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Risk Factors Of Cervical Spines Osteoarthritis In Adult Women: Case-Control Study

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ABSTRACT

Background: Osteoarthritis is the mainly disabling illness over the universe, and now it is definitely a well-recognized as a public health dilemma. cervical osteoarthritis is observed among common form of the illness in women. Adult and elderly women are found to be more involved by this disease. From the available evidences, it is now logical to regard as this disease as one of the most significant among the chronic non-communicable diseases and study for the risk factors that are connected with this disorder is very important. This study, showed this important subject in our country. This study aimed to study a significant part of risk factors in the development of symptomatic cervical spine osteoarthritis for adult women.

Results: Obesity as showed by body mass index ≥ 25 appeared in this work to be highly and significantly associated with the development of cervical osteoarthritis in adult women (OR= 7.48, P= 0.0001 and 95%C.I.= 3.66-15.29). Moreover, central obesity as calculated by the ratio of waist to hip ≥ 0.85 was also found to be linked with the occurrence of cervical osteoarthritis (OR=8.43, P= 0.0001, 95%C.I.= 3.66-10.77). Having an equal or more than 5 life births as a sign of high parity revealed positive association in the occurrence of cervical osteoarthritis (OR= 6.97, P= 0.0001, 95%C.I.= 3.55-13.70). In addition, positive family history for cervical osteoarthritis was also found to be positively and significantly (P= 0.001) associated to the occurrence of the disease. Lastly, unhealthy nutritional behavior as indicated by too much intake of salts, sugars and fats was one of the important risk factor in the occurrence of cervical osteoarthritis (OR= 3.21, P= 0.002, 95%C.I.= 1.64-5.94).

Conclusion: Overweight (general and central), elevated parity, positive family history and unhealthy nutritional behavior, all are found to be associated with the development of cervical OA in adult women.

Keywords: Risk factors, Cervical, Osteoarthritis, Women.

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INTRODUCTION

Osteoarthritis (OA) is commonest joint disease in the world and causes of pain, impaired function and disability in adults. It is a condition involves joints and their constituent elements; including muscle, bone and cartilage. Formerly considered as a degenerative disease that was an unavoidable outcome of aging and trauma, osteoarthritis is now viewed as a metabolically active, essentially reparative process that is more and more amenable to treatment and prevention [1].Despite the fact that the frequency of OA increases with age in both sexes, the cervical spine OA in women is predominantly vulnerable to this dangerous disease [2]. In women ages more than 50 years, the reported prevalence of radiographic OA in the cervical spines is around 7%; in women older than age 65, the occurrence increases considerably to around 20% [3, 4].From pathological point of view, OA is a state of synovial joints characterized by focal cartilage defeat and an accompanying reparative bone reaction. For many the plain radiograph remains the most excellent way of evaluation, with evidence of cartilage loss (joint space narrowing) and bone response (occurrence of osteophytes and sclerosis) being the main criteria. This definition, however, excludes joints with early minimum change, disregards tissues other than cartilage and bone, and skips consideration of biological consequences (symptoms and disability). Thus, better understanding of the causes of symptoms and disability is currently a key challenge [5].A structured approach to diagnosis is crucial to distinguish the OA from other forms of joint pain, which include, but are not limited to rheumatoid arthritis, psoriatic arthritis, and tendonitis. To increase the sensitivity and specificity of the OA diagnosis, the American College of Rheumatology recommends that data be gathered through clinical, laboratory, and radiographic examination [6]. Clinical data should be established from a inclusive history and musculoskeletal physical examination of the neck and cervical spines. Physical findings reliable with OA of the cervical spines include crepitus, bony overgrowth or deformity, muscle wasting, and reduced range of motion. Laboratory examination includes useful tests are serum measurement of rheumatoid factor and an erythrocyte sedimentation rate [6]. Radiographic examination of cervical spines OA by postero-anterior and lateral radiographs essential for accurate diagnosis, staging, and treatment of OA. The extent of compartmental involvement, joint space narrowing, osteophyte development, and any gross angular deformities. Risk factors of cervical spines OA: In addition to advanced age and female gender, several other risk factors for cervical spines OA have been identified through both longitudinal and cross-sectional epidemiologic studies. Obesity is one of the strongest risk factor for OA; it is also a preventable cause of disease progression. Major joint injury is thought to play a role in the long-term development of OA. The OA changes are also thought to be caused by abnormal joint kinematics associated with accelerated wear of the joint cartilage. Overuse from frequent bending or kneeling of head may cause excessive load and wear on the cervical spine joint. Two studies have demonstrated a possible protective effect of estrogen replacement therapy in the development and progression of cervical spine OA [5,7].All the above, signify that cervical spine OA for adult women can be regarded amongst the chronic non-communicable diseases and explorations through mode of life and habits (i.e. healthy and unhealthy life styles) can be very useful in recognizing more risk factors that are agreeable for prevention and control of this dangerous disorders. Furthermore, in our

oriental society, high birth rate should also be investigated among women as a possible risk factor.

