



## Topic Overview: The Burden and Impact of Arthritis and Obesity Among Women and Racial/Ethnic Minorities

***“Being only 10 pounds overweight increases the force on the knee by 30-60 pounds with each step.” – Johns Hopkins Arthritis Center***

Arthritis is the single greatest cause of chronic pain and disability among Americans.<sup>1</sup> In 2003, it cost the nation more than \$128 billion a year in medical care and lost earnings.<sup>2</sup> Eighty percent of Americans either have or know someone with arthritis<sup>3</sup> and the numbers continue to escalate.

One in five Americans suffer from doctor-diagnosed arthritis.<sup>4</sup> But among three segments of the population the impact is worse. According to the Centers for Disease Control (CDC), National Institute of Health (NIH) and Arthritis Foundation (AF) reports, women, African-Americans and Hispanics have more severe joint pain, arthritis and functional limitations.

While there are more than 100 types of arthritis, fifty-four (54) percent of arthritis sufferers have osteoarthritis (OA)<sup>5</sup>. Commonly known as “wear and tear arthritis”, OA is a chronic degenerative joint disease characterized by the breakdown of cartilage that cushions the ends of the bones.<sup>6</sup> Bone rubs on bone causing chronic pain and joint stiffness. As the disease progresses, people with OA can experience pain during joint use and at rest. A common reaction to the pain is reduced or no physical activity. Almost 44% of adults with doctor-diagnosed arthritis report no leisure time physical activity.<sup>7</sup> A dangerous consequence of inactivity due to osteoarthritis is weight gain. Every pound gained represents four (4) pounds of pressure on knees and six (6) times the pressure on hips, creating a vicious cycle of pain, inactivity and weight gain for arthritis sufferers.

Among some women, African-Americans and Hispanics, this triple threat of chronic pain, inactivity and weight gain can escalate into obesity, worsening the burden of their osteoarthritis. But for many others within these same communities, obesity initiates the cycle.

Overweight and obesity directly affects weight-bearing joints, especially the knees. The repetitive stress of a weight load that may begin in childhood, or young adulthood initiates an accelerated pace of cartilage erosion. According to the Johns Hopkins Arthritis Center, being only 10 pounds overweight increases the force on the knee by 30-60 pounds with each step. Studies have shown that knee osteoarthritis is 4 to 5 times more common in overweight people compared with people who are of normal body weight<sup>8</sup>, and

overweight individuals in their thirties who did not have knee OA were at greater risk of later developing the disease.<sup>9</sup>



**Source: Lower Extremity Review**

According to the U.S. Surgeon General, calculating Body Mass Index (BMI) is one of the best methods for population assessment of overweight and obesity. Adults who have a BMI of 25.0 to 29.9 are considered overweight, those with a BMI greater than 30 are considered obese, and those with a BMI greater than 40 are considered extremely obese.<sup>10</sup> Women, African-Americans and Hispanics have the highest BMI levels in the nation.

Is obesity triggering osteoarthritis, or is osteoarthritis triggering obesity? While there may be evidence to support either contention, the consequence of inaction has far-reaching repercussions.

If untreated, what begins as painful movement can advance to a sedentary lifestyle and descend into disability. This may occur in parallel with a tragic downward spiral from normal weight to overweight to morbid obesity. The nexus of osteoarthritis and obesity represents a national public health challenge that has implications for chronic disease management, healthcare costs, and workforce productivity.

The call to action is clear. We must change health-seeking behavior among communities disproportionately affected by obesity and osteoarthritis, catalyze a downward trajectory in the burden and impact of both health conditions, and improve the health of the nation.

