"Clinical Profile of Rheumatoid Arthritis and Its Association with Atherosclerosis".

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*ABSTRACT: Background: Rheumatoid arthritis (RA) is the commonest rheumatological disorder seen in clinical practice, with an estimated prevalence in the community in India of 0.75 %. **Results:**Most common age group affected was 41-50 years. Mean age of the patients in study was 48.9 ± 9.4. Females were affected more than males in present study with male to female ratio being 1:1.5. Most common presenting feature was morning stiffness in 90% of cases followed by tender joints (60%), painful joints (44%), Swollen joints (32%). Polyarticular involvement was seen in 64% while oligoarticular and monoarticular involvement were 20% and 16% respectively. Limb deformity was present in 56% of cases. ESR was raised in88%. Most common extra articular manifestation was anaemia (56%) followed by depression (30%), Raynaud's phenomenon (20%), sicca syndrome (12%), pulmonary manifestation (6%), cardiac manifestation (6%), peripheral neuropathy (4%) and ocular manifestation (4%). Most common joint involved is wrist joint of left hand (45 patients), followed by wrist joint of right hand (43 patients), and followed by 2ndmetatarsophalangeal joint of left hand (38 patients). Most common large joint involved is knee joint (40 patients) followed by shoulder joint (38 patients). Mean CIMT of cases was 0.117 ± 0.02 which was statistically significantly higher than control group mean CIMT of 0.07 ± 0.01. Mean CIMT in cases positive for plaques was 0.190 ± 0.031 which was significantly higher than that of controls having 0.07 ± 0.02. The sensitivity and specificity of CIMT as a marker of atherosclerosis in present study were 74% & 70% respectively. DAS-28 score with low disease activity score were 30%, moderate disease activity score were 48% and heavy disease activity score were 22%. HAQ score severity 22% patients fell in to mild to moderate score, 52% in to moderate to severe score and remaining 26% patients were very severe HAQ score grading. Correlation co-efficient is 0.8 which suggest that there is strongly positive co-relation between DAS-28 score and HAQ score. DAS-28 score has clear impact on patient's daily living activity which is evident from HAQ scoring (p-value=0.012). As the scoring in DAS-28 score increases severity of the disease is also increases and patient's daily living activity gets compromised which can be accessed by HAQ scoring.*
Keywords: Arthritis, Treatment, HAQ Scoring, DAS-28, Prognosis.

Date of Submission: 05-11-2019   Date of Acceptance: 20-11-2019

I.   Introduction

Rheumatoid arthritis (RA) is the commonest rheumatological disorder seen in clinical practice, with an estimated prevalence in the community in India of 0.75 %[1].

It means around 7 million people affected with Rheumatoid Arthritis. Limitations of physical activity adds to mortality, morbidity and possess the huge economic burden with significant loss of work hours. RA is associated with disability, shortened life expectancy, and increased mortality as compared to the general population[2]. This study aims at assessing the impact of disease activity on daily living with special reference to DAS score-28(disease activity score-28).

The diagnosis of patients with established Rheumatoid Arthritis (RA) is based upon symmetrical polyarthritis characteristically involving small joints of the hands with / without deformities. The current

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treatment approach for patients with rheumatoid arthritis involves early initiation of aggressive therapy with disease-modifying anti-rheumatic drugs (DMARDs) with the goal of achieving remission.

Such "goal directed" therapy requires repeated assessment of disease activity for making appropriate modifications in treatment. Accurate measurement of disease activity in patients with RA has the same importance as the measurement of blood glucose or blood pressure in patients with diabetes mellitus or hypertension, respectively.

Assessment of disease activity in RA is a complex process since it is reflected in several clinical and laboratory domains like swollen and tender joint counts and the erythrocyte sedimentation rate (ESR). Single measures of disease activity are likely to be inaccurate. This lead to the creation of composite indices which take into account multiple variables.

The "gold standard" index used to assess disease activity both in trials and in the clinic has been the Disease Activity Score-28 (DAS-28). DAS-28 is measured by assessing 28-tender-joint count (range 0–28), 28-swollen- joint count (range 0–28), Erythrocyte Sedimentation Rate (ESR) and patient global assessment on a visual analogue scale (VAS) (0–100mm). 2 DAS- 28 is a continuous index ranging from 0 to 9.4, in which low disease activity as is defined as a score ≤3.2; moderate disease activity as scores >3.2 to ≤5.1; high disease activity as scores >5.1. 3 A commonly used cut off point for remission in DAS-28 is <2.6. 4 The calculation of DAS28 requires the use of a formula involving square roots and logarithms which can only be done with a specific calculator.

Form assessment of Impact on daily living each patient would complete a Health Assessment Questionnaire (HAQ).

The health assessment questionnaire is an instrument to measure the impact of the disease on a patient's life. It assesses the ability of the person to carry out various activities of daily living and provides a measure of the disability caused by the disease.

Hence the study aimed at assessment of impact of disease(by DAS-28 score) on limitations of daily living activities(bu HAQ score) through clinical examination thoroughly, so that it can serve as a tool for gauging impact of treatment also.