SUBJECTS AND METHOD

In order to reach the aim of this research, a case-control study design was assumed and carried out in Bagdad city in consultation clinic at Al-Noman Teaching Hospital from June 2019 through May 2020, where 112 women with symptomatic cervical OA were signed up in this study as cases according to the subsequent inclusion criteria:

- The participant, must be an adult woman, her age more than 50 years.
- Indicative history and positive clinical examination for cervical OA.
- Positive finding for OA in the X-ray examination of the cervical spines.
- All the above criteria were completed according to the criteria of American College of Rheumatology [6]

Another 112 women were chosen as control for this study with the following inclusion criteria:

- The participant, must be woman, her age more than 50 years.
- Negative history to any previous episode for cervical spines pain, crepitus.
- Negative X-ray findings for cervical spines OA.
- All the above criteria were made according to the criteria of American College of Rheumatology [6].

Un-paired sampling method was used in this study, matching was done for age (± 5 years). Every woman in this study was interviewed by the researchers and the following inquiries to participants were answered in addition to the specific anthropometric measurements such as, body mass index (BMI) and waist to hip ratio (WHR). Family history of cervical OA, the presence of chronic non-communicable diseases, parity and abortion were all included in the questionnaire form.Ethical Approval and permissions were obtained by Ethical Committee in the Department of Family and Community Medicine at the College of Medicine, Al-Iraqia University and from hospital administration respectively. Other ethical considerations including respondents' consent with their right for refusal and confidentiality were ensured.Data were entered and analyzed using SPSS version 26. Chi-square test was used to test the associations among study's groups, Odds Ratio (OR) with 95% confidence interval (95% C.I.) were also estimated for every risk factors of the concern in this study. $P \leq 0.05$ was considered significant throughout study tests.

RESULTS

Table 1 reveals the allocation of cases and controls according to BMI, and it shows that obesity is found to be related with the development of cervical OA (OR= 7.48, *P*=0.0001 and 95%C.I.= 3.66-15.29). Moreover, WHR ≥ 0.85 is found to be an actual and important risk factor in the occurrence of cervical OA (OR=8.43, *P*= 0.0001, 95%C.I.= 3.66-19.77).

Table 1 Distribution of the studys' population according to their anthropometry

BMI Factor	Cases		Controls		OR	*P*-value	95% C.I.
	No.	%	No.	%			
BMI ≥ 25	102	91.81	67	60.00	7.48	0.0001	3.66-15.29
WHR≥ 0.85	104	93.63	79	70.91	8.43	0.0001	3.66-19.77

Table 2 shows that positive family history is found to be significantly (*P*= 0.001) associated with the development of cervical spines OA. Moreover, unhealthy dietary behavior is also found to be related to the occurrence of the disease in a considerable manner (OR= 3.21, *P*= 0.002, 95%C.I.= 1.64-5.94). Nevertheless, the occurrence of CNCD was found to be not associated to the development of cervical spines OA.

Table 2 Distribution of the study's population according to their other variables

Factors	Cases		Controls		OR	P-value	95% C.I.
	No.	%	No.	%			
Positive family history	68	61.81	35	31.81	3.47	0.001	2.01-6.00
Unhealthy diets	63	57.27	17	15.45	3.21	0.002	1.64-5.94
CNCD	85	77.27	82	74.54	1.16	0.636	0.63-2.14

Table 3 reveals High parity is also appears to be risky in the development of cervical spines OA in adult women (OR= 6.97, *P* = 0.00o1, 95%C.I.= 3.55-13.70). Unlike abortion, appears not to play a role in the development of cervical spines OA.

