Development of Osteoarthritis in Nigerian's Elderly Women: Risk Factors and Lifestyle Management Strategies

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Abstract

Osteoarthritis is a common chronic joint disorder that affects the quality of life of elderly populations worldwide. The management of the condition is an important area of research. This paper explores the development of osteoarthritis, risk factors and effective lifestyle management strategies among elderly women in Nigeria. In Nigeria, elderly women are particularly susceptible to osteoarthritis due to the combination of age, genetics, and lifestyle-related factors. Key risks factors identified in this paper include physical activity, sedentary behaviour and occupational activities, all of which contribute to the onset and progression of osteoarthritis. Aging is a primary risk factor due to the natural degeneration of joint cartilage and post-menopausal hormonal changes. Obesity contributes significantly to osteoarthritis, with excess body weight exerting additional pressure on weight-bearing joints. To manage osteoarthritis effectively, this paper advocates for a multi-faceted approach centred on lifestyle modifications. Weight management through balanced nutrition and regular physical activity, community based-exercise programmes tailored for the elderly, along with educational initiatives on healthy lifestyles, massage therapies, relaxation and coping skills can help women to adopt preventive measures and maintain joint function and overall health.

Keywords: Osteoarthritis, risk factors, development and management strategies.

Introduction

Arthritis affects millions of people worldwide. It is a sudden or gradual inflammation of one or more joints. Arthritis is a general term that refers to more than 100 different types of joint pain and joint diseases (Athanasiou et al., 2013). The prevalence of arthritis according to the Nigerian Orthopaedic Association (NOA) is 1.5million Nigerians. On the average, 30 in every 100 persons would have one form of arthritis or the other. The National Institute of Arthritis and Musculoskeletal and Skin Diseases, (2022) defined arthritis as a group of musculoskeletal disorders that affects the joints causing pain, stiffness, swelling and sometimes loss of function. The most common form of arthritis is osteoarthritis. It is often referred to as wear and tear arthritis as it usually develops due to the normal aging process. It is the major public health problem in Nigeria with the country having one of the highest rates of the disease in Africa (Adeniyi & Agboola, 2018). Osteoarthritis (OA) is defined by the American College of Rheumatology as a "heterogeneous group of conditions that lead to joint symptoms and signs which are associated with defective integrity of articular cartilage, in addition to related changes in the underlying bone at the joint margins."

Globally, osteoarthritis accounts for half of all chronic conditions in persons over 65 years of age and prevalence is expected to rise significantly in the coming decades due to increasing life expectancy. In Nigeria, osteoarthritis is the most common cause of disability and affects approximately 8 million people which portend a mounting public health burden (Akinpelu et al., 2009).Osteoarthritis is a degenerative joint disease, in which the tissues in the joint breakdown over time. It is caused by the breakdown of cartilage, the cushion material that covers the ends of bones in joints. It is a firm, slippery tissue that enables nearly frictionless joint motion.

Usually, the earliest changes that occur in osteoarthritis are at the level of the articular cartilage that develops surface fibrillation, irregularity, and focal erosions. These erosions eventually extend down to the bone and continually expand to involve more of the joint surface. On a microscopic level, after cartilage injury, the collagen matrix is damaged, causing chondrocytes to proliferate and form clusters. A phenotypic change to hypertrophic chondrocyte occurs, causing cartilage outgrowths that ossify and form osteophytes. As more of the collagen matrix is damaged, chondrocytes undergo apoptosis. Improperly mineralized collagen causes subchondral bone thickening in advanced disease, bone cysts infrequently occur. Even rarer, bony erosions appear in erosive osteoarthritis.

There is also some degree of synovial inflammation and hypertrophy, although this is not the inciting factor as is the case with inflammatory arthritis. Soft-tissue structures (ligaments, joint capsule, menisci) are also affected. In end-stage osteoarthritis, both calcium phosphate and calcium pyrophosphate dihydrate crystals are present. Their role is unclear, but they are thought to contribute to synovial inflammation (Stewart & Kawcak, 2018). This breakdown can be caused by a variety of factors including age, sex, injury, obesity, genetics and certain metabolic diseases. As the cartilage breaks down, it can cause inflammation, pains, stiffness and limited movement in the affected joints.

