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Distribution of Risk Factors in Male and Female Primary Health Care Patients with Osteoarthritis in Albania

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ABSTRACT

Aim: We aimed to describe the distribution of the main risk factors among primary health care users diagnosed with osteoarthritis in Albania, a post-communist country in South Eastern Europe. **Methods:** Our study involved all individuals who were diagnosed with osteoarthritis over a two-year period (January 2013 – December 2014) in several primary health care centers in Tirana, the Albanian capital. On the whole, during this two-year period, 1179 adult individuals were diagnosed with osteoarthritis (521 men aged 60.1±10.6 years and 658 women aged 58.1±9.6 years). According to the criteria of the American College of Rheumatology, the diagnosis of osteoarthritis was based on the history of the disease, physical examination, laboratory findings and radiological findings. Binary logistic regression was used to assess the sex-differences regarding the major risk factors among individuals diagnosed with osteoarthritis. **Results:** In multivariable-adjusted logistic regression models, female gender was inversely associated with smoking (OR=0.39, 95%CI=0.27-0.56), alcohol intake (OR=0.08, 95%CI=0.06-0.10), overweight but not obesity (OR=0.65, 95%CI=0.46-0.91 and OR=0.74, 95%CI=0.46-1.18, respectively), weight lifting (OR=0.38, 95%CI=0.22-0.66) and heavy physical exercise (OR=0.69, 95%CI=0.46-1.03). Conversely, female gender was positively related to genetic factors (OR=2.17, 95%CI=1.55-3.04) and preexisting inflammatory diseases (OR=1.53, 95%CI=0.93-2.53). **Conclusion:** This study offers useful evidence about the distribution of the main risk factors for osteoarthritis in adult individuals diagnosed with osteoarthritis in Albania. This information may support health professionals and decision-makers in Albania for evidence-based health planning and policy formulation in order to control the toll of osteoarthritis in this transitional society.

Key words: **Albania, alcohol intake, genetic factors, obesity, osteoarthritis, physical exercise, primary health care, risk factors, smoking, trauma, weight lifting.**

1. INTRODUCTION

Osteoarthritis is the most common joint disorder in the United States and many other industrialized countries (1). In adult individuals aged 60 years and above, the prevalence of symptomatic knee osteoarthritis is estimated at about 10% in men and 13% in women (2). However, the prevalence of osteoarthritis varies according to the definition used, the specific joints under investigation, and the characteristics of the study population (2). The age-standardized prevalence of radiographic knee osteoarthritis in adults aged 45 years or above was 19.2% among the participants in the Framingham Study and 27.8% in the Johnston County Osteoarthritis Project (3). In addition, in the third National Health and Nutrition Examination Survey (NHANES III), about 37% of participants aged 60 years and above exhibited radiographic knee osteoarthritis (2, 3). Furthermore, the age- and sex-standardized incidence rates of symptomatic hip, knee, and hand osteoarthritis were estimated at 88, 240 and 100 (per 100,000 person-years), respectively, according to a study conducted in Massachusetts, USA (4).

The etiology of osteoarthritis is multi-factorial and is generally considered as a product of interaction between systemic and local factors (1, 2). From this point of view, certain individuals may have a genetic predisposition to develop osteoarthritis, but this condition (osteoarthritis) will be established only if an injury to the joint takes place. Essentially, the systemic risk factors for osteoarthritis include age (1,3,5), sex (6, 7), race and ethnicity (8, 9), genetics (10, 11), congenital and other developmental factors

(12, 13) and diet (14, 15). On the other hand, local factors consist of obesity (1, 2), injuries (2, 16), occupation (2, 17), physical exercise (2, 18), mechanical factors, alignment, or laxity (2, 19, 20).

Yet, the relative importance of each risk factor may vary for different joints affected, for different stages of osteoarthritis, for the development (establishment) versus the progression of disease, and for radiographic compared to symptomatic disease (2).

It should be noted that the number of individuals who develop osteoarthritis is expected to increase due to the aging of the population and the obesity epidemic (2). A similar aging and obesity situation is evident also in Albania, a post communist country in South Eastern Europe which is experiencing a significant socioeconomic transition in the past twenty five years. Due to the demographic transition in the past couple of decades, in Albania, the proportion of individuals aged 65 years and above has increased up to 11% (21). This proportion is going to increase further given the decline of fertility rates (21), a gradual increase in life expectancy (21, 22) and the ongoing emigration of young people (22). In addition, overweight and obesity pose a serious public health concern in view of the rapid changes in lifestyle/behavioral patterns, where processed foods are increasingly replacing traditional foods in Albania (22). According to the World Health Statistics 2014 report, the prevalence of obesity in Albania is 21.7% in males and 20.5% in females (23).

