Diyala Journal of Medicine

ORIGINAL RESEARCH
Published: 5 April 2023
Doi: 10.26505/DJM.24016890831

Prevalence Rate of Rheumatoid Arthritis among Patients Attending Rheumatology Consultation Clinic at Baquba Teaching Hospital

Muayad Kadhim Rashid (BSc, HD)[1]
[1] College of Medicine, University of Diyala , Diyala , Iraq

Abstract

Background: Rheumatoid arthritis (RA) is an inflammatory autoimmune disease that causes progressive and painful of multiple joints damage. **Objective:** To explore the prevalence of Rheumatoid arthritis (RA) among middle-aged and older of Iraqi patients attended the outpatients' clinics.
Patients and Methods: A prospective cross-sectional study was conducted from 1st February to 31st July 2022 at the rheumatology outpatient clinic at the Baquba teaching hospitals, Diyala province, Iraq. The eligible patients were interviewed using semi-structured questionnaires. Diagnosis of RA is based on clinical and serological parameters in accordance with criteria issued by American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) guideline. Descriptive, bivariate, and logistic regression analysis was performed. All statistical analyses were performed using SPSS 16.0 software. P-value < 0.05 was considered statistically significant.
Results: A total of 417 patients with an average age of 55.05 (+10.31) (ranged 40-79 years) have been included in the study. More than half were females (57.8%), married (74.3%), unemployed (67.9%), and 41.0% doctor-diagnosed arthritis. The prevalence of RA in adults was 0.96% compared to 2.34% in doctor-diagnosed arthritis group (females 1.75% vs. males 0.59%, P= 0.011). Results of the multiple logistic regressions showed that older age (odds ratio (OR) = 1.100, 95% CI: 1.070 to 1.130) was associated significantly with "doctor-diagnosed arthritis" ($p < 0.001$). The female patients (OR = 4.928, 95% CI: 2.826 to 8.593), single or had no spouse (unmarried, widow, divorce) (OR = 5.076, 95% CI: 2.742 to 9.396) and had diabetes mellitus (DM) (OR = 7.251, 95% CI: 4.247 to 12.378) were associated significantly with "doctor-diagnosed arthritis" ($p < 0.001$).
Conclusion: With aging, the Iraqi females who have no spouse and suffer from diabetes mellitus become more vulnerable to symptomatic arthritis.
Keywords: Doctor-Diagnosed Arthritis, Rheumatoid Arthritis, Outpatient Clinic, Pain

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Correspondence Address: Muayad Kadhim Rashid
College of Medicine, University of Diyala, Diyala , Iraq.
Email: dr.muayad67@gmail.com

Website: https://djm.uodiyala.edu.iq/index.php/djm

Received: 31 August 2022
Accepted: 30 October 2022
Published: 5 April 2023

Introduction

Rheumatoid arthritis is a chronic disease known for its inflammatory and dysfunctional effect on multiple body joints. However, after the onset of RA, the extra-

ORIGINAL RESEARCH
Published: 5 April 2023
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articular multiorgan manifestations have been reported in different age groups [1]. The available data contained many risk factors related to RA. Clinical features such as arthralgia and morning stiffness with or without metatarsophalangeal or metacarpophalangeal might help to predict the disease prognosis [2]. However, Stack *et al*. [3] suggested that the serological and/or imaging characteristics are necessary to classify the rheumatoid patients. Gender is the most prominent epidemiological factor related to the development of RA. The autoimmune feature of rheumatoid arthritis has made it more prevalent among females than males. Females showed a greater ability to fight diseases than males due to the stronger innate and adaptive immune responses compared to males. However, women become victims of more than 80.0% of autoimmune diseases, including RA [4]. There is a real threat to the quality of patients' life due to the destructive polyarthritis characteristic of the RA disease [5]. Dominick *et al*. [6] found that Pennsylvanian respondents aged 65 years and older with a history of osteoarthritis and RA had poorer scores on all items of health-related quality of life (HRQOL) compared to those who had no history of arthritis.