Osteoarthritis is usually classified as primary or idiopathic when there is no obvious predisposing cause and secondary when there is some clearly defined predisposing pathology. (Altman, 1995). Idiopathic osteoarthritis is the most common type of arthritis and it's a debilitating progressive disease that affects 60% of men and 70% of women over the age of 65 (Sarzi-Puttini et al., 2005). Secondary osteoarthritis occurs with a pre-existing joint abnormality. Predisposing conditions include trauma or injury, congenital joint disorders, inflammatory arthritis, avascular necrosis, infectious arthritis, Paget disease, osteopetrosis, osteochondritis dissecans, metabolic disorders (hemochromatosis, Wilson's disease),

hemoglobinopathy, Ehlers-Danlos syndrome, or Marfan syndrome (Krishnan & Grodzinsky, 2018).

Its signs and symptoms typically show up more often in individuals over age of 50 but osteoarthritis can affect more younger people too, especially those who had a prior joint injury such as a torn anterior cruciate ligament (ACL) or meniscus. While there is no cure for osteoarthritis, treatment such as physical therapy, medication and surgery can help to manage symptoms and improve the risk of osteoarthritis.

Symptoms of Osteoarthritis

Osteoarthritis symptoms often develop slowly and worsen over time. It begins with one or a few joint. Pain is the most common reported symptoms of osteoarthritis, with around 90% of patients reporting pain in the affected joint (Bijlsma et al., 2011). The pain of osteoarthritis is caused by a combination of factors, including inflammation, damage to the joint cartilage, and nerve irritation. The pain can be either acute (sudden and severe) or chronic (long-lasting and ongoing). Acute pain is often caused by joint inflammation or damage to the cartilage, while chronic pain is often caused by wear and tear on the joints over time. In some cases, the pain can be constant, while in others it may come and go. The pain can range from mild to severe and can vary in intensity. Stiffness is another common symptom of osteoarthritis. The stiffness is caused by the thickening and hardening of the joint cartilage, which reduces the range of motion in the joint. It is caused by a lack of lubrication in the joints, which makes it harder for them to move. The stiffness is usually worse in cold or damp weather, and it may improve with gentle movement and exercise or by staying warm. Some people may also experience stiffness after sitting or lying down for a long period of time (Michael et al., 2010).

In addition, people with osteoarthritis may also experience tenderness in the affected joints. The tenderness affects the tendons or ligaments around the joint. Tenderness can make it difficult to carry out everyday activities, such as dressing or getting in and out of a chair. It can also interfere with sleep. The study by Helmick et al., (2008) found that loss of flexibility in people with osteoarthritis was often a major concern for them. Many people responded that the loss of flexibility made it difficult to perform everyday activities, such as reaching overhead or bending down to tie shoes. In some cases, the loss of flexibility can be so severe that it interferes with basic movements and could have significant impact on a person's quality of life. As the cartilage in the joints breaks down, the range of motion in the joint decreases.

Helmick et al., (2008) further stated other symptoms associated with osteoarthritis which include; Grating sensation, bone spurs and swelling. Grating sensation also known as crepitus, is a sensation of grinding, grating, or popping in the joint. It is a common symptom of osteoarthritis, especially in the knees and hips. The grating sensation is caused by the rough surfaces of the damaged cartilage rubbing together. Bone spurs, also known as osteophytes. Bone spurs are bony growths that form on the edges of the joints. They are caused by the body's attempt to repair the damage to the cartilage. Over time, the bone spurs can become large enough to cause pain and interfere with movement. Bone spurs can also cause a grating sensation in the joint. They are often found in the knees, hips, and spine. In some cases, bone spurs can lead to other problems, such as pinched nerves.

Swelling, also known as "edema", is a common symptom of osteoarthritis. It occurs when fluid builds up in the joint, causing it to swell. The swelling can be painful and may make it difficult to move the joint. The swelling can also put pressure on the nerves, causing tingling or numbness in the affected area. In some cases, the swelling can be so severe that it causes the joint to become deformed. Swelling can be managed with a combination of rest, ice, compression, and elevation (RICE) therapy, as well as non-steroidal anti-inflammatory drugs (NSAIDs). Merola et al., (2017).

