ASSESSMENT OF THE FRACTURE RISK AND EFFECT OF ANTI RHEUMATIC MEDICATIONS IN THE EGYPTIAN PATIENTS WITH RHEUMATOID ARTHRITIS

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ABSTRACT:

Background: *Numerous studies conducted over the past decades have revealed that, in addition to joint inflammation and degeneration, RA patients have lower bone mass and are more likely to develop osteoporosis. In a similar way, there is a substantial risk of osteoporotic fractures, particularly when it is compared with normal population of the same sex and age.*

Aim of the work: *To assess risk of fracture in Egyptian patients with RA and effect of anti-rheumatic medications on fracture risk.*

Patients and Methods: *100 patients diagnosed as RA, met the American College of Rheumatology / European League Against Rheumatism (ACR/EULAR) 2010 criteria for RA, aged 40 years or more, and 50 healthy controls. Thorough history including fracture and treatment history, clinical assessment by HAQ-DI and DAS-28 ESR, and laboratory assessment, FRAX and DEXA were done.*

Results: *Osteoporosis was present in 34% of patients, 16% of controls. Only 4% of patients had major osteoporotic fracture risk, 14% had hip fracture risk. For control group, 2% had major osteoporotic fracture risk, 6% had hip fracture risk. A significant higher risk for both major osteoporotic and hip fractures in patients compared to control and an increased risk of osteoporosis. An inverse correlation between FRAX and vitamin D, BMI, DEXA, leflunamide, HCQ, and biologic treatment. A direct correlation between FRAX and disease duration, DAS28-ESR, HAQ-DI, CRP, ESR, age, females, smoking, high dose steroid, methotrexate, combined treatment, RF, and anti-CCP. An inverse correlation between DEXA and disease duration, DAS28-ESR, HAQ-DI, serum calcium, and ESR.*

Keywords: *Rheumatoid arthritis, FRAX, DEXA*

INTRODUCTION:

The early symptoms of rheumatoid arthritis (RA), one of the most prevalant autoimmune diseases, are symmetrical swelling and pain of small joints in the hands and feet, soft tissue swelling surrounding the joints, fatigue, and morning stiffness [(1)]. Also, it is characterized by ongoing synovitis, symmetrical progressive joint damage, intra-articular manifestations such as decreased bone mass, subchondral lesions, and decreased overall bone density [(2)]. RA affects roughly 1% of the general population, but it is more common in females than males [(3)]. One of the most prevalent extra-articular symptoms of RA is osteoporosis, which affects almost double the number of RA patients as the general population. and this causes a considerable decline in living quality and could shorten life expectancy [(4)].

The pathogenesis of bone loss and secondary osteoporosis in RA is multi-

factorial and linked to general factors such as older age, female sex, low body mass index (BMI) [5], However, RA-disease characteristics and treatments such as disease severity, low vitamin D levels, and usage of corticosteroids, can also have an effect [6].

Bone loss is dependent on increased bone resorption brought on by pro-inflammatory cytokines that activate osteoclasts, together with decreasing bone mass. Tumor necrosis factor (TNF), Interleukins (IL-1, IL-6) are among several cytokines produced by the synovium as a result of the strong inflammatory response, which destroys cartilage and bone and causes widespread bone loss [6].

Fractures decrease life quality, especially in older age groups, increase the risk of morbidity and mortality and increase the financial burden [7]. One of the most frequent fractures is a vertebral fracture caused by low bone mineral density, which can cause kyphosis, activity limitations, disability, and even compromise pulmonary function [8].

The consequences linked to RA, which are still prevalant, have not decreased despite improvements in the identification of the disease's destructive mechanisms and pharmacological treatment [4].

AIM OF THE WORK:

Our study aimed to assess the risk of fracture in the Egyptian Patients with RA and the effect of anti-rheumatic medications on fracture risk, to try to prevent fractures and to improve patient's quality of life.