Moreover, the prevalence of RA increases by about 40-50% among individuals with first-degree relatives with a positive history of RA [7]. Although, the exact mechanism behind the impact of tobacco smoking on RA is uncertain, the effect of smoking on the autoimmune system was linked to an increased risk of cancer, heart, lung, and inflammatory diseases [8]. Similarly, the inconsistent effect of obesity on RA makes it a controversial risk factor. However, documenting the biological mechanisms for infection in the adipose tissue predisposed a better understanding of the relationship between obesity or overweight and RA [9].

In the profile of Iraq, the wheel of decline in the Iraqi health system has not stopped since the US-led invasion of Iraq in 2003 [10]. Compared to the advanced and professional health system in the seventies of the last century, the current health system has been unable to meet the lowest levels of health services due to poor management and widespread corruption [11]. Hence, the objective of this study was explore the prevalence of Rheumatoid arthritis (RA) among middle-aged and older of Iraqi patients attended the outpatients' clinics.

Patients and Methods

Study design and sampling

A prospective cross-sectional study was conducted at the rheumatology outpatient clinic in the Baquba Teaching Hospital, Baquba province, Iraq. The data was collected from the patients regularly attending the outpatient clinics from 1st Feb. to 31st July 2022.

Inclusion and exclusion criteria

All patients aged ≥ 40 years, of both genders, who signed the consent form and were willing to participate are included. Young individuals, or individuals with a history of disability, psychological and mental diseases, malignant tumors, incomplete data, who refused to sign the consent, and were unwilling to participate were excluded from the study.

Sample size

The online Raosoft sample size calculator was recruited to calculate the sample size

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[20]. By assuming 50% is the response rate, a 95% confidence level, and a 5% margin of error, the minimum sample size needed for the current study was 385 + 39 (10% non-response), which equals 424.

Questionnaire

A trained team was recruited to interview the respondents using a semi-structured questionnaire. However, two specialists took the full clinical history and examined all patients physically. The questionnaire recorded information about the sociodemographic factors, chronic disease, body mass index (BMI), employment, and physical activity.

Doctor-Diagnosed arthritis

In this study, the definition of doctor-diagnosed arthritis decided on answering "yes" to the standard question, "Have you ever been informed by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?"

Rheumatoid Arthritis

Each patient who has self-reported "Doctor-Diagnosed Arthritis" undergone further laboratory tests including the rheumatoid factor (RF), anti-citrullinated protein antibodies (ACPA), and C-reactive protein (CRP). The normal RF <5 by nephelometry method, and normal CRP levels 0–5 were detected using turbidimetric inhibition immune assay, and normal ACPA <20 by ELISA method was determined using chemiluminescent immunoassay. The rheumatoid factor (RA) was measured according to the criteria of the "American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) guideline" issued in 2010.

Dependent variable

In this study, the dependent variable was the presence of arthritis or not, depending on the answer of patients to the question "Have you ever been informed by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?"

Independent variables

The age of respondents was categorized into three age groups that involved 40-54, 55-74, and 75 and above. The gender was either male or female. The education was reported in three levels that included the elementary education and belowmiddle and high school, and high education. Patients were answered whether they had a history of chronic diseases such as diabetes mellitus, hypertension, or ischemic heart disease. The response of employment was currently employed or not including retired and housewives.

Statistical Analysis

Continuous and categorical variables were expressed as mean ± standard deviation (SD) and proportions. Quantitative variables were summarized as mean values and a 95% confidence interval (CI). If appropriate, the differences between groups were analyzed by chi-square test or Fisher's exact test for categorical data. Univariate and multivariate logistic regression analyses were undertaken to estimate the odds ratio (OR) and confidence interval (CI) factors associated with occurrence of doctor-diagnosed arthritis. All statistical analyses were performed using SPSS 16.0 software. p-value < 0.05 was considered statistically significant.