Osteoarthritis can affect any joint but typically affects hand, knees, hips, lower back and neck. Any joint can develop osteoarthritis, but symptoms linked to osteoarthritis most often affect the knees, hip, hands, spine, shoulder, elbow and jaw.

- Osteoarthritis of the knee is very common. This is probably because your knee has to take extreme stresses, twists and turns as well as bearing your body weight. Osteoarthritis often affects both knees.
- Osteoarthritis of the hip is also common and can affect either one or both hips. The hip joint is a ball-and-socket joint which normally has a wide range of movement. It also bears a lot of your weight. Hip osteoarthritis is equally common in men and women.
- Osteoarthritis of the hands usually occurs as part of the condition nodal osteoarthritis. This mainly affects women and often starts around the time of the menopause. It usually affects the base of your thumb and the joints at the ends of your fingers, although other finger joints can also be affected.
- The bones of the spine and the discs in between are often affected by changes that are very similar to osteoarthritis. In the spine, these changes are often referred to as

spondylosis. Although they are very common, they aren't the most common cause of back or neck pain.

- Osteoarthritis of the foot generally affects the joint at the base of your big toe. However, osteoarthritis of the mid-foot is also quite common. The ankle is the least commonly affected part of the foot.
- The shoulder consists of two joints, either of which can be affected by osteoarthritis: a ball-and-socket joint where the upper arm meets the shoulder blade – called the glenohumeral joint and a smaller joint where the collarbone meets the top of the shoulder blade – called the acromioclavicular joint.
- The elbow joint isn't commonly affected by osteoarthritis. When it is affected, it often follows either a single serious injury or a number of more minor injuries.
- The jaw, or temporomandibular joint, is one of the most frequently used joints in the body and the cartilage in this joint is particularly prone to wear. Osteoarthritis in the jaw often starts at an earlier age than in other joints.

Stages of Osteoarthritis

Osteoarthritis is classified into five stages, ranging from mild to severe. The Kellgren-Lawrence grading system (1957) is commonly used to classify OA into stages based on radiographic findings. Below are the five stages:

- Stage 1 is known as "early osteoarthritis," and it is the mildest form of the condition. Stage 1 is characterized by minor cartilage thinning and only mild symptoms, if any. The most common symptoms of stage 1 osteoarthritis include stiffness after rest, pain during activity, sometimes swelling (Kellgren & Lawrence, 1957).
- Stage 2 osteoarthritis is sometimes called "mild osteoarthritis," and it is characterized by moderate cartilage thinning and a mild to moderate loss of joint space. Stage 2 may also be associated with a mild loss of function, such as difficulty opening jars or getting up from a chair (Felson, et al., 1997).
- Stage 3 osteoarthritis is sometimes called "moderate to severe osteoarthritis". At this stage, the cartilage has deteriorated significantly and there is often a noticeable deformity of the joint. People with stage 3 osteoarthritis may also have trouble sleeping due to pain and may experience a loss of range of motion. They may also find it difficult to perform daily tasks like walking, climbing stairs, and dressing (Zhang et al., 2010).The cartilage is significantly thinned and symptoms such as pain and swelling begin to become more noticeable.

- Stage 4 is the most severe form of osteoarthritis and is sometimes called "severe osteoarthritis." People with stage 4 osteoarthritis often have severe pain, stiffness, and swelling. They may also have trouble sleeping and may experience a significant loss of range of motion (Hunter et al., 2009).
- Stage 5 is sometimes called "end-stage osteoarthritis. At this stage, the cartilage is almost completely worn away and the bones may rub directly against each other. This can cause significant pain, stiffness, and swelling. People with stage 5 osteoarthritis may also have bone spurs, a deformity of the joint, and a significant loss of range of motion (Brandt et al., (2008).

Osteoarthritis can be preventable; there are a number of things that people can do to help prevent the development of osteoarthritis. One of the most important is maintaining a healthy body weight. This can reduce the load on the joints and decrease the risk of osteoarthritis. In addition, certain exercises, like stretching and low-impact aerobics, can help to strengthen the muscles around the joints and reduce the risk of injury. Eating a healthy diet, getting enough sleep, and reducing stress can also help to prevent osteoarthritis. The goal of osteoarthritis prevention is to reduce the risk of developing the condition and improve the quality of life for those who already have it. Preventing osteoarthritis can help to reduce the need for joint replacement surgery and other costly treatments. also help to reduce the overall burden of the disease on the healthcare system. The Centres for Disease Control and Prevention (CDC) 2018.