The burden of musculoskeletal disorders has also increased in Albania in the past two decades. Overall, the share of these disorders accounted for 8.5% of the total burden of disease in 1990, whereas in 2010 it increased up to 11.0% (22, 24). In relative terms, there was evidence of a stronger increase in females (with 3.7% increase in the proportional burden of disease) compared to males (only 2.0%) (22, 24). However, specific information on osteoarthritis including its prevalence and associated risk factors is scarce for Albania.

In this context, we aimed to describe the distribution of the main risk factors among primary health care users diagnosed with osteoarthritis in Albania, which was the most isolated communist country in Europe until 1990.

2. METHODS

Our study involved all individuals who were diagnosed with osteoarthritis over a two-year period (from January 2013 to December 2014) in several primary health care centers in Tirana, the Albanian capital. Selection of the primary health care centers included in this study was based on the probability proportional to size principle. On the whole, during this two-year period, 1179 adult individuals were diagnosed with osteoarthritis (521 men aged 60.1 ± 10.6 years and 658 women aged 58.1 ± 9.6 years).

According to the recommendations of the American College of Rheumatology for the clinical diagnosis of osteoarthritis, the diagnosis of osteoarthritis was based on the following criteria (25, 26): *(i) history of the disease:* self-reported presence of pain, aching, stiffness, or other symptoms in the joints affected by osteoarthritis; *(ii) physical examination:* difficulties in flexion/extension and rotation of the joints (range of motions), tenderness,

crepitations, or enlargement of the joints; *(iii) laboratory findings:* erythrocyte sedimentation rate, rheumatoid factor, C-reactive protein and uricemia, and; *(iv) radiological findings:* joint space narrowing and presence of osteophytes.

Fisher's exact test was used to compare the distribution of the major risk factors (smoking, alcohol intake, body mass index, genetic factors, major trauma, weight lifting, heavy physical exercise and preexisting inflammatory diseases) among primary health care men and women diagnosed with osteoarthritis. Conversely, binary logistic regression was used to assess the sex-differences regarding the main risk factors among primary health care users diagnosed with osteoarthritis in Tirana. Initially, crude (unadjusted) odds ratios (ORs) and their respective 95% confidence intervals (CIs) were calculated. Next, multivariable-adjusted ORs and their respective 95% CIs were calculated in logistic regression models controlling (adjusting) simultaneously for all the main risk factors for osteoarthritis (smoking, alcohol intake, body mass index, genetic factors, major trauma, weight lifting, heavy physical exercise and preexisting inflammatory diseases). Statistical Package for Social Sciences (SPSS, version 17.0) was used for all the statistical analyses.

3. RESULTS

Table 1 presents the distribution of risk factors among primary health care users diagnosed with osteoarthritis in Tirana during the period 2013-2014. Overall, the prevalence of smoking was 23.7%. It was substantially higher in men than in women (37.2% vs. 13.1%, respectively; P<0.001). Similarly, the prevalence of alcohol intake was

Variable	Total (N=1179)	Men (N=521)	Women (N=658)	P†
Smoking:				
No	899 (76.3)*	327 (62.8)	572 (86.9)	<0.001
Yes	280 (23.7)	194 (37.2)	86 (13.1)	
Alcohol intake:				
No	643 (54.5)	114 (21.9)	529 (80.4)	<0.001
Yes	536 (45.5)	407 (78.1)	129 (19.6)	
Body mass index:				
Normal weight	436 (37.0)	182 (34.9)	254 (38.6)	0.111
Overweight	562 (47.7)	266 (51.1)	296 (45.0)	
Obesity	181 (15.4)	73 (14.0)	108 (16.4)	
Genetic factors:				
No	825 (70.0)	398 (76.4)	427 (64.9)	<0.001
Yes	354 (30.0)	123 (23.6)	231 (35.1)	
Major trauma (accidents):				
No	1048 (88.9)	458 (87.9)	590 (89.7)	0.195
Yes	131 (11.1)	63 (12.1)	68 (10.3)	
Weight lifting:				
No	1042 (88.4)	430 (82.5)	612 (93.0)	<0.001
Yes	137 (11.6)	91 (17.5)	46 (7.0)	
Heavy physical exercise:				
No	868 (73.6)	332 (63.7)	536 (81.5)	<0.001
Yes	311 (26.4)	189 (36.3)	122 (18.5)	
Preexisting inflammatory diseases:				
No	1059 (89.8)	479 (91.9)	580 (88.1)	0.033
Yes	120 (10.2)	42 (8.1)	78 (11.9)	