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Results

Descriptive and general characteristics of related factors

Out of 424 interviewed patients, seven subjects were excluded due to the above-mentioned inclusion and exclusion criteria. The final analysis was conducted on 417 subjects who signed the written consent form. The mean age of respondents was 55.05 (+10.31), ranged 40-79 years. The mean body mass index was 27.63 (+4.51). Most of the respondents were females (57.8%), married (74.3%), elementary education and above (44.8%), and unemployed (67.9%). History of DM and HT presented among 42.2% and 56.4% of respondents, respectively. About 27.6% were smokers, and 33.6% had walking scores Table (1).

Table (1): Univariate and bivariate analysis of doctor-diagnosed arthritis (n=417)

Variables	Categories	Total N (%)	Arthritis (No)N (%)	Arthritis (Yes)N (%)	χ^2 *t*-test	P-value
Observation			246(59.0)	171(41.0)		
Age, Mean (SD)	55.26 (10.31)		51.46(9.0)	60.22(9.9)	9.376	<0.0001
Age group	40-49	155(37.2)	128(82.6)	27(17.4)	73.867	<0.0001
	50-59	119(28.5)	70(58.8)	49(41.2)		
	≥ 60	143(34.3)	48(33.6)	95(66.4)		
Gender	Male	176(42.2)	137(77.8)	39(22.2)	44.721	<0.0001
	Female	241(57.8)	109(45.2)	132(54.8)		
Marital status	Single*	107(25.7)	43(40.2)	64(59.8)	21.042	<0.0001
	Married	310(74.3)	203(65.5)	107(34.5)		
Educational level	Elementary education and above	187(44.8)	97(51.9)	90(48.1)	7.533	0.023
	Middle and high school	143(34.3)	95(66.4)	48(33.6)		
	College and higher	87(20.9)	54(62.1)	33(37.9)		
Employment	Unemployed	283(67.9)	179(63.3)	104(36.7)	6.601	0.010
	Employed	134(32.1)	67(50.0)	67(50.0)		
Diabetes mellitus	No DM	241(57.8)	185(76.8)	56(23.2)	74.540	<0.0001
	Yes DM	176(42.2)	61(59.0)	115(65.3)		
Hypertension	No HT	182(43.6)	116(63.7)	66(36.3)	3.004	0.083
	Yes HT	235(56.4)	130(55.3)	105(44.7)		
Tobacco Smoking	No Smoking	302(72.4)	183(60.6)	119(39.4)	1.164	0.281
	Yes Smoking	115(27.6)	63(54.8)	52(45.2)		
Physical activity	Vigorous activity score	128(30.7)	77(60.2)	51(39.8)	2.805	0.246
	Moderate score	149(35.7)	94(63.1)	55(36.9)		
	Walking score	140(33.6)	75(53.6)	65(46.4)		
BMI, Mean (SD):	27.63(4.51)		26.85(6.73)	27.92 (4.32)	1.584	0.341

*Single or have no spouse of unmarried, widow, divorce), unemployed, retired, housewife

Factors associated with doctor-diagnosed arthritis in multiple logistic regression

Table (2) presents the final model of the multiple logistic regressions. The results of this study showed age odds ratio (OR) was 1.100, and 95% CI: 1.070 to 1.130 that was associated significantly with doctor-diagnosed arthritis at $p < 0.0001$. The female

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patients OR was 4.928, and 95% CI: 2.826 to 8.593, whereas the single or had no spouse OR was 5.076, and 95% CI: 2.742 to 9.396), and DM OR was 7.251, and 95% CI: 4.247 to 12.378 were associated significantly with doctor-diagnosed arthritis at $p < 0.0001$. The Hosmer and Lemeshow test indicated the good fit at $p = 0.689$. The total model was significant ($p = 0.001$) and accounted for 51.2% of the variance (Nagelkerke R square = 0.512).