Factors That Influence the Risk of Developing Osteoarthritis in Elderly Women

Women have a higher prevalence of osteoarthritis than men. Osteoarthritis not only occurs more frequently in women than in men but also with greater severity. Women often have more joints affected and report greater morning stiffness and joint swelling than in men (Hannan, 1996).

Certain factors have a crucial role in the development of osteoarthritis especially in elderly women. The role of daily activities in the development of osteoarthritis is complex and multifaceted. Some daily activities can contribute to the development of osteoarthritis, while others can help to prevent or reduce the risk of developing the condition. It is important to understand the different types of daily activities and how they impact joint health in order to take steps to protect the joints and reduce the risk of developing osteoarthritis. Some of the examples of the daily activities may include: Physical activity, sedentary behaviour, and occupational activities.

- **Physical activity** is any form of movement that increases energy expenditure, such as walking, running, biking, kneeling or squatting for long periods of time. Physical activity has been shown to have many benefits for joint health, including reducing inflammation and maintaining cartilage health. It can also help to maintain a healthy weight, which is important for reducing the risk of osteoarthritis. However, there is also evidence that certain types of physical activity, such as high-impact activities like running, pounding can increase the risk of developing osteoarthritis. This is because high-impact activities can put extra stress on the joints, which can lead to wear and tear over time. Repetitive physical activity, such as manual labour can lead to overuse injuries, which can eventually cause joint damage and osteoarthritis (Kuorinka et al., 1995).
- **Sedentary behaviours** in elderly women can include sitting while watching television, reading, using a computer, or talking on the phone. These activities are considered sedentary because they require little to no physical exertion. However, even though these activities are not physically strenuous, they can still be harmful to health. For example, people who spend more time sitting have a higher risk of developing knee osteoarthritis, even after adjusting for factors like age, gender, and body mass index, their muscles become weak and their joints become stiff. This makes the joints more vulnerable to injury and degeneration. It can cause inflammation and pain, which can further damage the joints (Guo et al., 2006). It's important to note that sedentary behaviour can have these effects even if a person is physically active on occasion. Research has shown that sedentary behaviour is associated with increased joint loading and reduced cartilage health (Felson et al., 2005). This is likely due to the increased pressure on the knee joint when sitting, which can lead to cartilage degeneration. Prolonged sitting is associated with decreased blood flow to the knee joint, which can lead to inflammation and pain. People who sit for more than eight hours per day have significantly thinner cartilage in their knees than those who sit for less than four hours per day (Guo et al., 2006). Sedentary behaviour is also associated with changes in the proteins that make up cartilage, as well as decreased levels of antioxidants that protect the joint from damage. All of these changes can contribute to the development of osteoarthritis. (Wolfe et al., 2009).

Occupational activities are the activities that people do as part of their jobs or daily tasks. In elderly women, occupational activities that may increase the risk of osteoarthritis include tasks that involve repetitive motions, prolonged standing, and lifting heavy objects. Jobs that involve a lot of lifting, such as nursing or housekeeping, can put a lot of strain on the joints, increasing the risk of developing osteoarthritis. For example, Nursing as a profession is a physically demanding job that involves a lot of lifting, bending, and twisting. These activities put a lot of strain on the joints, which can lead to the development of osteoarthritis. Elementary school teachers are at a higher risk because their jobs often involve kneeling, squatting, and lifting. In contrast, high school and college teachers spend more time sitting and standing, which puts less strain on the joints. Farming is a physically demanding job that can put a lot of stress on the joints, which makes it a risk factor for osteoarthritis. Farming tasks like lifting, squatting, and walking long distances can all cause wear and tear on the joints over time. Also, farmers may be exposed to chemicals and other environmental factors that can increase the risk of developing osteoarthritis. (Kuorinka et al., 1995).

Other risk factors may include: age, family history/ genetics and joint injuries.