II.   Patients And Methods:

A cross-sectional observational study was conducted, involving 50patients of RA who came to Civil Hospital Ahmedabad between August 2016 to August 2018. Age and sex matched 50 healthy controls were included in the study.

Inclusion criteria:
- Patients more than 12 years of age and satisfying the American College of Rheumatology (formerly the American Rheumatism Association) criteria for RA were included in the study.

Exclusion criteria:
- Patients with age below 12 years and RA overlap with other rheumatic diseases were excluded from the study.
- Patients and control subjects exhibiting traditional risk factors like hypertension (blood pressure >140/90 mm Hg), smoking, diabetes mellitus, and clinically manifest atherosclerosis by way of CAD, peripheral vascular disease (PVD), cerebrovascular disease etc. were excluded from the study.
- Patients with history of cardiac, respiratory, renal or hepatic failure, psychological disorders and congenital deformities were excluded from the study.
- Patients with chronic use of pain medications and history of substance abuse & current opioid use were also excluded from the study.
  All the patients were subjected to clinical evaluation in the form of detailed history and physical examination. The laboratory investigations carried out in RA patients included hemoglobin, total and differential white cell counts, platelets, ESR, blood glucose, liver and kidney function tests, serum lipid profile, ECG, chest X-ray, urine analysis and rheumatoid factor. Thyroid profile was done if thyroid dysfunction was clinically suspected. Plain radiographs of the hands and wrists were taken. Similarly, all the controls were subjected to a thorough clinical evaluation and estimation of blood sugar and lipids.

All subjects (including controls) underwent carotid artery Doppler. The common carotid arteries (CCA) were examined bilaterally up to the bifurcation (including proximal part of internal carotid artery (ICA) and external carotid artery (ECA). The intimal media thickness (IMT), plaque characterisation (including echotexture, calcification, and cavitation) were assessed – initially by gray scale USG and then followed by colour flow imaging. All measurements were taken in diastole, measured in the phase when the lumen diameter is at its smallest and IMT at its largest.

The cut off values used for different parameters of studies are as follows: Anaemia- Hb<11 gm/dl, ESR by Westergreen>10mm for men and >20mm for women, Cholesterol >200mg/dl, Triglyceride >150m mg/dl, HDL<40, LDL >160, CIMT >0.08 cm as positive.

DAS 28 score was calculated for each patient and the results were
Classified in four categories.
Category A: <2.6- Disease remission
Category B: 2.6 – 3.2: Low disease activity
Category C: 3.2 – 5.1: Moderate disease activity
Category D: >5.1: High disease activity

Form assessment of Impact on daily living Each patient would complete a Health Assessment Questionnaire (HAQ).
The health assessment questionnaire is an instrument to measure the impact of the disease on a patient's life. It assesses the ability of the person to carry out various activities of daily living and provides a measure of the disability caused by the disease.
The original HAQ was first described in 1980 by Fries et al. from Stanford University. 18 In 1983, Pincus et al. published an abridged version ('Modified HAQ' or MHAQ), retaining only eight questions out of the original 20 and showed that MHAQ captured the same information as obtained with the somewhat lengthy original HAQ.
Pincus et al subsequently published a more comprehensive instrument called the multi-dimensional HAQ (MDHAQ) in which advanced activities of daily living and items related to psychological domain were added to the MHAQ.
A modified version of the MDHAQ adapted for clinical use in Indian patients was developed and validated by Kumar et al in 2002.
Descriptive statistical analysis was carried out in the present study.
Results on continuous measurements are presented on mean ± SD and results on categorical measurements are presented in number (%).significance is assessed at 5% level of significance. Student t test has been used to find the significance of study parameters on continuous scale while chi square test has been used to find the homogeneity of sample on categorical scale.
Suggestive significance: P value: $0.05<P<0.01$
Moderately significant: P value: $0.01<P\leq0.05$
Strongly significant: P value: $P\leq0.01$

III. Results And Statistical Analysis:

Various observations from our study have been tabulated in different tables and results are discussed along with. They are as follows

TABLE NO.1: AGE INCIDENCE IN RHEUMTOID ARTHRITIS

Age Group(years)	Cases		Controls	
	No	%	No	%
31-40	09	18	09	18
41-50	21	42	21	42
51-60	14	28	14	28
61-70	06	12	06	12
Mean age group	48.9+/- 9.47			

Samples are age matched with p=1.0
➤ There were 9 patients in the age group of 31-40 and 21 patients in age group of 41-50.
➤ Age group of 51-60 and 61-70 had 14 and 06 patients respectively.
➤ Our study has similar number of controls in each age group.
➤ No patients in our study were <31 or >70 years of age.
➤ Mean age of patients in the study was 48.9 ± 9.47.

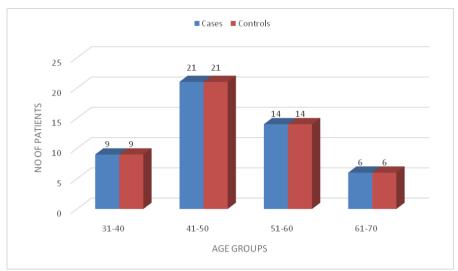**CHART NO.1: AGE INCIDENCE IN RHEUMATOID ARTHRITIS**

TABLE.2: COMPARISON OF AGE INCIDENCE WITH OTHER STUDIES.