PATIENTS AND METHODS:

The study is a case control study held on 100 patients diagnosed as RA who met the American College of Rheumatology / European League Against Rheumatism (ACR/EULAR) 2010 criteria for RA [9], all are aged 40 years or more, who are collected from Internal medicine and Rheumatology department and outpatient clinic at Ain Shams University Hospitals and 50 apparent healthy persons as a control group matched in age and sex. All patients were attending the outpatient rheumatology clinic, Ain Shams University Hospital. Medical history asking about age, sex, smoking status, menstrual history, other comorbidity, disease duration number of painful and swollen joints, history of previous fractures, disease modifying anti rheumatic drugs (DMARDs), dose of steroid in mg, and cumulative dose of steroid /year, calcium and vitamin D supplementation or anti-osteoporotic treatment. General and musculoskeletal examination were done. General Examination especially the weight, height for Body Mass Index (BMI) and rheumatological examination assessing the patients clinically using Health Assessment Questionnaire disability index (HAQ-DI) that is used to assess of functional disability [10]. Disease activity scoring 28 (DAS28-ESR) [11]. Laboratory investigation including CBC, liver enzymes, serum creatinine and BUN and specific inflammatory markers including the erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), rheumatoid factor (RF) and Anti- cyclic citrullinated protein antibody (Anti-CCP) and serum calcium was assessed as well as alkaline phosphatase, phosphorus, and vitamin D levels were measured. All patients were assessed for fracture risk using FRAX and were assessed for osteoporosis using Dual-energy X-ray absorptiometry (DEXA).

FRAX is a computer-based algorithm, intended to calculate fracture risk from readily available clinical risk factors in males and females [12]. It predicts the 10-year probability of both major osteoporotic fracture (humerus, hip, wrist, or spine fracture) and hip fracture. FRAX of major fractures was considered high if it was greater than or equal to 20 and that for hip fracture, if it was greater than or equal to 3 [13]. BMDs will be measured by DEXA (GE Lunar densitometer, Madison, WI 53717-1915, USA). The measurements have been carried

out on the spine from the second to fourth Lumbar vertebra, femur, and radius using widespread methods and matched gender, weight, and race. diagnosis of osteoporosis was identified when the T score was − 2.5 standard deviation (SD) or lower, osteopenia was diagnosed when the T score was lower than − 1 and higher than − 2.5 SD according to the World Health Organization criteria [(14)]. Patients with chronic kidney disease, chronic liver disease, primary hyperparathyroidism and thyroid disorders and other autoimmune disease were excluded.

Statistical Analysis:

Data were coded and entered utilizing the statistical package SPSS version 24. Comparison between quantitative variables was done using the nonparametric Mann-Whitney tests. For comparing categorical data, chi-square ($\chi 2$) test was performed. Correlation was done by pearson and spearman test.

Ethical approval:

The research and ethics committee for Ain Shams University, the college of medicine, and all procedures carried out during the study complied with all applicable ethical standards. On December 2, 2022, the Research Ethics Committee (REC) No. FWA 000017585 FMSAU R 244/2022 gave the approval. Participants gave their written informed consent to take part in this study.

The FMASU REC is organized and operated according to guidelines of the International Council on Harmonization (ICH) and the Islamic Organization of Medical Sciences (IOMS), the United States Office for Human research Protections and the United States Code of Feral Regulations and operates under Federal Wide Assurance No. FWA 000017585. FMASU R 244/2022.

RESULTS:

Our patient's age was 52.15±9.09, while in control group, it was 49.74±9.01, and there was no difference between patients and control group regarding age. Our patient's disease duration was 6.14±6.005. Eighty-nine (89%) of studied patients were females, and 11% were males. Osteoporosis was present in 34% of patients and 16% of healthy controls (Table 1-2).

Comparison between patients and control, there was significant increased risk of fracture for both major osteoporotic fracture and hip fracture and increased risk of osteoporosis indicated by lower bone mineral density in patients with RA (Table 3).

On studying effect of disease parameters and treatment modalities on FRAX, we found inverse correlation with a statistically significant difference between FRAX and leflunamide, lumbar DEXA, while for major osteoporotic fracture vitamin D, DEXA of radius, and for hip fracture with BMI, while there was positive significant correlation between FRAX and DAS28-ESR, age, smoking, combined treatment while major osteoporotic fracture with HAQ-DI, high dose steroid and hip fracture with methotrexate and anti-CCP (Table 4 and figures 1-2-3).

Our results showed significant inverse correlation between radial and femoral DEXA and disease duration and HAQ-DI (Table 5 and figure 4-5).

Our results showed positive correlation between DEXA and HCQ, biologic treatment with significant correlation between femur and radius with HCQ (Table 5).