Table (2): Factors associated with doctor-diagnosed arthritis in multiple logistic regression

Variables	B	S.E.	Wald	Sig.	Exp(B)	95.0% C.I. for Exp(B) Lower-Upper
Age	0.095	0.014	47.629	0.000	1.100	1.070-1.130
Female	1.595	0.284	31.613	0.000	4.928	2.826-8.593
Male					Reference	
Single	1.625	0.314	26.743	0.000	5.076	2.742-9.396
Married					Reference	
DM (Yes)	1.981	0.273	52.714	0.000	7.251	4.247-12.378
DM (No)					Reference	
Constant	7.967	0.994	31.377	0.000	0.000	-

Discussion

In this study, the prevalence of doctor-diagnosed arthritis among adult patients attending the rheumatological outpatient clinic was 41.0%. At the same time, the prevalence of RA was 0.96% and 2.34 among adult patients and those who had doctor-diagnosed arthritis, respectively. Further analyses showed that sociodemographic variables (older age, female gender, single), and having DM were risk factors for developing doctor-diagnosed arthritis. The scarcity of recent research on the prevalence of rheumatoid arthritis at the national level in Iraq has made the comparison with the few research published for a long time [12] an inevitable choice. Al-Rawi *et al*. [12] found that the prevalence rate of RA in ten surveyed Iraqi provinces was 1.0 %, corresponding to a total population of 12 million in 1977 [21]. Our finding showed that the prevalence of RA in Diyala province is almost similar to that reported (0.74%) by Al-Rawi *et al*. [12]. The difference might be partly explained by the fact that the Al-Rawi *et al*. [12] study was conducted in only ten provinces in Iraq, where various demographic characteristics and social and economic levels. However, the significant increase in the total population of Iraq [21] to almost three times (39 million in 2020) the population in 1977 can bring the image closer and support the current results. Our finding of higher than that reported in most of the surrounding countries and other Arab world countries such as Turkey (0.56%) [22], Iran (0.37%) [23], Jordan (0.31%) [24], Saudi Arabia (0.30) [25], UAE (0.31%) [26], and Algeria (0.43%) [27]. However, the results of our study findings are in agreement with some studies from Europe, such as Spain (0.82%) [28], Sweden (0.66%) [29], but higher than other European studies such as Italia (0.41%) [30], and Estonia (0.46%) [31]. Hunter *et al*. [32] found that the prevalence of RA increased from 0.41 in 2004 to 0.54%

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in 2014. The difference in the prevalence of RA across the neighboring countries of Iraq and even non -neighboring countries might be related to the difference in methodology of the study, samples, and the difference in describing and definition of the cases. Variability among different countries is related to epidemiological (gender, age, race, ethnicity, and family history in RA), geographical, socio-economic, nutritional, and lifestyle variables [33, 2]. However, there was strong evidence that other factors such as the different methodology and study designs, definition of results, serological analysis, and the difference in allocated times to follow-up have a role in producing different statistical values [35 ,36].

Results of multiple logistic regression showed that age, female gender, single patients, and those who had DM were significantly associated with doctor-diagnosed arthritis ($p < 0.0001$). Similar to several previous studies [24,29,31] reported the prevalence of arthritis increases with age (odds ratio (OR) = 1.100, 95% CI: 1.070 to 1.130, $p < 0.0001$). Al Saleh *et al*. [26] found that the risk of lower back pain and knee osteoarthritis significantly increases with age. Barbour *et al*. [37] reported that the percentage of reported doctor-diagnosed arthritis increased from 7.1% among the age group 18-44 years to 49.6% among Americans aged 65. More than sixty percent of diagnosed RA patients worldwide are females [33]. The hypothesis of the stimulatory impact of estrogen hormone on the immune system is largely explained by the high prevalence of RA among females than males [38]. Barbour *et al*. [37] indicated that 26.0% of American females ever reported doctor-diagnosed arthritis compared to 19.1% of males between 2013 and 2015. The estimated prevalence of RA among adults in Sweden females was 0.94% compared to 0.37% for males [29]. The standardized prevalence RA among Turkish females was 0.89% (95% CI; 0.51-1.27) compared 0.10% (95% CI; -0.05-0.25) for males [22]. Females of Algeria showed higher prevalence of RA than their counterparts (0.25% vs 0.02%, $P < 0.001$) [27].

