Welcome to Presentation of Thesis Proposal

Title

A Study of Carotid Intima-Media Thickness in Patients with Rheumatoid Arthritis

Submitted by

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INTRODUCTION

Introduction

- Rheumatoid arthritis (RA) is a systemic autoimmune disease that has been characterized by extra-articular involvement and inflammatory arthritis affecting approximately 0.24 to 1 percent of the general population globally (England and Mikuls, 2020).
- RA is a debilitating disease that not only affects the quality of life (QOL) but also carries a high cardiovascular disease (CVD) risk (Khaliq et al., 2023).
- The incidence of myocardial infarction is 30%-60% higher and its onset is approximately 10 years earlier in RA patients (Corrales et al., 2015).

Introduction Cont..

- The increase in cardiovascular disease among these patients is not entirely understood by conventional cardiovascular risk factors but inflammation may be a contributing factor behind it (van Sijl et al., 2011).
- Furthermore, there is an increasing evidence that atherosclerosis is an inflammatory disease (Kim et al., 2015).
- The inflammatory nature of the RA disease can result in the transformation of a fat streak into an unstable plaque in artery as well as aberrant lipid metabolism and promote different stages of atherosclerosis, from endothelial dysfunction, plaque development to plaque rupture (Singh et al., 2025).

Introduction Cont..

- Patients with RA have premature atherosclerosis which can be assessed by increased intima-media thickness (IMT) in the common carotid artery (CCA).
- Carotid intima-media thickness (cIMT) is an important marker to quantify atherosclerotic burden in the common carotid artery (Jamthikar et al., 2020).
- Carotid ultrasound provides quantitative measurements of cIMT that can be used to assess cardiovascular disease (CVD) risk and to monitor ongoing disease progression and regression.

Introduction Cont..

- Though atherosclerotic disease may remain asymptomatic for decades, its consequences can be severe, even fatal.
- Early detection of atherosclerosis and efforts to ameliorate its progression has become important goals in prevention of rheumatoid arthritis.
- Measurement of cIMT will be beneficial in the early detection of atherosclerosis and the implementation of the requisite measures to mitigate the development of cardiovascular diseases in rheumatoid arthritis patients.

RATIONALE

Rationale

- Rheumatoid arthritis (RA) is a chronic condition that induces stiffness, swelling and discomfort of the joints and typically impacts the wrists, ankles and hands.
- A critical aspect of RA is the development of subclinical atherosclerosis which serves as a precursor to more severe cardiovascular events including myocardial infarction and stroke.
- Atherosclerosis is a dynamic inflammatory process starting with endothelial activation, leukocyte recruitment, lipid oxidation, culminating with plaque destabilization and thrombosis.

Rationale Cont..

- This sub-clinical stages of atherosclerosis can be measured accurately and reliably by carotid intima-media thickness (cIMT) using ultrasound techniques which are readily accessible to the carotid arteries.
- So, increased cIMT, as measured by ultrasound, is considered an early indicator of overall atherosclerosis.
- The non-invasive, rapid, reproducible and risk-free nature of cIMT measurement is just one of its numerous benefits.
- It is capable of serving as a surrogate marker for the severity of the disease and to quantify the extent of subclinical disease.

Rationale Cont..

- cIMT measurement of the carotid artery is a cost-effective, sensitive and noninvasive method for the diagnosis of atherosclerosis in RA patients who are at-risk of developing cardiovascular diseases.
- Though it is an important issue for RA patients but there are very limited study regarding the topics in Bangladesh.
- This study will be carried out to determine the thickening of carotid intima-media in patients with rheumatoid arthritis in comparison to non-rheumatoid arthritis individuals by high resolution B-mode ultrasonography.

Research hypothesis

Carotid intima-media thickness is higher in patients with rheumatoid arthritis than the healthy individuals.

OBJECTIVES

General Objective

To assess and compare the carotid intima-media thickness between the patients with rheumatoid arthritis and healthy individuals.

Specific objectives

- To determine the carotid intima-media thickness by B-mode ultrasonography in patients with rheumatoid arthritis.
- To determine the carotid intima-media thickness by B-mode ultrasonography in age and sex matched healthy participants.
- To compare the carotid intima-media thickness between the patients with rheumatoid arthritis and healthy participants.
- To describe the socio-demographic characteristics of the participants.

METHODS AND MATERIALS

- **Study design:** It will be an observational case-control study.

- **Place and period of study:** This study will be carried out over a period of one and half years from January 2025 to July 2026 in the Department of Medicine in collaboration with Department of Radiology & Imaging, Rajshahi Medical College Hospital, Rajshahi.

- **Data collection place:** Data will be collected from the inpatient and outpatient Department of Medicine and outpatient Department of Rheumatology, Rajshahi Medical College Hospital, Rajshahi.

- **Study population:** All rheumatoid arthritis patients based on the 2010 American College of Rheumatology/ European League Against Rheumatism (ACR/EULAR) criteria with disease duration of at least 5 years as well as healthy individuals at the time of data collection will be the study population. Study population will be divided into two groups
- Rheumatoid arthritis patients will be included in one group.
- Healthy individuals will be included in another group.

ELIGIBILITY CRITERIA

Inclusion criteria

The following respondents will be included in this study

- Diagnosed rheumatoid arthritis patients fulfilling ACR/EULAR 2010 classification criteria and suffering from the disease for at least 5 years.
- Adult age and sex matched healthy subjects with no history of inflammatory arthritis or vascular disease.
- Patients ≥ 18 years of age.
- Both genders.