Age: a person's chances of developing osteoarthritis increase as they age. As people age, the cartilage that cushions the joint naturally breaks down, leading to increased frictions and wear on the joints. Aging can lead to changes in joint mechanics, such as altered gait patterns and muscle weakness. Muscle strength typically decreases with age. This can cause pain, stiffness and limited mobility. Elderly women are particularly affected due to the decreased oestrogen level during menopause especially from age of 50 and above (Hunter et al., 2019).

Family history/genetics: research has shown that osteoarthritis can run in families, indicating a hereditary component. This family history may include shared lifestyle and environmental factors and hormonal factors that run in families (oestrogen levels in women). Specific genes may affect the development, maintenance, and repair of joint cartilage, increasing the likelihood of developing osteoarthritis. Certain inherited physical traits, such as joint shape, alignment and bone structure can predispose individuals to osteoarthritis. Abnormal joint mechanics due to inherited traits can increase joint wear and tear (Felson et al., 2008).

Joint injuries: are significant risk factors for the development of osteoarthritis in elderly women. Elderly women are more prone to osteoporosis, a condition that decreases bone density and increases the risk of fractures. Fragile bones make falls and joint injuries more likely. Traumatic injuries to joints, such as those sustained during sports activities, accidents, or

repetitive strain, can accelerate the degeneration of cartilage and lead to the early onset of osteoarthritis (Felson et al., 2005).

Management Strategies of Osteoarthritis among Elderly Women

The main goal of treatment for osteoarthritis is to reduce pain and improve function. Exercise and activity are important parts of this treatment, and they can help to reduce the symptoms of osteoarthritis and improve overall health. Physical activity is an important part of treatment for osteoarthritis, because it can help to improve joint mobility and reduce pain. There are many different types of activity that can be beneficial, including Exercise (range-of-motion, low impact exercises and stretching), Dieting, Massage therapy, weight management, relaxation and coping skills. Each of these types of activity can help to reduce stiffness and improve function in different ways (Zhu et al., 2017).

Exercise

Exercise is physical activity that involves heavier, repetitive actions, and is designed to improve or maintain physical fitness. Activities like lifting weights, walking on a treadmill, or taking a yoga class are different forms of planned motion that specifically work to improve strength, endurance or flexibility.

Participating in a properly designed exercise program is a great way to help alleviate the discomfort caused by osteoarthritis. Therapeutic exercise can reduce pain and fatigue, improve mobility and overall fitness. It can also help improve mood and state of mind by allowing you to actively participate in your own treatment.

- Range-of-motion exercises: are designed to improve flexibility and mobility in the joints. They involve slowly and gently moving the joints through their full range of motion. These exercises can be done sitting or standing, and they can be adapted to meet the needs of different individuals. They are especially beneficial for the knees and hips. For example, women with knee osteoarthritis might do range-of-motion exercises for the knees by moving the knee up and down, side to side, and in circles. Range-of-motion exercises can help to reduce stiffness and improve mobility in the affected joints. In addition to range-of-motion exercises, stretching is another important type of activity for people with osteoarthritis. Stretching helps to maintain flexibility in the muscles and tendons around the joints. This can help to reduce pain and improve function. A person with osteoarthritis might do hamstring stretches, quadriceps stretches, or calf stretches. They can also try yoga, which combines stretching with breath control and relaxation.

- Low-impact and joint-friendly exercises can be a great way to manage osteoarthritis in elderly women. These exercises can help to strengthen the muscles that support the joints, which can reduce pain and improve function. They can help to improve flexibility and range of motion in the joints. Low-impact exercises can include activities like swimming, walking, and cycling. They put less stress on the joints than high-impact exercises like running or jumping. Joint-friendly exercises can include range-of-motion exercises and gentle resistance exercises. These exercises can help to improve the health of the joints without causing damage.

Dieting

A healthy diet can play a big role in managing osteoarthritis. Some foods can help to reduce inflammation and improve joint health. For example, omega-3 fatty acids, found in fish like salmon and tuna, can help to reduce inflammation. Foods high in antioxidants, like berries and leafy greens, can also help to reduce inflammation. Vitamin C, found in citrus fruits and bell peppers, can help to build healthy cartilage. Protein is essential for maintaining muscle mass, which supports joint function, preserve muscle strength and joint stability. Other nutrients that can help to manage osteoarthritis include calcium, vitamin D, and magnesium. And of course, staying hydrated is important for maintaining joint health (Mayo clinic, 2021).