Table 1. Distribution of risk factors among primary health care users diagnosed with osteoarthritis in Tirana during 2013-2014. * Absolute numbers and their respective column percentages (in parentheses). † P-values from Fisher's exact test.

remarkably higher in men compared to women (78.1% vs. 19.6%, respectively; P<0.001). There was no significant difference in the prevalence of overweight or obesity among male and female patients with osteoarthritis (P=0.111). On the other hand, the prevalence of the predisposing genetic factors was significantly higher in women compared to men (35.1% vs. 23.6%, respectively; P<0.001). Major trauma experienced in life (different types of accidents) were somehow equally distributed between men and women (P=0.195). Conversely, the proportion of men reporting weight lifting was significantly higher compared to women (17.5% vs. 7.0%, respectively; P<0.001). Likewise, the prevalence of self-reported heavy physical exercise (at work, at home, or at leisure time) was considerably higher in male patients compared to their female counterparts (36.3% vs. 18.5%, respectively; P<0.001). On the other hand, the prevalence of preexisting inflammatory conditions (including rheumatoid arthritis, ankylosing spondylitis, metabolic arthropathy, or other inflammatory diseases) was significantly higher in women than in men (11.9% vs. 8.1%, respectively; P=0.033) (Table 1).

Table 2 presents the sex-differences with regard to selected risk factors between primary health care men and women diagnosed with osteoarthritis in Tirana during the period 2013-2014. In crude (unadjusted) logistic regression models, there was an inverse association of female gender with smoking (OR=0.25, 95%CI=0.19-0.34) and especially with alcohol intake (OR=0.07, 95%CI=0.05-0.09). There was no statistically significant association with overweight or obesity (overall P=0.111). On the other hand, there was evidence of a positive association between female gender and constitutional (genetic) factors (OR=1.75, 95%CI=1.35-2.27). There was no significant association with past major trauma experiences (P=0.341), but an inverse association of female gender with weight lifting (OR=0.36, 95%CI=0.24-0.52) and heavy physical exercise (OR=0.40, 95%CI=0.31-0.52).

Upon simultaneous adjustment for all the risk factors presented in Table 2, female gender was inversely associated with smoking (OR=0.39, 95%CI=0.27-0.56), alcohol intake (OR=0.08, 95%CI=0.06-0.10), overweight but not obesity (OR=0.65, 95%CI=0.46-0.91 and OR=0.74, 95%CI=0.46-1.18, respectively), weight lifting (OR=0.38, 95%CI=0.22-0.66) and heavy physical exercise (OR=0.69, 95%CI=0.46-1.03). On the other hand, female gender was positively related to genetic factors (OR=2.17, 95%CI=1.55-3.04) and preexisting inflammatory diseases (OR=1.53, 95%CI=0.93-2.53) (Table 2).

4. DISCUSSION

Our main findings relate to a negative (inverse) association of female gender with lifestyle/behavioral factors including smoking and alcohol intake, overweight (not obesity though), weight lifting and heavy physical exer-

Variable	Crude (unadjusted models)		Multivariable-adjusted models	
	OR (95%CI)*	P*	OR (95%CI)*	P*
Smoking: No	1.00 (reference)	<0.001	1.00 (reference)	<0.001
Yes	0.25 (0.19-0.34)		0.39 (0.27-0.56)	
Alcohol intake: No	1.00 (reference)	<0.001	1.00 (reference)	<0.001
Yes	0.07 (0.05-0.09)		0.08 (0.06-0.10)	
Body mass index:		0.111 (2)†		0.04 (2)†
Normal weight	1.00 (reference)	-	1.00 (reference)	-
Overweight	0.80 (0.62-1.03)	0.08	0.65 (0.46-0.91)	0.012
Obesity	1.06 (0.75-1.51)	0.75	0.74 (0.46-1.18)	0.204
Genetic factors: No	1.00 (reference)	<0.001	1.00 (reference)	<0.001
Yes	1.75 (1.35-2.27)		2.17 (1.55-3.04)	
Major trauma (accidents): No	1.00 (reference)	0.341	1.00 (reference)	0.812
Yes	0.84 (0.58-1.21)		0.94 (0.59-1.52)	
Weight lifting: No	1.00 (reference)	<0.001	1.00 (reference)	0.001
Yes	0.36 (0.24-0.52)		0.38 (0.22-0.66)	
Heavy physical exercise: No	1.00 (reference)	<0.001	1.00 (reference)	0.067
Yes	0.40 (0.31-0.52)		0.69 (0.46-1.03)	
Preexisting inflammatory diseases: No	1.00 (reference)	0.033	1.00 (reference)	0.094
Yes	1.53 (1.03-2.28)		1.53 (0.93-2.53)	