PRESENT STUDY MEAN AGE GROUP	J Sany et al[3]	Licia Maria Henrique da Mota et al [4]	H.Singh et al[5]	V Mahajan et al[6]
48.9+/-9.47	56.7+/- 13.9	45.64+/-14.51	44.60+/-11.63	44.06+/-11.32

➢ Mean age of patients in our study was 48.9 ± 9.47 with mean age group being 41-50 years.
➢ Mean age in study done by J Sany et al in France was 56.7 ± 13.9, by H.Singh was 44.60 ± 11.63 and by V Mahajan was 44.06 ±11.32.
➢ This shows that RA has similar age incidences worldwide
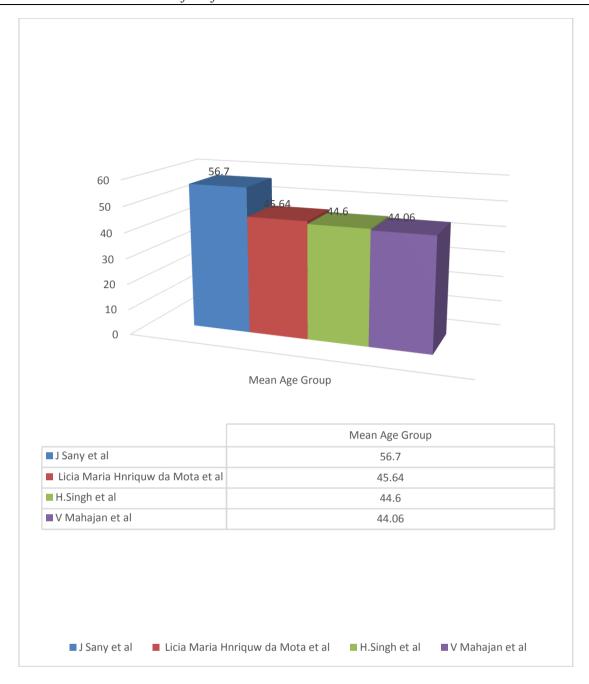
CHART.2: COMPARISON OF AGE INCIDENCE WITH OTHER STUDIES

	Mean Age Group
■ J Sany et al	56.7
■ Licia Maria Hnriquw da Mota et al	45.64
■ H.Singh et al	44.6
■ V Mahajan et al	44.06

TABLE.3 GENDER DISTRIBUTION OF PATIENT STUDIED

Sex	Cases		Control	
	No	%	No	%
Male	20	40	14	28
Female	30	60	36	72

Samples are gender matched with p=1.0
- In cases, 60 %(n=30) were females and 40 %(n=20) were males.
- In controls, 60 %(n=30) were females and 40 %(n=20) were males.
- Male to female ratio in our study was 1:1.5.

TABLE NO.4: COMPARISION OF SEX INCIDENCE WITH OTHER STUDIES

SEX	Present study	H.Singh et[5]	J Sany et al[3]	V Mahajan et al[6]
MALE	40%	33%	22.7%	06%
FEMALE	60%	67%	77.3%	94%

- The higher preponderance of females in our study was comparable with other studies like H.Singh et al having 67%, J Sany et al77.3% and V Mahajan 94%.

➢ Females outnumbered males in all these studies suggesting that the burden of rheumatoid arthritis is higher in females.
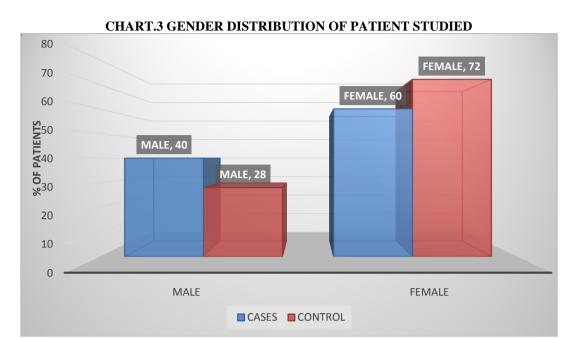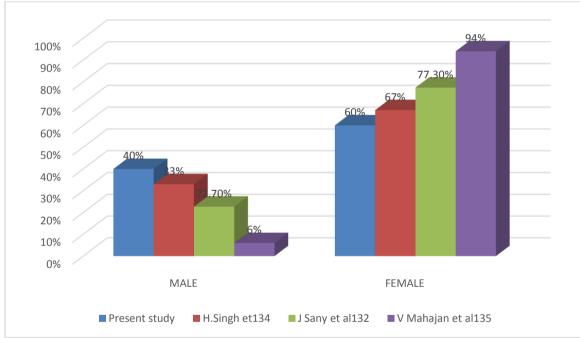
CHART.3 GENDER DISTRIBUTION OF PATIENT STUDIED

CHART NO.4: COMPARISION OF GENDER DISTRIBUTION WITH OTHER STUDIES

TABLE.NO.5: CLINICAL FEATURES OF RA.

