

The Metabolic Syndrome in Older Adults

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Metabolic syndrome (MetS) is becoming an increasingly significant global public health problem. In the United States, metabolic syndrome is seen in about 45% of adult Americans over the age of 50, and increases in prevalence as people age (Alexander, 2003). MetS is described as an epidemic in older persons who are 70 years and older. Interestingly, Monami et al, (2009) found that the old old (75-84) and oldest old (85+) groups showed a decreased mortality from MetS, because many of these groups had already died from the cardiovascular disease. MetS does not discriminate between ethnic groups and races. The morbidity and mortality from MetS has huge adverse economic consequences from this preventable illness.

Defining Metabolic Syndrome

While separate groups of health professional specialists disagree as to just what MetS is, the vast amount of literature on the subject does show a consensus that a cluster of potential and present risk factors cause clinically significant metabolic disequilibrium, which, in turn, cause severe multifaceted morbidity and increased mortality (Newsline, 2005). Whether the American Diabetes Association (ADA) calls the syndrome “insulin resistance” or the American Heart Association (AHA) calls it “cardio-metabolic risk,” the end result is a derangement of metabolic processes leading to excess morbidity and mortality.

In order to be diagnosed with MetS, the person must have at least three of the major risk factors (described in the next section). No matter what the ADA or the AHA perceive as the criteria for MetS, both groups do agree that obesity leading to insulin resistance are the major risk factors for this affliction (American Diabetes Association Position Statement, 2002; National Cholesterol Education Program [NCEP], Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults {Adult Treatment Panel III} [ATP III], 2001 with 2004 update).

In their study to assess the prospective association between metabolic syndrome and cardiovascular disease in older people, McNeill et al (2006) found that it was essential to recognize and to treat the presence of MetS in younger and middle-aged persons to help ward off the devastating consequences of this syndrome when people reach old age.

While not really a “geriatric” syndrome, because MetS is not specifically a result of growing old, older persons do develop MetS, because of their errors of living that have foiled their normal physiological functioning. When one physiological function is impaired, a cascade effect occurs causing multiple organ breakdowns. These concomitant breakdowns lead to a “syndrome” of pathophysiology. In older adults, syndromes can easily occur because older people have less physiologic resources to fend off the cascading insults.

Criteria for Diagnosing Metabolic Syndrome

In order to be diagnosed with MetS, the person must show evidence of three of the defined criteria for MetS (NCEP, 2004).

Abdominal Obesity. The person must have a waist size greater than 40 inches (100 cm) in men and 35 inches (87.5 cm) in women. These measurements may be adjusted for racial/ethnic groups. The person must also have a body mass index (BMI) of more than 30 kg/m². Because intra-abdominal (visceral) fat is “more metabolically active than subcutaneous fat” (Gavin, 2006; Gavi et al, 2007), abdominal obesity starts the co-morbidities of MetS, especially insulin

resistance and hypertension.

Even though MetS is not gender-specific, Gavi et al (2007) reported that women store more peripheral (limb) fat and men store more visceral (trunk) fat. Distribution of fat - i.e., ratio of limb fat to trunk fat - and not gender, is more of a determinant of insulin resistance than just trunk fat alone. In the 74-84 age group, women have been found to have a higher prevalence of obesity than men (Li, Fisher, & Harmer, 2005). In their study of MetS in older women, Zamboni et al (2004), found that leptin (an adipose peptide) was linked to adiposity, insulin levels, insulin resistance, and dyslipidemia in this group.

Reynolds, Saito, & Crimmins (2005) in their study of the impact of obesity and active life expectancy found that obesity itself had little effect on the life expectancy of older persons, but did produce years of disability and reduced quality of life in this group. In their study of obesity and mortality in nursing home residents, Grabowski, Campbell, & Ellis (2005) found that very obese residents had a higher mortality early (within a few months) in their stay, but those residents with an elevated BMI and who had longer stays, seemed to cope with their obesity. Thus, obesity, in itself, was not a predictor of morbidity.

Dyslipidemia. The National Cholesterol Education Program [NCEP] (2001) identified the lipid risk factors for MetS as having an HDL (high density lipids) of less than 40 mg/dL in men and less than 50 mg/dL in women and a triglyceride level of more than 150 mg/dL. If the person is already obese, adding dyslipidemia to the list of criteria for MetS also greatly increases the risk for cardiac events (Hadley, 2005; Beattie, 2009).

Elevated fasting glucose. There are two categories of elevated fasting glucose (100 mg/dL or higher) that point to MetS:

- Impaired fasting glucose (IFG) – i.e., a fasting plasma glucose level of 100 -125 mg/dL.
- Impaired glucose tolerance (IGT) – two hours after a sugar load, the plasma glucose level is between 140 to 199 mg/dL (Appel, 2005).

If screening reveals one or both of these categories, the older person is considered to have “prediabetes” (ADA, 2002). Prediabetes, while not a discrete disease entity, does warn clinicians and the older client that immediate steps must be taken to return the IFG and/or IGT to acceptable values (Aliabadi, 2005).