There is no cure for osteoarthritis (OA).<sup>11</sup> The joints most commonly affected are the knees, hips, and those in the hands and spine. The specific causes of osteoarthritis are unknown, but are believed to be a result of both mechanical and molecular events in the affected joint.<sup>12</sup> Disease onset is gradual and usually begins after the age of 40. Total annual disease costs are \$5,700 per year, with average direct costs of OA at \$2,600 per year for out-of-pocket expenses.<sup>13</sup> Workers with OA pain reported losing 50% more productive time while at work and through absenteeism compared with workers without OA. Job-related OA costs range from \$3.4 to \$13.2 billion per year.<sup>14</sup>

Nearly 69 percent of U.S. adults and 32 percent of children are either overweight or obese, creating an annual medical cost burden that may reach \$147 billion<sup>15</sup>. Each year, obesity contributes to an estimated 112,000 preventable deaths in the United States.<sup>16</sup> Obese adults are at increased risk for many serious

health conditions, including high blood pressure, high cholesterol, type 2 diabetes and its complications, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, and respiratory problems, as well as endometrial, breast, prostate, and colon cancers.<sup>17</sup> In January 2011, USA Today reported that the cost of obesity was approaching \$300 billion a year, and a recent George Washington University study revealed that obesity carries a high cost for women, estimating the annual cost of being obese at \$4,879 for a woman and \$2,646 for a man.

Funded by the National Institutes of Health (NIH), the Osteoarthritis Policy Model, a computer simulation model of knee osteoarthritis and obesity, was used to estimate quality-adjusted life-year losses due to knee osteoarthritis and obesity in comparison with the reference group. Model findings suggested that reversing obesity prevalence to levels seen 10 years ago would avert 178,071 cases of coronary heart disease and 889,872 cases of diabetes.<sup>18</sup> Such a reduction in obesity would increase the quantity of life by 6,318,030 years and improve life expectancy by 7,812,120 quality-adjusted years in U.S. adults aged 50 to 84 years.

“When combined, obesity and osteoarthritis result in 86 million quality-adjusted life-years lost among U.S. adults aged 50 to 84 years,” according to researcher Elena Losina, PhD, of Brigham and Women’s Hospital in Boston, and colleagues in the *Annals of Internal Medicine* in February 15 2011.

Studies reveal that gender and race are causal factors in the disproportionate burden of arthritis and obesity among many Americans.

### **Osteoarthritis and Obesity Among Women**

- Sixty-one (61) percent of arthritis sufferers are women.<sup>19</sup>
- Women represent sixty-four (64) percent of an estimated 43 million visits to physicians’ offices and outpatient clinics in a single year, where arthritis was the primary diagnosis.<sup>20</sup>
- Women represent sixty (60) percent of approximately one million hospitalizations that occurred in 2003 for which arthritis was the primary diagnosis.<sup>21</sup>

As outlined in the *Sex and Gender Differences In Knee Osteoarthritis* presentation by Mary O’Connor, MD, Orthopaedic Department Chair at the Mayo Clinic Florida, women develop more knee OA as they age and at a greater rate than men. Women are more symptomatic than men for the same degree of knee OA. Women required greater effort to do each function and were significantly slower although the level of pain was similar. The greater degree of difference in normalized strength, stair-climb test times and six (6) minute walk test among arthroplasty candidates suggest that women are more adversely affected by osteoarthritis than men are, and that women undergo arthroplasty at a more advanced disease state than men do.

In assessing the association between obesity and current osteoarthritis among women, a history of obesity throughout adult life conferred an increased risk of knee osteoarthritis.

Obesity and arthritis worsen women's lives two-and-a-half times more than men, especially during their declining years, according to a study by Duke University Medical Centre (DUMC) released in April 2009. The study<sup>22</sup> included 5,888 people over the age of 65, women suffered up to two-and-a-half times more disabilities than men of the same age. Higher rates of obesity and arthritis among these women explained up to 48 percent of the gender gap in disability, above all other common chronic health conditions. "While women tend to live longer than men, this study shows that they are at greater risk of living with disability and much of the excess disability is attributable to higher rates of obesity and arthritis," said Heather Whitson, assistant professor of medicine and lead study investigator. "This is important because it suggests that women's tendency to pack on extra pounds in their child-bearing and peri-menopausal years translates into loss of independence in their old age." Researchers said the study is the first to isolate the impact of specific chronic health conditions on the difference in disability rates between older men and women said a DUMC release. "The reason for this discrepancy in disability has not been well understood but we found that chronic health conditions that women experience in greater numbers than men may explain part of that gap," said Harvey Jay Cohen, study co-author.