Table 2. Sex-differences regarding risk factors among primary health care users diagnosed with osteoarthritis in Tirana during 2014-2015. * Odds ratios (OR: women vs. men), 95% confidence intervals (95%CIs) and p-values from binary logistic regression. † Overall p-value and degrees of freedom (in parentheses).

cise. On the other hand, female gender in this study conducted in Tirana was positively related to genetic factors and preexisting inflammatory diseases.

Similar to our findings, women have been largely shown to be at a higher risk for osteoarthritis compared to men including also development of more severe forms of this condition (2, 6, 7).

Regarding the genetic predisposition, several studies have demonstrated that osteoarthritis is inherited and this tendency may vary by joint site (2). In addition, some studies have reported an inverse (negative) association between general joint hypermobility, a lone benign trait, with hand and knee osteoarthritis and serum cartilage oligometric matrix protein levels (2).

The association with obesity in our study is compatible with prior international reports (1, 2). Obesity and overweight have long been recognized as important risk factors for osteoarthritis, especially of the knee (1, 2). According to the Arthritis, Diet, and Activity Promotion Trial, weight loss combined with exercise, but neither weight loss nor exercise alone, were effective in decreasing pain and improving function in obese elderly individuals with symptomatic knee osteoarthritis (27).

As for the role of physical activity, there are conflicting findings in the international literature. Interestingly, the overall level of physical exercise may in itself increase the risk of osteoarthritis (2). Findings from the Framingham Study indicate that older individuals who engaged in

high levels of physical exercise (consisting of leisure time walking and gardening) had a threefold greater risk of developing radiographic knee osteoarthritis than their sedentary counterparts (2, 18). Similar results were obtained in another study in which women who had a high lifetime level of physical exercise had also a high prevalence of hip osteoarthritis (28). Conversely, some other studies indicate that, in the absence of acute injury, recreational (but moderate) long distance running and jogging does not increase the risk of osteoarthritis (29).

Our study may have some limitations, mainly related to the recruitment of participants and the information obtained through the interview. In our study, we included several primary health care centers (on a probability proportional to size basis) which are assumed to be representative of the overall primary health care facilities in Tirana. Our data collection period lasted for two years and included all male and female adults diagnosed with osteoarthritis in the primary health care centers under investigation. Hence, the sample of patients with osteoarthritis included in our study is assumed to be representative of the overall primary health care users in Tirana. Nonetheless, representativeness of our study sample cannot be assumed for the overall adult population of Albania given the fact that we did not include in our study health centers from other districts of Albania. From this point of view, our findings should be interpreted with caution and should be limited to adult primary health care users of the Albanian capital namely Tirana. In our study, the diagnostic criteria for osteoarthritis were based on the instruments and criteria recommended by the American College of Rheumatology (25,26), which is a clear strength pointing to employment of standardized and well-validated tools for diagnosis of osteoarthritis in the Albanian population. On the other hand, in our study, data on behavioral/lifestyle determinants was based on interview, which may have been subject to different information biases. Thus, male and female participants may have tended to report differently about their lifestyle characteristics. If so, we cannot entirely exclude the possibility of reporting bias for the self-reported information about lifestyle/behavioral factors including smoking, alcohol intake and physical exercise.

5. CONCLUSION

Potential limitations aside, this study offers useful evidence about the distribution of the main risk factors for osteoarthritis in adult individuals diagnosed with osteoarthritis in Albania. This information may support health professionals and decision-makers in Albania for evidence-based health planning and policy formulation in order to control the toll of osteoarthritis in this transitional society.

CONFLICTS OF INTEREST: NONE DECLARED.

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