CLINICAL FEATURES	NO OF CASES	% OF CASES
Painful Joints	22	44
Tender joints	30	60
Swollen joints	16	32
Morning stiffness	45	90
Mono-articular involvement	08	16
Oligo-articular involvement	10	20
Poly-articular involvement	32	64
Limb Deformity	28	56
Raised ESR	44	88

➢ Most common presenting complaint was morning stiffness in 90% of cases.

➤ It was followed by tender joints (60%) and painful joints (22%).
➤ Swollen joints were seen in 32% of cases.
➤ Most cases presented with polyarticular involvement (64%).
➤ Oligoarticular and monoarticular involvement were 20% and 16%respectively.
➤ Limb deformity was present in 56% of cases. ESR was raised in88%.

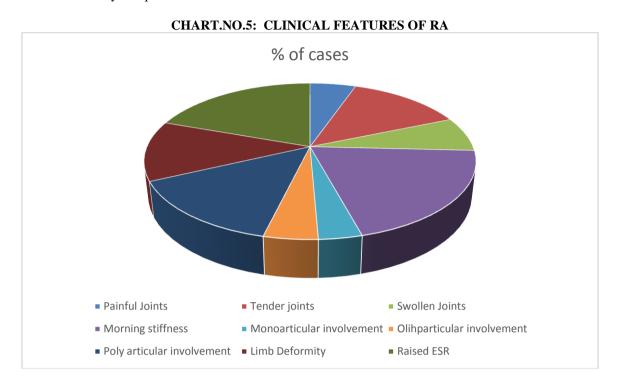### CHART.NO.5: CLINICAL FEATURES OF RA

TABLE NO.6: COMPARISON OF CLINICAL FEATURES WITH OTHER STUDIES.

CLINICAL FEATURES	PRESENT STUDY	Licis Maria Henrique da Mota et al[4]
Painful Joints	44	18.64
Tender joints	60	-
Swollen joints	32	13.92
Morning stiffness	90	62.3
Moniarticular involvement	16	4.61
Oligo-articular involvement	20	16.15
Poly articular involvement	64	69.23
Limb Deformity	56	-
Raised ESR	88	-

➤ A study done by Licia Maria Henrique da Mota in France also showed similar results.
➤ In their study, morning stiffness was present in 62.3% of cases, painful joints in 18.64%. Polyarticular joint involvement in69.23%. The results are comparable with present study.

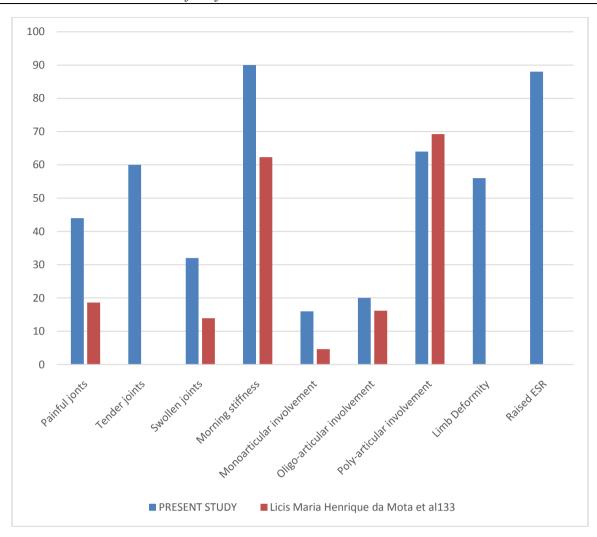### CHART.6: COMPARISON 0F CLINICAL FEATURES WITH OTHER STUDIES

PRESENT STUDY ■ Licis Maria Henrique da Mota et al133

Table.7: EXTRAARTICULAR MANIFESTATIONS OF RA.

EXTRAARTICULAR MANIFESTATION	NO. OF CASES	% OF CASES
Anemia	28	56
Raynaud's manifestation	10	20
Pulmonary manifestation	08	06
Ocular manifestation	02	04
Cardiac manifestation	03	06
Peripheral neuropathy	02	04
Depression	15	30
Siccca Syndrome	06	12

➢ Extra articular manifestations are common clinical findings in rheumatoid arthritis.
➢ In present study, Anaemia (56%) was the most common extraarticular feature.
➢ It was followed by depression (30%), Raynaud phenomenon (20%)and sicca syndrome in 12%.
➢ Pulmonary and cardiac manifestations were seen in 6% and 6%respectively while ocular manifestation was seen in only 4%.
➢ Peripheral neuropathy was present in 4% cases.
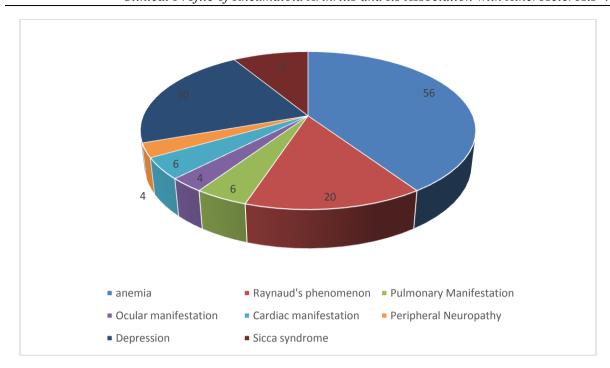
CHART.6:EXTRA-ARTICULAR MANIFESTATIONS OF RA.