Data from the first National Health and Nutrition Examination Survey (HANES I) indicates that obese and overweight women are at four (4) times a higher risk of developing knee osteoarthritis.<sup>23</sup> Another way that obesity impacts osteoarthritis among women is that their hips are wider than their knees, thereby, the knee joints are not aligned exactly straight, according to Dr. Yusuf Yazici, a rheumatologist at New York University Hospital for Joint Diseases in New York.<sup>24</sup> Higher knee injuries are commonplace among women due to this biological characteristic. In turn, osteoarthritis results later in life from these knee injuries and obesity only help to aggravate the condition. However, in the Framingham Osteoarthritis Study<sup>25</sup> it was determined that obese individuals in their thirties who had not endured knee injuries still maintained a greater risk of developing osteoarthritis.

The Framingham study<sup>26</sup> also indicated that weight loss helps to reduce the risk of developing osteoarthritis of the knee and possibly other joints. An average height woman decreases her risk of knee osteoarthritis by 50 percent for every 11 pounds in weight she loses. Furthermore, if obese women with a BMI greater than 30 decreased in weight to be classified as overweight and women in the overweight category reduced enough weight to be advanced to the normal weight category, it would result in a 33 percent decrease in knee osteoarthritis among women.

Escalating obesity rates among young girls reflect an alarming trend with foreboding consequences. Recall the John Hopkins arthritis reference that "being only 10 pounds overweight increases the force on the knee by 30-60 pounds with each step." Imagine the onset of osteoarthritic symptoms commonly expected among

40+ age women manifesting in the 20s or 30s for today's younger generation, during prime college education and workforce productivity years.

### **Osteoarthritis and Obesity Among African-American and Hispanics**

While no particular race is biologically predisposed to suffer from arthritis, African-Americans and Hispanics have more severe joint pain, arthritis and functional limitations.

- African-Americans have a higher prevalence of knee symptoms, radiographic knee osteoarthritis and symptomatic knee osteoarthritis than Whites.<sup>27</sup>
- Hispanics are 50% more likely than non-Hispanic Whites to report needing assistance with at least one instrumental activity of daily living and report difficulty walking.<sup>28</sup>
- African-Americans and Hispanics were 1.3 times more likely to have activity limitation; 1.6 times more likely to have work limitations, and 1.9 times more likely to have severe joint pain than Whites.<sup>29</sup>

African-Americans have a higher rate of multiple, large-joint osteoarthritis and knee osteoarthritis than Caucasians.<sup>30</sup> This was revealed by a recent study of participants in the Johnston County Osteoarthritis Project by the University of North Carolina at Chapel Hill Rheumatology/Thurston Arthritis Research Center. After adjusting for age, gender and body-mass index, the investigators noted that blacks were twice as likely as whites to have knee osteoarthritis and 77 percent more likely to have knee and spine osteoarthritis together.

African-American and Hispanic women are particularly burdened by osteoarthritis because of the “perfect storm” convergence of risk factors: gender, race and having the highest levels of obesity in the nation. African American women have the highest rates of being overweight or obese compared to other groups in the U.S. About four out of five African American women are overweight or obese.<sup>31</sup> Hispanic Americans were 1.2 times more likely to be obese than Non-Hispanic Whites, with highest levels among Mexican American women.<sup>32</sup> Seventy-three (73) percent of Mexican-Americans are overweight or obese, as compared to only 61.6 percent of the general female population.<sup>33</sup>

The percentage of women aged 50 to 84 years, who have symptomatic knee osteoarthritis, obesity, or both ranges from 30% for Whites, 50% for Hispanics and 55% for African-Americans. African-American women experience 47% excess loss in quality-adjusted life years due to obesity and/or knee osteoarthritis relative to their population size.<sup>34</sup>

Osteoarthritis among Hispanics is an understudied area. However, NIH's Women Health Initiative reported in the Journal of the American Geriatric Society September 2008 issue on a study analyzing risk factors for self-reported osteoarthritis (OA) in an ethnically diverse cohort of post-menopausal women. Among other

issues, the study revealed that higher obesity rates among Hispanic women, and the greater prevalence of other major OA risk factors among Hispanic women than in non-Hispanic white women. The Osteoarthritis Policy Model also demonstrated disproportionate losses in morbidity and mortality for Hispanic women due to osteoarthritis and obesity. Hispanic women experience 37% excess loss in quality-adjusted life years due to obesity and/or knee osteoarthritis relative to their population size.