Table (1): Comparison between RA patients and control:

	Patients	Control
	Number/%	Number/%
Female	89(89%)	45(90%)
Smoking	7(7%)	3(6%)
Osteoporosis	34(34%)	8(16%)
Positive history of fracture	4(4%)	1(2%)
Major osteoporotic fracture	4(4%)	1(2%)
Hip fracture	14(14%)	3(6%)
Calcium and vitamin D supplementation	100(100%)	4(8%)

Table (2): Demographic data for RA patients:

Patients	Number/%
Low dose steroid	11(11%)
High dose steroid	81(81%)
Methotrexate only	36(36%)
Leflunamide only	35(35%)
Combined methotrexate and leflunamide	29(29%)
Hydroxychloroquine	86(86%)
Sulphasalazine	6(6%)
Biologic	13(13%)
Positive RF	59(59%)
Positive Anti-CCP	52(52%)
	Mean±SD
Disease duration	6.14±6.005
ESR	39.13±21.08
CRP	14.359±16.5
HAQ-DI	1.59±0.66
DAS28-ESR	4.339±4.845

RF: Rheumatoid factor, Anti CCP: Anti cyclic citrullinated peptide, ESR: Erythrocyte sedimentation rate, CRP: C reactive protein, HAQ-DI: Health assessment questionnaire disability index, DAS28-ESR: Disease activity scoring 28 ESR.

Table (3): Comparison between patients and control:

	Patients	Control	T-Test	
	Mean±SD	Mean±SD	T	P
Age	52.15±9.09	49.74±9.01	-1.535	0.1
BMI	31.76±3.39	31.62±2.97	-0.248	0.8
Calcium and vitamin D supplementation	22.8±9.42	23.66±5.3	0.599	0.5
Serum calcium	8.582±0.426	8.448±0.54	-1.657	0.09
BMD femur	-0.8475±1.478	0.276±1.80	4.075	0.0001
BMD Lumbar	-0.299±2.07	0.048±1.89	0.996	0.3
BMD Radius	-0.073±2.37	0.304±1.822	0.988	0.3
Major osteoporotic fracture	8.421±5.147	6.48±3.92	-2.346	0.02
Hip fracture	1.303±1.79	0.734±0.854	-2.127	0.03

BMI: Body mass index, BMD: Bone mineral density

Table (4): Correlation between FRAX and RA disease parameters:

Mean±SD	Major osteoporotic fracture		Hip fracture	
	(r)	P value	(r)	P value
Disease duration	0.101	0.3	0.07	0.4
DAS28-ESR	0.4453	0.000003	0.4163	0.00001
HAQ-DI	0.19	0.04	0.143	0.1
Calcium and vitamin D supplementation	-0.28	0.004	-0.053	0.6
Serum calcium	-0.134	0.19	0.066	0.5
CRP	0.042	0.6	0.078	0.4
ESR	0.06	0.5	0.082	0.4
Age	0.64	<0.00001	0.544	<0.00001
BMI	-0.134	0.1	-0.179	0.07
BMD femur	-0.04418	0.6	-0.1203	0.2
BMD Lumbar	-0.2792	0.004	-0.2169	0.03
BMD Radial	-0.2331	0.01	-0.1537	0.12
Number/%	(r_s)	P value	(r_s)	P value
Female sex	0.06509	0.5	0.0808	0.4
Smoking	0.2405	0.015	0.2242	0.024
Low dose steroid	-0.07	0.4	0.013	0.8
high dose of steroid	0.24	0.01	0.11	0.2
Methotrexate	0.022	0.8	0.1695	0.09
Leflunamide	-0.2134	0.03	-0.2716	0.006
Methotrexate and leflunamide	0.262	0.008	0.1659	0.09
Hydroxychloroquine	-0.29	0.8	-0.21	0.03
Sulphasalazine	0.069	0.4	-0.05	0.6
Biologic	-0.22	0.02	-0.16	0.1
RF	0.0664	0.5	0.2191	0.028
Anti-CCP	0.039	0.6	0.09	0.3

Pearson correlation coefficient (r), Spearman's rank correlation coefficient (rs), DAS 28ESR: Disease activity scoring 28 ESR, HAQ-DI: Health assessment questionnaire disability index, CRP: C reactive protein, ESR: Erythrocyte sedimentation rate, BMI: Body mass index, BMD: Bone mineral density, RF: Rheumatoid factor, Anti-CCP: Anti cyclic citrullinated peptide.