TABLE.7: COMPARISON OF EXTRAARTICULAR MANIFESTATIONS WITH OTHER STUDIES

EXTRAARTICULAR MANIFESTATION	PRESENT STUDY	Licia Maria Henrique da Mota et al[4]	Sahatciumeka et al [7]	Sandeepsharma et al [8]
Anemia	56	18.46	97.8	82
Raynaud's phenomenon	20	09.43	-	-
Pulmonary manifestation	16	3.07	-	-
Ocular manifestation	04	3.07	4	06
Cardiac manifestation	06	0.0	-	20
Peripheral neuropathy	0 4	1.53	16.7	04
Depression	30	13.84	-	-
Siccca Syndrome	12	13.84	-	-

➢ As shown in the above table, anaemia was the common extraarticular feature in all the studies, with Sharma et al having82% cases, Licia et al- 18.46% and Sahatciu et al- 97.8% cases.
➢ Cardiac manifestations were seen in large no of cases in Sharma etal study (20%) as compared to present study (04%).
➢ Peripheral neuropathy was present in just 1.53% in Licia et al study, but was present more in patients of Sahatciu et al study group (16.7%).
➢ Present study was comparable with Licia et al study in terms of raynaud's phenomenon, ocular manifestation, peripheral neuropathy and sicca syndrome and with Sharma et al study interms of high incidences of anaemia and peripheral neuropathy.

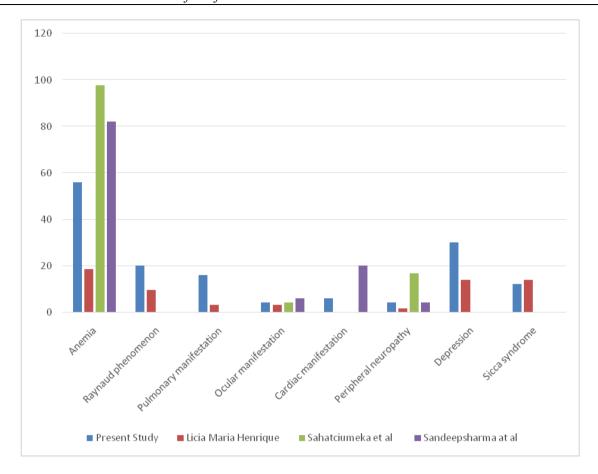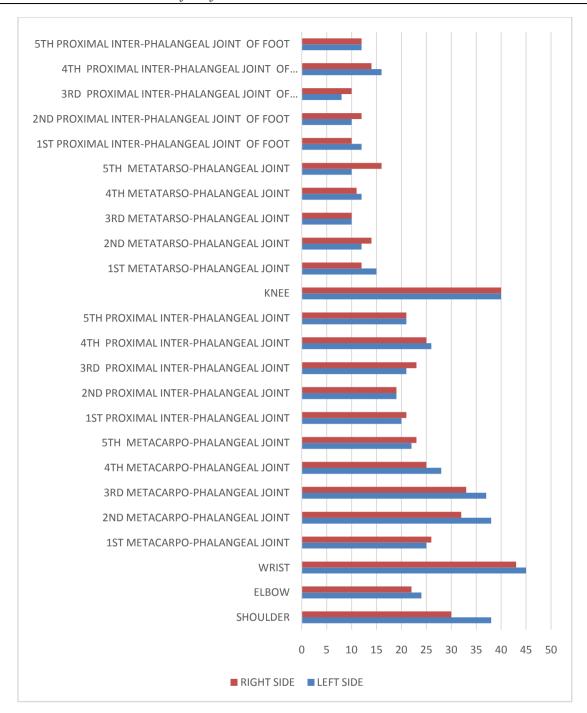**CHART.7: COMPARISON OF EXTRA ARTICULAR MANIFESTATION WITH OTHER STUDIES.**

TABLE.8: JOINT INVOLVED IN RHEUMATOID ARTHRITS PATIENTS.

JOINT INVOLVED	LEFT SIDE	RIGHT SIDE
SHOULDER	38	30
ELBOW	24	22
WRIST	45	43
1ST METACARPO-PHALANGEAL JOINT	25	26
2ND METACARPO-PHALANGEAL JOINT	38	32
3RD METACARPO-PHALANGEAL JOINT	37	33
4TH METACARPO-PHALANGEAL JOINT	28	25
5TH METACARPO-PHALANGEAL JOINT	22	23
1ST PROXIMAL INTER-PHALANGEAL JOINT OF WRIST	20	21
2ND PROXIMAL INTER-PHALANGEAL JOINT OF WRIST	19	19
3RD PROXIMAL INTER-PHALANGEAL JOINT OF WRIST	21	23
4TH PROXIMAL INTER-PHALANGEAL JOINT OF WRIST	26	25
5TH PROXIMAL INTER-PHALANGEAL JOINT OF WRIST	21	21
KNEE	40	40
1ST METATARSO-PHALANGEAL JOINT	15	12
2ND METATARSO-PHALANGEAL JOINT	12	14
3RD METATARSO-PHALANGEAL JOINT	10	10
4TH METATARSO-PHALANGEAL JOINT	12	11
5TH METATARSO-PHALANGEAL JOINT	10	16
1ST PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	12	10
2ND PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	10	12
3RD PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	8	10
4TH PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	16	14
5TH PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	12	12