One cause of impaired glucose function is “insulin resistance.” Interestingly, insulin resistance does occur as one grows older. This means that more insulin is required to maintain hepatic glucose production in control. This cannot happen if LDL (low density lipids) and triglyceride levels are high and the person is obese. Some older persons are unable to secrete enough insulin to cover free fatty acid production, as well as the increase in hepatic glucose production,

along with a decrease in skeletal muscle uptake of glucose. Diabetes mellitus Type 2 is the result, increasing the risk for MetS (Garnett, 2005). Further, Gavi et al, (2007) found the lipid-derived hormone, adiponectin, which is reduced in older obese persons, is closely associated with insulin resistance, but only in relation to the limb/trunk fat ratio.

Hypertension. Because hypertension is a consequence of obesity and dyslipidemia, the risk for MetS and subsequent disastrous cardiac events is high. Both the American Diabetes Association (2002) and the Joint National Committee on Prevention, Detection, and Evaluation and Treatment of High Blood Pressure, Report 7 [JNC7], (2003) have agreed that blood pressure in hypertensive patients with Type 2 Diabetes should be lower than 130/80. In fact, the JNC7 (2003) states that persons with systolic blood pressures between 120-139 mmHg and diastolic blood pressures between 80-89 mmHg are now considered to have pre-hypertension. Unfortunately, some older persons may not be able to tolerate the blood pressure goals of the JNC7 because of age-related stiffness of their arteries.

There is considerable leeway for nurses to make errors when collecting blood pressure data on older persons that could lead to failure to recognize warning signs of adverse events and to medical misdiagnosis. Older persons may show an average 20 mm/Hg elevation of blood pressure which increases the risk for atherosclerotic disease (JNC7, 2003). Therefore, careful monitoring of the older person's blood pressure taken in the lying, sitting, and standing positions (if possible) on a consistently agreed upon schedule (e.g., weekly) needs to be done. The blood pressure of older persons drops during sleep and while resting, and may take as long as three hours to rise sufficiently to accommodate daily activities. If the blood pressure cannot drop at night, the risk for a cardiovascular event is increased (Flack, Alexander, Sahabzamani, Spates, & Wynne, 2004).

Blood pressure cuffs must be large enough to accommodate an obese arm. The cuff must be completely deflated between measurements. When taking the blood pressure in the standing position, older persons must rise to a standing position slowly. The nurse must wait three minutes before taking the standing blood pressure. The reason for this is that it takes longer for the blood pressure to rise to its systolic level in older persons than it does in younger persons. If the nurse fails to take the blood pressure correctly, erroneous data could be obtained (JNC7, 2003).

Not only must nurses interpret the meaning of the systolic and diastolic blood pressures, they must interpret the pulse pressure (difference between systolic and diastolic pressures). Pulse pressure is a better predictor of increasing risk for a cardiovascular morbidity than interpreting the blood pressure alone (Vidt, 2006). Abnormal pulse pressure warns of structural alterations within the arteries (Rigaud &

Forette, 2001).

Smoking. Smoking is already a well-known risk factor for cardiovascular disease. Smokers, especially older smokers, add this increasing burden to their already compromised physiology.

Proinflammatory states. Elevated C reactive protein and homocystine levels are among the risk factors for MetS.

Other risk factors. Clinicians must also assess for a strong familial predisposition for MetS criteria. Age of the client must be considered, because expected age-related changes may influence preventive and treatment measures. Gender, as has been shown above, should also be considered a risk factor. For example, polycystic ovary syndrome, because of its propensity to derange hormones and promote obesity, is considered a risk factor for MetS. Lower testosterone levels in men and higher levels in women pose increased risks for MetS (Meneilly & Tessier, 2004).

Preventing MetS in Older Adults

Nurses have the opportunity to play a significant role in the prevention of MetS, especially in older persons. Not only must nurses use their professional intuition to suspect that MetS could be a consequence of the risks factors their patients/clients are exhibiting, but they must be assertive in helping citizens, including older adults, in their communities to practice healthier lifestyles.

Nurses in all settings, including nursing homes, clinics and primary care sites, must recognize somatic and psychosocial risk factors for MetS and must insist that thorough assessments be done to determine damage from those risk factors – retinopathies, neuropathies, cardiovascular disease, diabetes mellitus, etc. (Vogelzangs et al, 2007). Nurses must develop care plans that delineate measures to prevent MetS. One major online resource is the clinical guidelines for assessment for MetS risk factors from NCEP.

As nurses do their assessments and interpret lab test reports, they must take into account the age, gender, personal goals, finances, psychosocial stresses, family interactions, and personal willingness to change habits. Older persons may have barriers that must be overcome – sensory impairments, functional disabilities, cognitive impairments, lack of transportation, inability to afford a healthy lifestyle, as well as low literacy or lack of English skills.