Table (5): Correlation between DEXA and other parameters:

Mean±SD	DEXA femur		DEXA lumbar		DEXA radius	
	(r)	P	(r)	P	(r)	P
Disease duration	-0.1816	0.04	-0.0489	0.6	-0.1879	0.03
DAS28-ESR	-0.18	0.06	-0.2317	0.02	-0.3	0.002
HAQ-DI	-0.2909	0.003	-0.159	0.1	-0.2827	0.004
Serum calcium	-0.2837	0.004	-0.1289	0.2	-0.0325	0.7
ESR	-0.2734	0.005	-0.0241	0.8	-0.038	0.7
Number/%	(r_s)	P	(r_s)	P	(r_s)	P
Hydroxychloroquine	0.1748	0.08	0.02002	0.8	0.197	0.04
Biologic	0.1126	0.2	0.01704	0.8	0.051	0.6

Pearson correlation coefficient (r), Spearman's rank correlation coefficient (rs), DAS28-ESR: Disease activity scoring 28 ESR, HAQ-DI: Health assessment questionnaire disability index, ESR: Erythrocyte sedimentation rate.

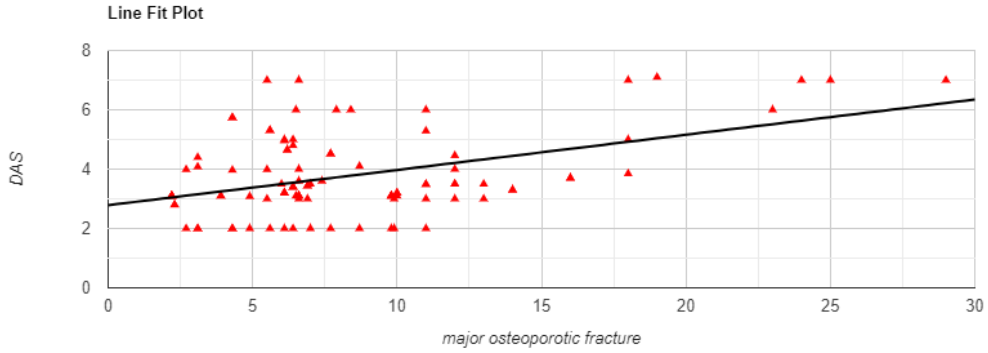

Figure (1): Correlation between major osteoporotic fracture and DAS 28 ESR:

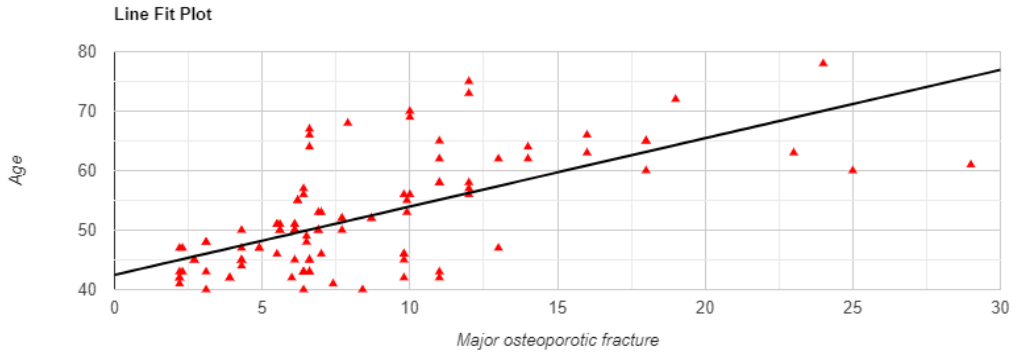

Figure (2): Correlation between major osteoporotic fracture and age:

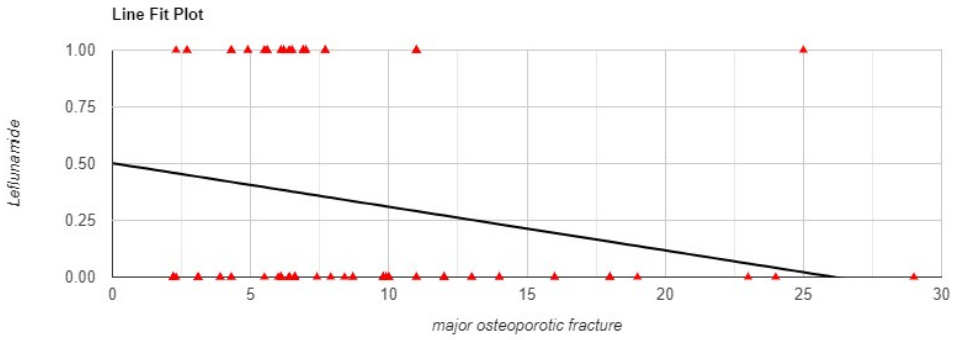

Figure (3): Correlation between major osteoporotic fracture and leflunamide:

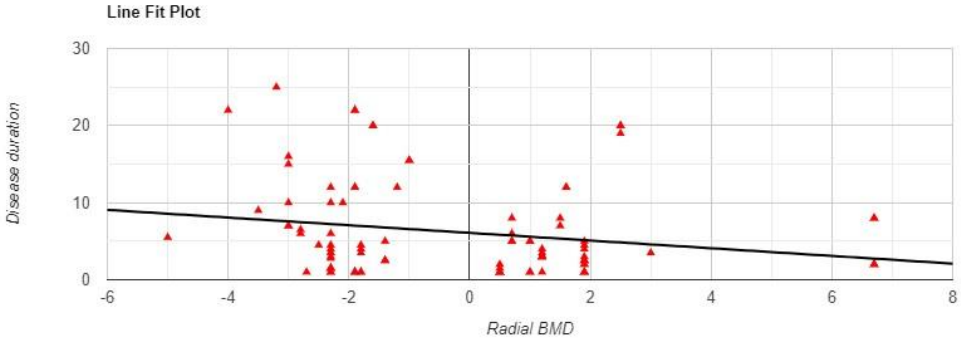

Figure (4): Correlation between radial BMD and disease duration:

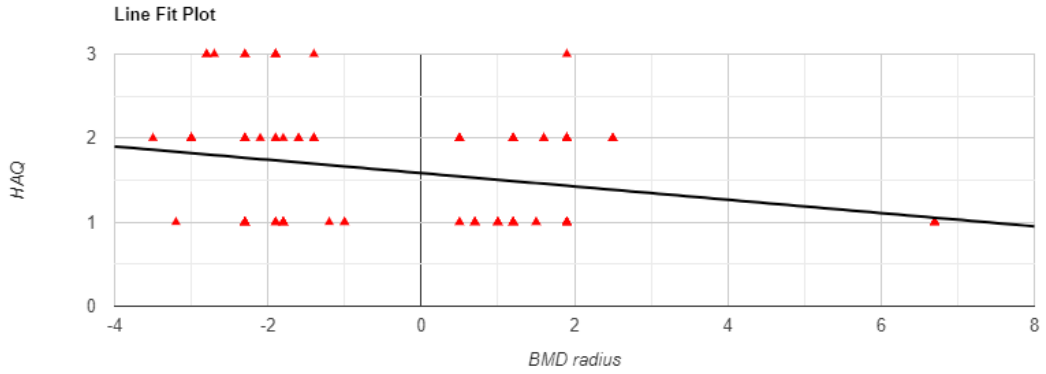

Figure (5): Correlation between radial BMD and HAQ:

DISCUSSION:

RA is a persistent, inflammatory joint condition. It causes both localized and widespread bone loss, and osteoporosis eventually. Growth factors and cytokines that control the interactions between osteoblast, osteoclasts, and immune cells are what lead to localized or periarticular osteoporosis. When the synoviocytes of fibroblast and lymphocytes, plasma cells, antigen-presenting cell, neutrophils and macrophage phenotype accumulated in the inflamed joints, they activate receptor activator of nuclear factor kappa B ligand (RANKL) that cause activation of osteoclast and bone loss [(15)].

We studied 100 RA patients for fracture risk, and DEXA, we found higher risk of fracture and osteoporosis in RA than matched control group, comparing frequency of osteoporosis between patients and control, we found that osteoporosis was present in 34(34%) of patients, while in control, it was in 8 (16%) of healthy controls, Also, the risk of osteoporosis was more in RA patients than control group especially BMD of femur (-0.8475±1.478 for RA patients vs. 0.276±1.80 for control group) and was statistically significant lower, while BMD of radius and lumbar spine were lower in RA patients than control yet it did not reach a statistical significance, our results agreed with **Sinigaglia et al,**[(16)], whose study focused entirely on RA patients and found that the prevalence of osteoporosis in those patients was 36.2% at the femoral neck and 28.8% in the lumbar spine. our results disagree with **Lee and colleagues,** [(17)], who examined postmenopausal females and reported that 46.8% of RA patients had osteoporosis which was higher than ours and this can be explained that our RA population included premenopausal and postmenopausal females, as well as males.

Concerning FRAX, there was statistically significant difference between patients and control where fracture risk was higher in patients with RA than the control group regarding major osteoporotic fracture with (8.421±5.147 vs. 6.48±3.92) and major hip fracture (1.303±1.79 vs. 0.734±0.854) with (P values =0.02, 0.035 respectively). Kim et al, and Brennan et al, [(18&19)], were in line with this study, that patients with RA are at significantly higher risk for both hip and major fractures compared to control group. Also agreed with Fardellone et al, [(6)], who concluded that the fracture risk increased by 1.5- to 2-fold among RA patients in comparison to the general population.