CHART.8: JOINT INVOLVED IN RHEUMATOID ARTHRITIS PATIENTS

According to present study most common joint involved was wrist joint of left hand (45 patients), followed by wrist joint of right hand (43 patients), and followed by 2nd metacarpophalangeal joint of left hand (38 patients). Most common large joint involved in our study was knee joint (40 patients) followed by shoulder joint (38 patients).

Results of our study was comparable to the B. Siddhartha Kumar et al[9] study that was carried out at Medicine Outpatient Department (OPD), Rheumatology Clinic and Medicine Wards at Sri Venkateswara Institute of Medical Sciences, a tertiary care teaching hospital in Tirupati, Andhra Pradesh.

Though metatarsophalangeal joints and interphalangeal joints of foot were not taken into consideration in that study.

TABLE.8: JOINT INVOLVED IN RHEUMATOID ARTHRITIS PATIENTS IN OUT STUDY & IN COMPARISON STUDY.

	Present study		B. Siddhartha Kumar et al[9]	
Joint involved	**Left side**	**Right side**	**Left side**	**Right side**
SHOULDER	76%	60%	80%	78%
ELBOW	48%	44%	82%	78%
WRIST	90%	86%	92%	86%
1ST METACARPO-PHALANGEAL JOINT	50%	52%	72%	68%
2ND METACARPO-PHALANGEAL JOINT	76%	64%	72%	71%
3RD METACARPO-PHALANGEAL JOINT	74%	66%	72%	64%
4TH METACARPO-PHALANGEAL JOINT	56%	50%	85%	73%
5TH METACARPO-PHALANGEAL JOINT	44%	46%	61%	60%
1ST PROXIMAL INTER-PHALANGEAL JOINT	40%	42%	63%	67%
2ND PROXIMAL INTER-PHALANGEAL JOINT	38%	38%	69%	71%
3RD PROXIMAL INTER-PHALANGEAL JOINT	42%	46%	71%	71%
4TH PROXIMAL INTER-PHALANGEAL JOINT	50%	50%	64%	73%
5TH PROXIMAL INTER-PHALANGEAL JOINT	42%	42%	63%	46%
KNEE	80%	80%	83%	80%
1ST METATARSO-PHALANGEAL JOINT	30%	24%	-	-
2ND METATARSO-PHALANGEAL JOINT	24%	28%	-	-
3RD METATARSO-PHALANGEAL JOINT	20%	20%	-	-
4TH METATARSO-PHALANGEAL JOINT	24%	22%	-	-
5TH METATARSO-PHALANGEAL JOINT	20%	32%	-	-
1ST PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	24%	20%	-	-
2ND PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	20%	24%	-	-
3RD PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	16%	20%	-	-
4TH PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	32%	28%	-	-
5TH PROXIMAL INTER-PHALANGEAL JOINT OF FOOT	24%	24%	-	-

➢ Joint involvement pattern in our present study was comparative to comparison study as like Most commonly involved small joints were left wrist (92%) followed by the right wrist second and third metacarpal phalangeal joints in that order.

➢ Most common large joint involvement was observed to be knee (80%) followed by elbow and shoulder joint (78%).

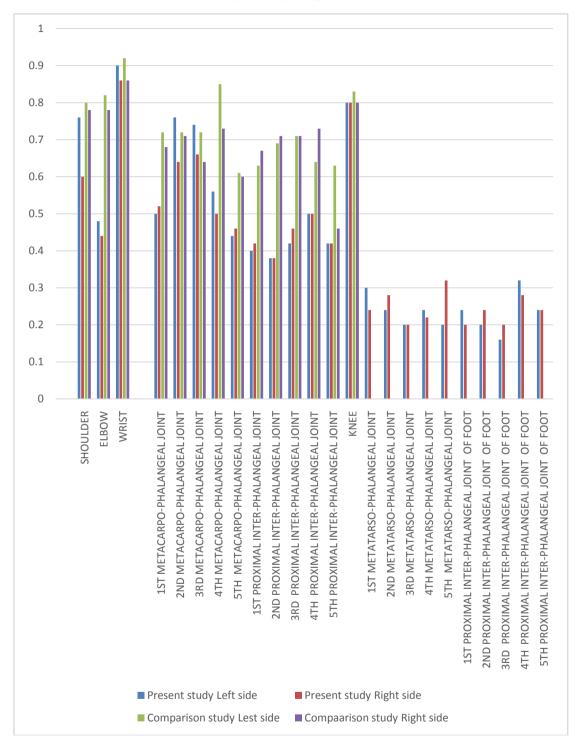**CHART.8: JOINT INVOLVED IN RHEUMATOID ARTHRITIS PATIENTS IN OUT STUDY & IN COMPARISON STUDY.**

TABLE NO.9: COMPARISON OF CIMT IN TWO GROUPS ACCORDING TOPRESENCE OR ABSENCE OFPLAQUE.

