with AHI ≥10
**SLEEP APNEA Facts and Figures**

**HYPERTENSION LINKS**
- Studies have shown that sleep apnea is an independent risk factor for hypertension
- 30–83% of patients with hypertension have sleep apnea
- 43% of patients with mild OSA and 69% of patients with severe OSA have hypertension
- AHA guidelines on drug-resistant hypertension have shown treatment of sleep apnea with CPAP likely improves blood pressure control

**TYPE 2 DIABETES LINKS**
- 48% of type 2 diabetes sufferers have sleep apnea
- OSA may have a causal role in the development of type 2 diabetes
- OSA is associated with insulin resistance (independent of obesity)
- 30% of patients presented to a sleep clinic have impaired glucose intolerance
- Mild forms of SDB may be important in predicting risk of pre-diabetes
- 86% of obese type 2 diabetic patients suffer from sleep apnea

**STROKE RISK**
- 65% of stroke patients have SDB
- Up to 70% of patients in rehabilitation therapy following stroke have significant SDB (AHI >10)

**MORTALITY LINKS**
- SDB is associated with a 3-fold increase in mortality risk
- There is an independent association of moderate to severe OSA with increased mortality risk
- Severe sleep apnea raises death risk by 46%

**HEALTH CARE COSTS**
(Economic consequences of untreated SDB)
- Undiagnosed patients used $200,000 more in the two-year period prior to diagnosis than matched controls
- Prior to sleep apnea diagnosis, patients utilized 23–50% more medical resources
- Total economic cost of sleepiness = approximately $43–56 billion
- Undiagnosed moderate to severe sleep apnea in middle-aged adults may cause $3.4 billion in additional medical costs in the US

**TRAFFIC ACCIDENTS**
- People with moderate to severe sleep apnea have an up to 15-fold increase of being involved in a traffic accident
- People with sleep apnea are at twice the risk of having a traffic accident
- Treating all US drivers suffering from sleep apnea would save $11.1 billion in collision costs and save 980 lives annually

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