Massage therapy

Massage therapy can be a useful part of managing osteoarthritis. Massage can help to relieve pain and stiffness by increasing circulation, relaxing muscles, and stimulating the release of endorphins. It also helps to reduce stress and improve sleep quality, which can be important for managing chronic conditions like osteoarthritis. And of course, massage therapy can be relaxing and enjoyable, which can improve quality of life (Journal of alternative and complementary medicine, 2015). Heat compression, taking a hot shower and using warm packs are great ways to help reduce pain, relieving muscle spasms, tightness and stiffness. Also, application of cryotherapy that is using a commercial cold pack or a homemade one (from ice cubes, a damp face cloth or a bag of frozen vegetables) can be helpful to provide short-term relief from inflammation and constricting blood flow to an inflamed joint. Myofascial release technique can be done to help improve flexibility and reduce pain in the areas surrounding the arthritis joints. However, it's important to find a qualified massage therapist who is experienced in working with people with osteoarthritis. (Hsu et al., 2016).

Effective weight management

Just as there is no single definition of a healthy body, there is no single definition of a healthy weight – it's unique for each individual based on body composition, age, sex, lifestyle and other conditions. Carrying excess body weight increases the risk of developing osteoarthritis in your load-bearing joints (knees, hips, ankles, spine, feet), and increases the rate at which this condition progresses. Excess weight has also been linked to osteoarthritis of the hand, indicating that there is also a metabolic link to the disease even in non-weight-bearing joints, so achieving and maintaining a healthy weight is critical. (Walsh et al., 2012).

There are a number of ways to achieve weight loss including healthy eating, exercise, and cognitive behavioural strategies. Being overweight can put excess strain on your joints. To work normally, the body needs food to supply energy, vitamins and minerals. Healthy eating helps to manage weight and give the body energy to complete daily activities, as well as promote a strong immune system and bone and tissue health.

Relaxation and coping skill

Developing relaxation and coping skills can help elderly women maintain balance in life, give greater feeling of control over arthritis and a more positive outlook. Relaxing the muscles around a sore joint reduces pain. There are many ways to practice relaxation. They include: meditation or deep breathing exercises. Listening to music or relaxation tapes, as well as visualizing a pleasant and restful activity. (Hannon et al., 2015).

Conclusion

Osteoarthritis poses a significant health challenge for Nigeria's elderly women, driven by a combination of aging, obesity, physical inactivity, genetic predispositions, and occupational stresses. This paper has highlighted the multifaceted nature of these risk factors and the urgent need for effective management strategies to mitigate the impact of osteoarthritis on this vulnerable population. Comprehensive lifestyle modifications, including weight management, relaxation, dieting and regular physical activity, are crucial in reducing joint stress and mobility. While some physical activities may increase the risk of developing the condition, others may help to prevent or reduce its severity. As such, a holistic approach to managing the condition is necessary to alleviate the impact of osteoarthritis and improve the well-being of Nigeria's aging female population.

Suggestions

The following suggestions are recommended:

1. Educational campaigns should be lauched to raise awareness about the importance of maintaini9ng a healthy weight, staying physically active, and seeking early medical intervention for osteoarthritis. These campaigns should be culturally sensitive and accessible to elderly women in both urban and rural areas.
2. Sports and exercise experts should design and implement exercise programs specifically tailored for elderly women at risk of or suffering from osteoarthritis. And also undertake research to better understand the impact of different types of physical activities on the progression and management of osteoarthritis in elderly women.
3. The government should improve access to healthcare services by expanding the reach of healthcare facilities, especially in underserved rural areas. Invest in mobile clinics, telemedicine services, and community health programmes to ensure early diagnosis and effective management of osteoarthritis.
4. The healthcare services should offer lifestyle counselling, including nutrition counselling and weight management support. Also, establish referral systems for social support groups and other community-based programs. These measures can help to improve quality of life for elderly women with osteoarthritis.

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