In accordance with our study, Senosi et al**,** [(20)], who found that fracture risk and osteoporosis was significantly higher in RA patients than control.

Our findings showed that the RA female patients have insignificant higher risk of

fracture more than males, this insignificance can be explained that 51 of our female patients were premenopausal, 38 patients were postmenopausal, this was in accordance with Paksima et al**,** [21] ,who discussed that postmenopausal women are more prone to osteoporosis and it is found that osteoporotic fracture occurs at least once in approximately half of postmenopausal females and in over 20% of males older than 50 years of age. Our results showed that older patients had strong and positive correlation with FRAX (P<0.00001) and this agreed with many studies [15,18,22].

Our results stated that low BMI was negatively correlated with FRAX and risk of osteoporosis with significant correlation between major osteoporotic fracture and BMD of lumbar and radial, and hip fracture with BMD for lumbar spine, and this agreed with a study done by **Lee et al,** [17], who found that lower BMI were independent risk factors of osteoporosis.

Bone loss starts early in the course of the disease in RA patients [23] and increases with longer disease duration [24], Longer disease duration was associated with increased significantly femoral neck and radius osteoporosis and insignificant higher risk of osteoporotic fractures that met with several studies [17,25].

Higher HAQ-DI increased the osteoporosis frequency significantly, especially in the femur, and positively correlated significantly with major fracture risk (p = 0.04), and this was in line with different studies, [17,26&27].

In our study, a high DAS28-ESR score was strongly positively correlated with FRAX and negatively correlated with BMD with significant correlation with lumbar and radius BMD (P=0.02, and 0.002, respectively). This was in agreement with Ismail, et al, [15], who found that both fracture risk was directly correlated to DAS28-ESR but showed significant inverse correlation with BMD at the femoral neck. On the contrary, Ketabforoush and collegues[28], measured DAS28-ESR but in newly diagnosed RA patients, showed insignificant difference between disease activity level and spine and hip osteoporosis.

In addition, inflammatory markers, ESR showed a positive correlation with FRAX, risk of osteoporosis, which was significant with BMD of femur only but insignificant with others, CRP was positively correlated but insignificant with FRAX, which agreed with Meng et al, [22], and this confirms that those with higher disease activity are at greater risk for both osteoporosis and fracture risk**.** Llorente et al**,** [27], considered CRP level is an indicator of the fracture risk that underlies the role of systemic inflammation.

The pathogenesis of inflammation and a reduction in BMD are influenced by a variety of immune system variables, like the impact of autoantibodies against citrullinated proteins, hyper-expression, (RANKL) and pro-inflammatory cytokine secretion [29]**.**

In our study, we found that positivity of RF and anti-CCP were directly correlated with FRAX but significant only between RF and risk of hip fracture, this partially agreed with Senosi et al, [20], who stated that patients with positive RF and anti-CCP had considerably higher FRAX (major and hip). Also, Stemmler et al, [30], reported that the presence of RF and anti-CCP are predictors of femoral neck osteoporosis.

Concerning vitamin D level, for patients, it was 22.8±9.42, and that for control group, it was 23.66±5.3, with no significant difference between both groups as most of them had deficiency. And this was in accordance with Senosi and collegues,[20]. The distinctive pattern of conservative clothes in our population and the lack of outdoor physical exercise in females may be responsible for this vitamin D insufficiency.

Our study showed that low levels of vitamin D, increase fracture risk and were

significantly correlated with major osteoporotic fracture risk. This was in agreement with other studies, [31,32], which reported that decreased bone mass can also be affected by lower levels of vitamin D.

There are many factors contributed to the occurrence of osteoporosis in RA patients, with ongoing inflammation being one of the most significant [27], Decreased intake of vitamin D is linked to a higher risk of developing RA, and vitamin D deficiency is linked to disease activity in RA patients [33]. Thus, one of the common explanations for RA and osteoporosis is vitamin D deficiency. A meta-analysis study's findings revealed that RA patients had much higher levels of vitamin D deficiency than healthy people [17].

Low serum Ca levels significantly increase femoral neck osteoporosis and increase insignificantly major osteoporotic fracture risk, Bischoff-Ferrari et al, [34]. explained that patients who received calcium supplementation experienced a 20% decrease in falls and nonvertebral fractures.