### **A Deadly Triple Threat: Osteoarthritis, Obesity and Physical Inactivity Among Women, African-Americans and Hispanics**

A key modifiable risk factor for obesity and osteoarthritis is physical activity. However, women, African-American and Hispanics have the highest levels on inactivity. Increased physical activity and decreased sedentary behavior are not only associated with lower rates of obesity, but also reduce the risk for many diseases associated with obesity, such as diabetes, heart disease, hypertension, stroke among others.

Women were almost two (2) times more likely than men to never engage in physical activity.<sup>35</sup> Almost 51% of African-Americans and of Hispanics are physically inactive. Is this due to arthritic symptoms? Centers for Disease Control (CDC) reports demonstrate that arthritis sufferers are significantly less likely to be physically active.<sup>36</sup>

According to Arthritis Foundation Vice President of Public Health, Dr. Patience White, says, "People with arthritis have specific barriers to being physically active, such as fear of increasing pain or making their symptoms worse." Contrary to the physical benefits of activity and exercise for the relief of pain and stiffness caused by arthritis, physical inactivity is a precursor to the advancement and exacerbation of arthritis amongst adults in the United States. The compounded impact of osteoarthritis, obesity and physical inactivity among women, African-Americans and Hispanics warrants heightened national dialogue and action. Especially because there is a widespread perception that people with arthritis need to rest their joints, a myth that the Centers for Disease Control and Prevention, The Arthritis Foundation and American College of Rheumatology work hard to dispel through various education campaigns.

### **The Consequence of Individual Choice on Health Status**

At the heart of this health crisis is the consequence of individual choice on health status. Osteoarthritis and obesity are progressive chronic conditions that worsen or improve over time depending on when and how an individual decides to act. There is empirical proof that specific choices have a long-term positive effect on obesity and osteoarthritis, and other choices have limited, superficial or temporary effect. In the worst case scenario, delayed action or choosing not to act can have life-threatening consequences. It may cause the diseases to worsen, and create or exacerbate other health conditions. In some cases, poor health may lead to death.

As osteoarthritis and obesity worsen, an individual may become disabled or experience a level of chronic pain where joint replacement surgery is the only remedy. For obese patients, their poor health status can cause medical complications during their surgery e.g. prolonged wound drainage, infection, bleeding, and blood clots may occur<sup>37</sup>. The surgery may take longer and be more difficult.<sup>38</sup> And even after a successful surgery, studies have shown that, as a result of the delay, some individuals “never catch up” ( a termed coined by orthopaedic surgeon, Dr. Carlos J. Lavernia<sup>39</sup>) and don’t experience the full post-operative mobility improvement experienced by more proactive patients. There are many who experience the disabling effects of advanced osteoarthritis but chose to delay surgical intervention. Recently, a review of Medicare records identified osteoarthritis patients, separating them into two groups – those who underwent total knee replacement (TKR) and those who did not. There were significant positives in the TKR group: the risk of mortality was half that of the non-TKR group and the congestive heart failure rate was also lower at three, five and seven years after surgery.<sup>40</sup> This study clearly demonstrates the negative consequence of delay and inaction in seeking end-stage arthritis intervention.

Change begins with the individual choices made along a challenge/reward/benefit continuum Therefore it is critical that we isolate the factors that influence behavior change, understand barriers to changing behavior and recognize the subjective definitions of “reward” for changing behavior.

There is a life-saving connection between choice and healthy lifestyle behaviors. How can we “crack the code” among communities disproportionately affected by obesity and osteoarthritis and catalyze a downward trajectory in the burden and impact of both health conditions? Motivating sustained behavioral change that restores and preserves optimal health can have a transformative effect on current quality of life and life expectancy indicators in this nation.

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