Plaque	Mean CIMT		P value
	Cases	Controls	
Present	0.190+-0.031	0.07+-0.02	<0.0001
Absent	0.098+-0.030	0.06+-0.01	<0.0001

CHART NO 9: COMPARISON OF CIMT IN TWO GROUPS ACCORDING TO PRESENCE OR ABSENCE OFPLAQUE.

- ➢ Mean CIMT in cases positive for plaques was 0.190 ± 0.031 which was significantly higher than that of controls having 0.07 ± 0.02 with p value<0.0001.
- ➢ Mean CIMT in cases positive for plaque was more than those negative for plaque (0.098 ± 0.030) showing the severity of involvement of carotid arterial wall with progression of disease, presence of plaque being the marker of disease progression.
- ➢ Mean CIMT of cases negative for plaques was also significantly higher than that of controls with p value being<0.0001.

TABLE.10: ROC CURVE ANALYSIS FOR PREDICTING CIMT AS A MARKER OF ATHEROSCLEROSIS.

CIMT	Sensitivity	Specificity	AU ROC
>0.08	74	70	0.743

- ❖ The Receiver Operator Curve (ROC)

- ➢ The diagnostic performance of a test, or the accuracy of a test to determine diseased cases from normal cases is evaluated using Receiver Operating Curve analysis (Metz, 1978; Zwing & Campbell,. 1993). Performance of laboratory or diagnostic tests (Grineretal, 1981).
- ➢ In the above graph if the black line is exactly meeting the orange diagonal line then it indicates that the test cannot differentiate between two groups under study. Here the black line is away from orange diagonal line and area covered under it is 0.743 which indicates that the test used will differentiate between two groups studied.
- ➢ The sensitivity and specificity of CIMT as a marker of atherosclerosis in present study is 74% & 70& respectively.

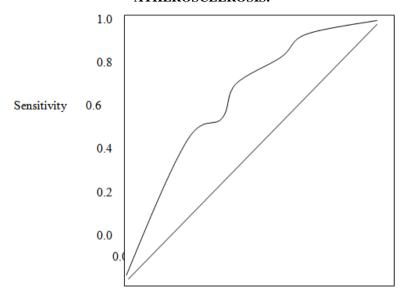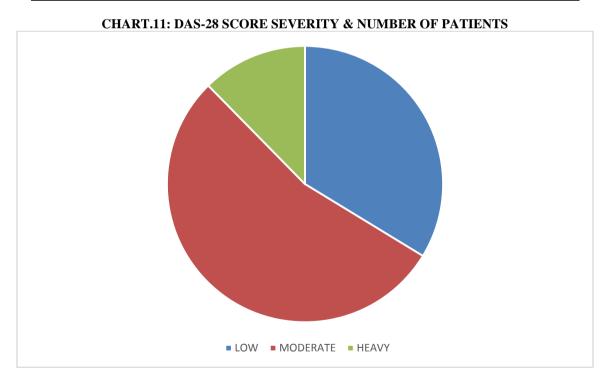**CHART.10: ROC CURVE ANALYSIS FOR PREDICTING CIMT AS A MARKER OF ATHEROSCLEROSIS.**

TABLE.11: DAS-28 SCORE SEVERITY & NUMBER OF PATIENTS

DAS-28 SCORE SEVERITY	NUMBER OF PATIENTS
LOW	15
MODERATE	24
HEAVY	11

CHART.11: DAS-28 SCORE SEVERITY & NUMBER OF PATIENTS

■ LOW ■ MODERATE ■ HEAVY

As per our present study carried out on opd basis patients, patient with das-28 score in low disease activity score were 30%, moderate disease activity score were 48% and heavy disease activity score were 22%.

TABLE.12: HAQ SCORE GRADING AND NUMBER OF PATIENTS

HAQ SCORE SEVERITY	HAQ SCORE GRADING
MILD TO MODERATE	11
MODERATE TO SEVERE	26
VERY SEVERE	13

CHART.12: HAQ SCORE GRADING AND NUMBER OF PATIENTS.

In our study Assessment of daily living activity was is done by the Health Assessment Questionnaire (HAQ). Patients were graded on the basis of their answers to the questions asked to them.