We concluded that lower BMD of the radius is associated with an increase in major fractures, while lower lumbar BMD is associated with an increase in major fractures and hip fracture risks, our results agreed with those of Ismail et al, [15]. who found that both fracture risk had significant relationships with BMD of the lumbar spine and femoral neck in the RA group.

Concerning anti-rheumatic drugs and their effect on fracture risk, we found that high dose corticosteroids increase osteoporosis, especially in the femur. In addition, they also increase the major fracture risk, which agrees with many studies, [15,22,25]. Although other studies [35,36], suggest that the anti-inflammatory effects of glucocorticoids, can prevent local and systemic decreases in BMD. Another study done by Engvall et al, [37], focused on low dose glucocorticoids having a protective impact on the bone, mostly because they lower process of inflammation, which was against ours, as we did not find significance with low dose steroids.

In our study, we found that leflunamide decrease the major fracture risk also anti-malarial drugs decrease both hip and major fracture risk.

While Methotrexate and combined DMARDS increases both major and hip fracture risk that agree with a study done by Raterman et al, [38], who found that patients receiving corticosteroids and methotrexate experienced greater BMD declines than individuals receiving corticosteroids alone.

Robin et al, [39], explained what is called methotrexate osteopathy, they stated that, in presence of methotrexate, the effects of mechanical stimulation on human trabecular bone cells showed an alteration in mechanotransduction, with hyperpolarization of the membrane, acting on the integrin pathway, but they believed these mechanisms are still not well understood, raising the question of a possible remnant effect of methotrexate on osteoforming bone cells, and if it is dose-dependent or not, especially that their study was done on patients having hematologic conditions who received substantially larger doses than those used in rheumatology conditions as RA.

Contrary to other research' findings, which stated that DMARDs are used to induce remission by reducing inflammation, data reveals that DMARDs also protect cartilage and bone from structural damage [35,36], Other studies [40,41], found no effect of methotrexate on BMD. More studies should be done to explain more about methotrexate effect on bone.

TNF and the interleukins (IL-1, IL-6, and IL-17) are two pro-inflammatory cytokines that are particularly significant in the etiology of inflammation that results in bone loss. TNF stimulates (RANKL), which binds to the RANK receptor on osteoclast precursors and causes osteoclast maturation then activation,

leading to resorption of bone and inhibition of osteoblast function and bone formation. Osteoprotegerin (OPG) is a decoy receptor, the RANKL/OPG being important to maintain the balance between bone formation and bone resorption, where expression of OPG is increased in patients treated with anti-TNF [(42)].

Regarding biologic treatment, 13 (13%) patients were on biologic 8 were on anti-TNF, 5 were on JAK inhibitor, where we found that biologics or targeted synthetic DMARDs decrease significantly the major fracture risk that was in agreement with Murakami et al,[(43)], who reported that Baricitinib inhibit osteoclast development through inhibition of expression of RANKL on osteoblasts in vitro, Kim et al,[(44)], reported that biologics used for RA cause favorable changes in the profile of markers for bone turnover and demonstrate good outcomes in restoring BMD.

According to another point of view, TNF inhibitor users have either had an improvement or a steady BMD in various prospective investigations [(45^46)].

Conclusions

RA patients still suffer from high incidence of osteoporosis and fracture risk than healthy population despite the effective treatment options available nowadays compared with 2–3 decades ago. So regular screening of DEXA scan and FRAX should be done on regular bases, in addition to modification of their lifestyle, cessation of smoking, doing exercise. adequate intake of ca and vitamin d and controlling disease activity to prevent or decrease morbidity for RA patients and improving their quality of life.

Disclosure and Conflict of Interest:

Competing interests:

There are no competing interests that the authors can disclose with regard to this article.

Consent for publication: Not applicable due to patients' privacy concern.

Availability of data and materials:

Due to patient privacy, the datasets created and/or analyzed during this work are not publically accessible, but they are obtainable from the corresponding author upon justifiable request.

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Authors contributions:

All authors have participated in the concept, design, collect, analysis and interpretation of data, writing, drafting and revising the manuscript. FM: Patients were gathered, clinical examinations and evaluations were completed, and result sheets were produced. MAZ performed statistical analysis and data tabulation, analysed the patient's data, and wrote the final results. MM: collected patient data, performed clinical examinations and assessments, and revised manuscripts and data interpretation. NN: was a key contribution to the manuscript's writing and editing, as well as its design, implementation, and ethical review. All authors have read the final version that has been submitted, accepted it, and agreed to the terms listed on the Authorship Agreement Form. The manuscript's material has not been released or offered for publication anywhere. The final manuscript was read and approved by all writers.