Table 3 Distribution of the studys' population according to their parity and abortion

Factors	Cases		Controls		OR	P-value	95% C.I.
	No.	%	No.	%			
Parity ≥ 5	100	90.11	63	57.66	6.97	0.0001	3.55-13.70
Abortion	16	14.45	13	11.81	1.27	0.550	0.58-2.78

DISCUSSION

Osteoarthritis is now definitely recognized as a public health problem. There have been advances in defining the disorder and assessing its component features clinically, radiographically, and by other investigative methods. There are variety of risk factors that have been found helpful in identifying those with the greatest risk of developing OA. Some of the strongest and best-established risk factors-including getting older in age, female gender, congenital joint malformation, prior injury, and a family history of OA are not themselves agreeable to modification. However, these characteristics may still be helpful for targeting those mainly in need of prevention and treatment.Most studies indicate that the prevalence and incidence of radiographic and symptomatic OA of cervical spines increase rapidly with age. This age-related increase is seen in all joints in which OA occurrence. The relationship between age and the risk of OA is possibly mediated by age-related increases in a variety of systemic and local biomechanical risk factors [8-10]. These include excess joint loading from obesity, impaired neuromuscular joint protective mechanisms (e.g. impaired muscle function and peripheral neurological responses) and increased joint instability (e.g. ligamentous laxity). Joint tissues also become more susceptible to the effects of biomechanical insults with age [11-13]. In this study, the age as a risk factor was beyond assessment, because matching of cases and control was based on the age (± 5 years) and all cases and controls were adult women. In addition to that, the gender factor was also beyond measure, because the study intended to examine risk factors that are related to female gender only (both cases and controls were women).Obesity is

- Repeated and excessive pregnancies, can abnormally lead to increase in the body weight for women and this obesity is regarded as an established risk factor for cervical spines OA [16, 17].
- Repeated pregnancies can lead and probably accelerate osteoporosis which is again an established risk factor for secondary OA [18].
- Probably, other hormonal changes during pregnancy and lactation may play a role in the occurrence of cervical spines OA [9,8,19].

A lot of studies recommended that numerous genes are likely to be involved in OA vulnerability, and that environmental factors also have a vital influence on disease appearance. The assessment of candidate genes for OA susceptibility has focused on genes encoding type II collagen (the main form of collagen in articular cartilage), for other structural proteins of the extra-cellular cartilage matrix, the vitamin D and estrogen receptor genes, and for bone and cartilage growth factors [14-16]. Genome-wide scans have also recognized a number of promising OA susceptibility loci that point to currently unspecified genes residing on chromosomal regions that do not anchorage the primary candidate genes assessed so far [18,19]. In this research, positive family history showed to be linked with the development of cervical spines OA. This goes in consistence with all the above studies.Unhealthy dietary behaviors like excessive high intake of salt, calorie and fat diets appeared in many studies [18-20] to be associated with many health problems. Alongside its contribution to obesity (unhealthy dietary behavior), lack of the antioxidants that is associated with Western type of diets (a lot of salt, carbohydrates and fat intake) is found to be as an important contributor to the development of OA in different types of joint in the body [20]. This goes in consistence with the results of this study, where unhealthy dietary behavior is found to be highly associated with occurrence of cervical spine OA in adult women.One of the constraints of this study, is that results acquired from it, cannot be generalized for all women among the important established risk factors for cervical spines OA, clearly goes before the development of cervical spines OA by many years, and accelerates structural worsening of existing cervical spines OA [14]. The primary mechanism for the association of excessive use and cervical spines OA is likely to involve the effect of excess weight on overloading of cervical spines joints during excessive activities, causing breakdown of cartilage and damage to ligaments and other support structures. Obesity also appeared to play a role in the development of cervical spine OA through mechanical injuries, elevated levels of blood glucose and C-reactive protein (CRP), all are associated with the risk of cervical spines OA and its progression in women [15]. In the current study, significant association was found between obesity and excessive use as a risk factor in the development of cervical spines OA in women >50 years. Moreover, central obesity as measured by WHR ≥ 0.85, is found in this study to be highly and significantly associated with the occurrence of cervical spines OA in adult women mostly may be due to metabolic effects of obesity.High parity, is alarming in this research, and expresses itself as an extra-important factor in the development of cervical spines OA in women more than 50 years. Where women with high parity (≥5) appeared to hold an elevated and important risk in the occurrence of such diseases. Furthermore, results of this work indicated a significant difference between cases and controls regarding average number of life births in the order that as much increase in life births happens, as greater the risk for development of cervical spines OA will be. This probably can be explained as the following:

with cervical spine OA. In reality, because one of the weakness of the case-control study is that it is not representative to the entire population of concern, but it is important to spotlight on the possible associations that may be proved later on by an additional stronger research.

CONCLUSION

The current study concluded that overweight (general and central), elevated parity, positive family history and unhealthy nutritional behavior, all are found to be associated with the development of cervical OA in adult women. Moreover, the researchers advised further more sophisticated studies (as cohort ones) to confirm this significant associations that are found in this research.

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CONFLICTING INTERESTS

Authors declare that no competing of interests is exist for this self-funding study

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