Regarding marital status, our finding showed that the single respondents (having no spouse) was 5.076 times more likely to develop RA. In multivariate analysis to estimate the prevalence of RA in Nepal by Arima *et al*. [39] found that in addition to age, smoking habit, and living in urban regions, having no spouse "(standardized parameter estimate = 3.17E−01, 95% CI = [5.74E−02, 5.77E−01], p = 0.0179)", had significantly higher ACR/EULAR 2010 and clinical disease activity index scores in females. Brennan-Olsen et al. [40] found that Russian (36.4%, 95% CI 29.1%–44.4%) and Ghanaian (11.7%, 95% CI 8.9%–15.1%) females who have no spouse (separated, divorced or widowed) showed a higher prevalence of arthritis than Chinese (0.9%, 95% CI 0.3%–3.0%), and South African females (12.1%, 95% CI 5.5%–24.7%) who had never married. Similarly, Ghanaian, Mexican, Russian, and South African males with no spouse (separated, divorced, or widowed) showed a higher prevalence of RA than their counterparts. In the same study mentioned above, the authors found that males who had never married showed the lowest prevalence of arthritis. Rheumatic

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patients who live in a supportive and positive family enjoy higher health and physical care. Akkaya and Kiyak [41] found that the mean loneliness score was higher among rheumatic patients who lack family members' care. Moreover, the social supports mean scores were higher among patients living in nuclear families. At the same time, the authors noticed that the mean scores of quality of life were higher among patients who lacked family members' care. Diabetes mellitus was 7.251 times more likely to develop "doctor-diagnosed arthritis". There was a close relationship between the prevalence of diabetes and RA. Moreover, the average insulin resistance was higher among RA patients [42]. Albrecht *et al*. [43] reported a high prevalence of DM among the diagnosed RA patients; however, forty percent lacked proper rheumatological care. Most RA-diabetes patients complained of further comorbidities, increased disease burden, and extended hospital stay. A systematic review and meta-analysis study conducted by Tian *et al.* [44] found a significant association between RA and increased risk of diabetes mellitus incidence (pooled relative risk, 1.23; 95% C. l. 1.07–1.40). This study suffers from some determinants. Although, the rheumatology outpatient clinic in the Baquba Teaching Hospital receives rural and urban patients and referral cases (severe) from all districts of the Diyala governorate. However, the mild symptom cases and those who did not attend the rheumatology outpatient clinic during the study period remain outside the studied sample. Therefore, the obtained prevalence rate in the current study might complain of an underestimation of the actual RA prevalence in Diyala Province.

Conclusions

The prevalence of RA among Iraqi patients in Diyala Province was 0.96 %, which is higher than the global estimation. With aging, the Iraqi females who have no spouse and suffer from diabetes mellitus become more vulnerable to symptomatic arthritis.

Recommendations

The RA is common probrem we advice to make more studies about this diseace.

Source of funding: The current study was funded by our charges with no any other funding sources elsewhere.

Ethical clearance: Ethical approval was obtained from the College of Medicine / University of Diyala ethical committee for this study.

Conflict of interest: Nil

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ORIGINAL RESEARCH
Published: 5 April 2023
Doi: 10.26505/DJM.24016890831

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Diyala Journal of Medicine

ORIGINAL RESEARCH
Published: 5 April 2023
Doi: 10.26505/DJM.24016890831

معدل انتشار التهاب المفاصل الرثوي بين مرضى العيادة الاستشارية لأمراض الروماتيزم في مستشفى بعقوبة التعليمي

مؤيد كاظم رشيد [١]

الملخص

خلفية الدراسة: (RA) التهاب المفاصل الرثوي هو مرض مناعي ذاتي التهابي يسبب تلف المفاصل المتعددة التدريجي والمؤلم.

اهداف الدراسة: لاستكشاف انتشار التهاب المفاصل الرثوي بحرف (AR) بين المرضى العراقيين في منتصف العمر وكبار السن الذين يحضرون عيادات العيادات الخارجية.