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Abbreviations:
RA= Rheumatoid arthritis
RANKL= Receptor activator of nuclear factor kappa B ligand
ACR/EULAR= American College of Rheumatology / European League Against Rheumatism
BMD= Bone mineral denisty
TNF= Tumor necrosis factor

HAQ DI= Health Assessment Questionnaire disability index
DAS 28 score= Disease activity scoring 28
CBC=Complete blood count.
ESR= Erythrocyte sedimentation rate
CRP= C-reactive protein
RF = rheumatoid factor
OPD= Osteoprotegerin

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تقييم مخاطر الكسر وتأثير مضادات الروماتيزم الأدوية في المصريين المصابين بالتهاب المفاصل الروماتويدي

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الخلفية:

خلال العقود الثلاثة الماضية ، وجدت العديد من الدراسات أنه إلى جانب التهاب المفاصل وتدميرها ، تكون كتلة العظام لدى مرضى التهاب المفاصل الروماتويدي أقل مما هي عليه في السكان غير المتطابقين من التهاب المفاصل الروماتويدي ، كما أن خطر الإصابة بهشاشة العظام مرتفع. وبالمثل ، فإن معدل حدوث كسور هشاشة العظام مرتفع خاصة عند مقارنته بعموم السكان من نفس العمر والجنس.

هدف العمل: هدفنا في هذه الدراسة هو تقييم مخاطر الكسور لدى مرضى التهاب المفاصل الروماتويدي المصريين وتأثير الأدوية المضادة للروماتيزم على مخاطر الكسور ، لمحاولة منع الكسور وتحسين نوعية حياتهم.

المرضى والطريقة: الدراسة عبارة عن دراسة حالة ضابطة أجريت على 100 مريض لديهم تشخيص مؤكد لمرض التهاب المفاصل الروماتويدي ، مستوفين معايير الكلية الأمريكية لأمراض الروماتيزم / الرابطة الأوروبية لمكافحة الروماتيزم 2010 (ACR / EULAR) لمعايير .RAجميعهم يبلغون من العمر 40 عامًا أو أكثر ، وتم أخذ التاريخ الطبي بما في ذلك خيارات العلاج من جميع المرضى ، حيث تم أخذ 50 شخصًا يتمتعون بصحة جيدة كمجموعة ضابطة. تم إجراء الفحص العام والعضلي الهيكلي. التقييم السريري للمرضى من خلال HAQ DI و .28 DASبيانات المختبر بما في ذلك الأجسام المضادة CBC و ESR و CRP و RF والأجسام المضادة لـ .CCP.

نتائج: وجدنا أن 89 (89٪) من مرضى التهاب المفاصل الروماتويدي لدينا كانوا من الإناث ، بينما في المجموعة الضابطة 45 (90٪) كانوا من الإناث. ترقق العظام كان موجودا في 34 (34٪) من المرضى ، 8 (16٪) من الاصحاء. تعرض 4 مرضى فقط (4٪) لخطر الإصابة بكسور ترقق العظام ، في حين تم العثور على مخاطر كسر الورك في 14 (14٪) من مرضانا في مجموعة التحكم ، 1 (2٪) كان لديه خطر كبير لكسر هشاشة العظام ، في حين تم العثور على مخاطر كسر الورك في (6٪). كان هناك زيادة كبيرة في خطر الإصابة بالكسور لكل من كسور هشاشة العظام الرئيسية وكسور الورك وزيادة خطر الإصابة بهشاشة العظام في مرضى التهاب المفاصل الروماتويدي مقارنة بمجموعة التحكم. كان هناك ارتباط عكسي بين FRAX ومدة المرض ، وفيتامين D، BMI، DEXA، leflunamide، HCQ ، واستخدام العلاج البيولوجي. كان هناك ارتباط إيجابي بين FRAX و DAS و HAQ و CRP و ESR والعمر والجنس الأنثوي والتدخين والجرعة العالية من الستيرويد والميثوتريكسات والعلاج المشترك و RF ومضاد CCP ، وكان هناك علاقة عكسية بين DEXA ومدة المرض ، DAS، HAQ ، مصل الكالسيوم ، و .ESR

الخلاصة: لا يزال انتشار OP في مرضى التهاب المفاصل الروماتويدي كبيرًا ويتطلب تدخلات أفضل ومبكرة ، على الرغم من التحسينات المهمة في الوقاية من مرضى التهاب المفاصل الروماتويدي وعلاجهم وأدوات التشخيص.