Nurses need to be good listeners in order to understand the feelings of older persons about participating in such a preventive program. The study by Huang, Gorawara-Bhat, & Chin (2005) showed that older patients tended to describe their health care goals in daily functional and self-care terms (e.g., able to cook meals) rather than in biomedical terms (e.g., visual or motor deficits).

The current prescription for prevention of MetS contains only four words: “Eat right; exercise more.”

While this saying seems simple, it is extremely difficult to achieve.

Using a team approach, nurses have a duty to teach older persons how to change unhealthy habits into healthy ones. Since the older person is central to positive outcomes, the care plan or clinical pathway must be one of the older person is willing to pursue. Changes in diet and activity must be introduced at a rate at which the individual older person will be able to demonstrate success, especially with weight loss and exercise. The older person must “grow into” the program. To reinforce success and to motivate continued participation in the program, small rewards can be given, such as a gift card for a healthy meal or for a movie or book.

Those persons with evidence of risk factors for MetS need to be encouraged to carry out an exercise program that promotes physical functioning. If they do not, it is likely that within four years these people will show evidence of loss of mobility and functional decline from heart attack, stroke, and neuropathy (Blazer, Hykels, & Fillenbaum, 2006).

Older persons must be assessed for their nutritional habits and beliefs, as well as for the age-related changes in food perception and food intake (Baker, 2007). The dietitian is a crucial member of the prevention team, both in the assessment and in the agreed upon prevention activities. Lessening of dietary restrictions for older persons may be needed, not only because a liberalized diet is more acceptable to older persons, but because such a diet may keep the older person motivated to reach goals. Diets that promote weight loss, lipid lowering, and glucose control must be carefully monitored for acceptance and tolerance (Baker, 2007). Care must be taken to avoid allowing older persons to lose weight too rapidly, because the compromised organ systems may not be able to handle rapid energy and metabolic losses.

Nurses must ensure that those older persons who need closer surveillance and motivation to change their lifestyles receive these professional services. Nurses should not “tell” an older person what to do and then abandon them to their own devices. Daily telephone calls, as well as frequent home or clinic/office visits may need to be conducted.

To help nurses carry out their teaching counseling plans, there are many available resources that are no cost or low cost. For example, the NCEP (2001) report contains diet plans, weight loss programs, appropriate exercise programs, as well as other resource information. For older persons on Medicare, CMC has a preventive care program which can be accessed at www.cms.hhs.gov/mlngeninfo/. This program includes an initial preventive physical exam (for those entering the Medicare program), adult immunizations, cardiovascular and diabetic screening, and smoking and tobacco use cessation counseling, as well as other screenings. Nurses have a duty to make their older clients aware of these Medicare covered services.

Nurses must also know available community resources to help prevent MetS. For example, there are health fairs, where screenings can be done for diabetes, metabolic, and cardiovascular risks. Often present at these health fairs are agencies that can help “at risk” persons to develop habits to reduce these risks or to help in the treatment of those with MetS.

Prevention of MetS has a positive cascading effect. If prudent diet and exercise reduce weight, this, in turn, lowers the blood pressure, especially if the person stops smoking. Lower weight and lower blood pressure also reduce the fasting plasma glucose, so insulin resistance and actual Type 2 diabetes mellitus are avoided. This, then, extinguishes the cardiac, hepatic, and renal risk factors for MetS. Thus, the quality of life of older clients is improved.

Pharmacological Intervention

The focus of this paper is on recognition and prevention of MetS by nonpharmacologic measures. Sometimes, prevention of MetS requires aggressive interventions, including drug therapy. The NCEP, JNC7, and ADA guidelines all have excellent information on drug therapy during the preventive and treatment phases of this syndrome.

Nurses caring for older persons who may need drug therapy must be especially diligent in monitoring for any adverse side effects and interactions of these drugs. For example, anti-hypertensives may raise the blood sugar; statins may affect physical mobility. All of the drugs recommended for use to prevent or treat MetS may cause cognitive impairments. The advice and counsel of a clinical pharmacist can offer considerable help to the prevention team by suggesting best choices for drug therapy and for follow-up protocols.

Importance of Metabolic Syndrome to Nurses Caring for Older Adults

No matter where nurses go, they are likely to see evidence of risk factors for MetS – e.g., the epidemic of obesity, the eating of unhealthy foods, smoking, the lack of exercise, etc. There is an increasing amount of older persons coming to all care settings who show evidence of the risk factors for MetS.

As long-time advocates for health and wellness, nurses are faced with the difficult challenge in helping citizens to change their lifestyles to avoid the risks of MetS. This is especially true in care of older persons, whether in the community or in institutions. Therefore, nurses need to have a current knowledge base of all of the components of this dreaded syndrome.

Nurses need to do the evidence-based clinical research that will help to clarify this syndrome and to standardize the MetS nomenclature for nursing diagnosis. This research should also lead to policies and procedures, as well as clinical guidelines, for the nursing care necessary to help prevent MetS, as well as for the competent nursing care of those older persons already diagnosed with the syndrome.