المرضى والطرائق: أجريت دراسة مستعرضة في١ فترة من فبراير الى ٣١ يوليو ٢٠٢٢ في العيادة الخارجية لامراض الروماتيزم في مستشفيات بعقوبة التعليمية محافظة ديالى العراق . تمت مقابلة المرضى المؤهلين باستخدام استبيانات شبه منظمه. يعتمد تشخيص التهاب المفاصل الرثوي على المعلمات السريرية والمصلية وفقا للمعايير الصادرة عن المبادئ التوجيهية للكلية الامريكية لامراض الروماتزم / الرابطة الاوروبية لمكافحة الروماتيزم(ACR – EULAR) لعام ٢٠١٠ . تم اجراء تحليل الانحدار الوصفي والمتغيرين واللوجستي . تم اجراء جميع التحليلات الاحصائية باستخدام برنامج ١٦,٠ SPSS. اعتبرت قيمة P<0.05 ذات دلالة احصائية.

النتائج: تم تضمين مامجموعة ٤١٧ مريضا بمتوسط عمر ٥٥,٠٥ (+١٠,٣١) (تراوحت اعمارهم بين ٤٠ و ٧٩ عاما) في الدراسة . كان اكثر من نصفهم من الاناث (٥٧,٨%) ومتزوجين (٧٤,٣%) وعاطلين عن العمل (٦٧,٩%) ابلغ حوالي ٤١,٠% عن التهاب المفاصل الذي تم تشخيصة من قبل الطبيب . كان انتشار التهاب المفاصل الرثوي لدى البالغين ٠,٩٦% مقارنة بنسبة ٢,٣٤% في مجموعة التهاب المفاصل التي يشخصها الطبيب (الاناث ١,٧٥% مقابل الذكور ٠,٥٩% ، P=٠,٠١١.

أظهرت نتائج الانحدارات اللوجستية المتعددة ان الشيخوخة (نسبة البدائلOR) = cl:٩٥% ١،١٠٠ ، ١ الى ١،١٣٠. (p<<(0.001) ارتبطت بشكل كبير بالتهاب المفاصل الذي تم تشخيصه من قبل الطبيب. ارتبطت المريضات : ٢،٨٢٦ cl الى ٨،٥٩٣. العازبات او ليس لديهن زوج (غير متزوجة ،أرملة ،طلاق) OR:٢،٨٢٦ ،٩٥%، ٩٢٨ cl (٩٥% الى ١٢،٣٧٨ بشكل كبير ب.:cl ٤،٢٤٧ > OR ٧،٢٥١ DM الى ٠،٣٩٦ و كان لديهم OROR ٥،٠٧٦%،

الاستنتاجات: بلغ معدل انتشار التهاب المفاصل الرثوي بين المرضى العراقيين في محافظة ديالى ٠,٩٦% وهو اعلى من التقدير العالمي (٠,٤٦%) (٤٥) . ولكنه أقرب الى تلك التي أبلغت عنها الدراسة الوطنية (١,٠%) لمجموع السكان العراقيين و ٠,٧٤% لمحافظة ديالى (١٢). ومن ذلك . فأن النتائج التي توصلنا اليها تتفق مع الاتجاهات العالمية ، حيث تكون المتغيرات الاجتماعية الديموغرافية مثل العمر (كبار السن) ، والجنس (الاناث) والحالة الاجتماعية (أعزب او ليس لديه زوج) اكثر عرضه (DM) والمتغيرات المتعلقة بالصحة مثل الامراض المزمنة للإصابة بالتهاب المفاصل العرضي من نظرائهم. يمكن استخدام نتائج دراستنا لتشكيل اساس دراسة وطنية جديدة لتقدير انتشار التهاب المفاصل والتهاب المفاصل الرثوي.

الكلمات المفتاحية: التهاب المفاصل الذي تم تشخيصه بواسطة الطبيب ، والتهاب المفاصل الرثوي ، والعيادة الخارجية ، والألم.

البريد الالكتروني: dr.muayad67@gmail.com

تاريخ استلام البحث: ٣١ آب ٢٠٢٢

تاريخ قبول البحث: ٣٠ تشرين الاول ٢٠٢٢

[١] كلية الطب – جامعة ديالى – ديالى - العراق