According to HAQ score severity 11 patients fell in to mild to moderate score, 26 in to moderate to severe score and remaining 13 patients were very severe HAQ score grading.
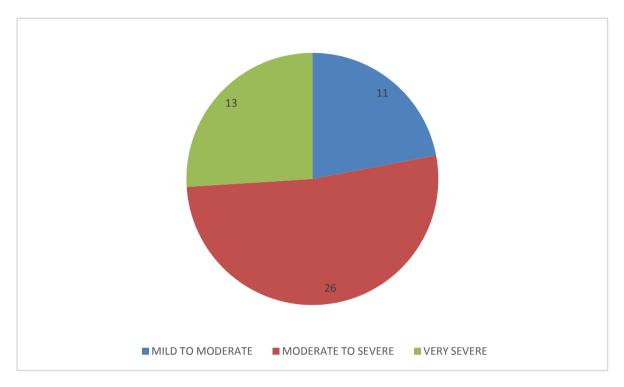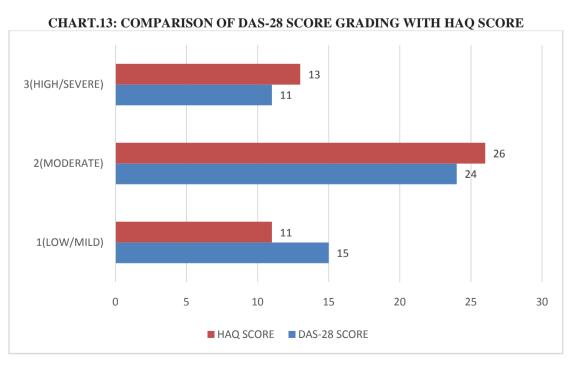

TABLE.13: COMPARISON OF DAS-28 SCORE GRADING WITH HAQ SCORE

GRADE	DAS-28 SCORE(NO OF PATIENTS)	HAQ SCORE(NO OF PATIENTS)
1	15	11
2	24	26
3	11	13

CHART.13: COMPARISON OF DAS-28 SCORE GRADING WITH HAQ SCORE

From our study its evident that das-28 score has clear impact on patient's daily living activity which is evident from HAQ scoring.

As the scoring in das-28 score increases, severity of the disease increases and patient's daily living activity gets compromised as accessed by HAQ scoring.

Control in the study were absolute normal healthy patients so DAS-28 and HAQ score were 0.

The drawback of this study is that DAS-28 score doesn't involve small joints of foot like metatarsophalangeal joins and interphalangeal joints, so variation is the results between DAS-28 score grading and HAQ score grading can be explained.
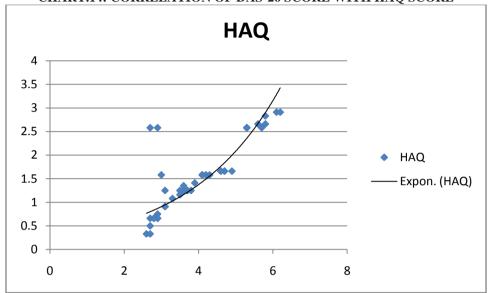
CHART.14: CORRELATION OF DAS-26 SCORE WITH HAQ SCORE

Correlation co-efficient between DAS-28 score and HAQ score in our study is 0.8312.
➢ Correlation co-efficient grading is between -1 to +1.
   -1 to 0 suggestive of negative or inverse correlation
   0 to +1 suggestive of positive correlation
      0 to 0.3 suggestive of mild positive correlation.
      0.3 to 0.6 suggestive of moderate positive correlation.
      0.6 to 1.0 suggestive of strongly positive correlation.

Thus is our study correlation co-efficient is 0.8 which suggest that there is a strongly positive co-relation between DAS-28 score and HAQ score.

P-value in our study is 0.012. As P-value is less than 0.05 the results of our study is statistically significant and thus co-relation between DAS-28 score and HAQ is not just by chance but its statistically strongly significant.

IV.   Conclusion

We concluded that, Rheumatoid Arthritis which is a chronic Inflammatory disease mainly involving joints has been found to have impact on daily living activity of the patient. As the disease progresses and patient's disease activity score increases, patient's daily living activity is adversely affected and disability increases. The physician can easily assess patients' disease progression and daily living activity just by assessing DAS-28 score clinically and can take further measures to control disease progression at early stage. Main drawback of DAS-28 score is that it does not take small joints of lower limb into consideration. Thus DAS-28 score and its correlation with HAQ score gives precise status about current status about patients disease and about measures to be taken to control patients disease activity.

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ABBREVIATIONS
RA- Rheumatoid Arthritis, CIMT- Carotid Intimomedial Thickness, FMD- Flow Mediated Dilatation, USG-Ultrasonography, ACPA- Anti Citrullinated Peptide Antibody, HLA- Human Leucocyte Antigen, CVD-Cardiovascular Disease, IHD- Ischemic Heart Disease, TNF- Tummor Necrosis Factor, IL- Interleukin, HDL-High Density Lipoprotein, LDL- Low Density Lipoprotein, TG- Triglycerides, MCP- Metacarpophalangeal Joint, PIP- Proximal Interphalangeal Joint, DIP- Distal Interphalangeal Joint, ESR- Erythrocyte Sedimentation Rate, CRP- C Reactive Protein, ACR- American College of Rheumatology, EULAR- European League against Rheumatism, DMARDs- Disease Modifying Anti Rheumatoid Drugs, NSAIDs- Non Steroidal Anti Inflammatory Drugs, DAS- Disease Activity Score, HAQ- Health Assessment Questionnaire.