Exclusion criteria

- Patients having connective tissue diseases other than RA.
- Patients with diabetes mellitus.
- Patients with hypertension (BP > 140/90 mmHg) or use of antihypertensive medications. Patients with pre-existing CVD.
- Patients on high dose steroids > 10mg/day.
- Patients with kidney disease.

Exclusion criteria Cont..

- Patients with dyslipidemia (total cholesterol > 240mg/dl, LDL >160 mg/dl, triglycerides > 200 mg/dl) or use of lipid lowering medication.

- Active smokers.
- Arthritis of any other cause including juvenile rheumatoid arthritis and juvenile idiopathic arthritis.

Sample size determination

• Sample size is determined using hypothesis testing for difference between two means Kirkwood and Sterne, (2010) as follows:

• It was expected from the findings of a previous study Sachin Kumar et al., (2024) that the cIMT was 0.95±1.06 mm in rheumatoid arthritis patients and 0.60±0.16 mm in healthy subjects. So, the minimum sample size at 5% level of significance and 80% power was calculated using the formula,

$$n = \frac{(Z_\alpha + Z_\beta)^2 \, X \, ({\sigma_1}^2 + {\sigma_2}^2)}{(\mu_1 - \mu_2)^2}$$

Sample size determination cont..

Here,

- n = Minimum required sample size to ensure the validity of the findings
- μ_1 = Mean value of cIMT in rheumatoid arthritis patients= 0.95 mm
- μ_2 = Mean value of cIMT in healthy subjects= 0.60 mm
- σ_1 = Standard deviation from the mean value among rheumatoid arthritis patients = 1.06 mm
- σ_2 = Standard deviation from the mean value among healthy subjects= 0.16 mm (Sachin Kumar et al., 2024)
- Z_α = Z value at 5% level of significance = 1.96
- Z_β = Z value at 80% power=0.85 (when β=0.2 and Power = 1-β).

Sample size determination cont..

Therefore,

$$n = \frac{(1.96 + 0.85)^2 \text{ X } (1.06^2 + 0.16^2)}{(0.95 - 0.60)^2}$$

$$= \frac{7.89\text{X}(1.12 + 0.03)}{0.12}$$

- So, calculated sample size is 37 in each group. However, 40 rheumatoid arthritis patients will be taken in one group and 40 healthy individuals will be taken in another group.

Sampling technique

- Purposive sampling technique will be followed.

Variables will be used in the study

Independent variables

- Complete blood count
- Serum creatinine
- Erythrocyte sedimentation rate
- RA titre
- C-reactive protein
- ACPA

Dependent variable

- Carotid intima-media thickness

OPERATIONAL DEFINITIONS

Operational definitions

Rheumatoid arthritis: It is a common, chronic, inflammatory, autoimmune disease of unknown etiology affecting approximately 1% of the world population.

Operational definitions cont..

Rheumatoid Arthritis according to the ACR/EULAR criteria

Domain	Category	Point
A	Joint Involvement (0-5)	
	• 1 large joint	0
	• 2-10 large joints	1
	• 1-3 small joints (large joints not counted)	2
	• 4-10 small joints (large joints not counted)	3
	• >10 joints including at least one small joint	5
B	Serology (at least one test needed for classification)	
	• Negative RF and negative ACPA (anti-citrullinated protein antibodies)	0
	• Low positive RF and low positive ACPA	2
	• High positive RF and High positive ACPA	3
C	Acute Phase Reactant (at least 1 test needed for classification; 0-1)	
	• Normal CRP and normal ESR	0
	• Abnormal CRP and abnormal ESR	1
D	Duration of symptoms	
	• Less than 6 weeks	0
	• More than or equal 6weeks	1

Operational definitions cont..

- **Healthy individuals:** Adult healthy subjects with no history of inflammatory arthritis or vascular disease.

- **Assessment of carotid intima-media:** Carotid intima-media wall thickness will be assessed by using Voluson p8 of GE Company ultrasonography machine with 7.5–10 MHz linear phased array transducer. This measurement will be performed on the left and right sides of the patient. Measurement of the intima-media thickness (IMT) will be taken at three points on each side: common carotid artery (10 mm before the bulb), bulb (5–10 mm cranially to the start of the bulb) and internal carotid artery (10 mm after the flow divider). The average of the 6 measurements will be used for the analysis. All measurements will be performed by same observer.

Data collection tools

- Data will be collected with the help of semi-structured questionnaire containing all the variables of interest, a good laboratory setting and B-mode Ultrasonography machine.

Detailed study procedure

- After obtaining approval from the ethical review committee of Rajshahi Medical College, Rajshahi, this observational case-control study will be conducted on 80 RA patients as well as healthy individuals from January 2025 to June 2026 in the Department of Medicine, Rajshahi Medical College, Rajshahi.
- Informed consent will be obtained from all the patients in the study.
- A total of 40 patients fulfilling the 2010 American College of Rheumatology/ European League against Rheumatism classification criteria for RA will be included in the study.

Detailed study procedure cont..

- All patients will be underwent a thorough baseline evaluation including a detailed review of their medical history, physical examination and disease activity score for 28 joints (DAS28) calculation.
- Baseline information regarding age, sex, duration of rheumatoid arthritis, presence and duration of morning stiffness, chest symptoms, cervical joint symptoms, list of painful joints, presence of other systemic disease and history of extra- articular manifestations of rheumatoid arthritis will be documented.
- All non-steroidal anti-inflammatory drugs (NSAIDs) and disease modifying anti rheumatic drugs (DMARDs) prescribed will be noted.

Detailed study procedure cont..

• All joints will be systematically examined for the presence of any tenderness, swelling, or deformity as well as the possible range of movements at these joints.

• Patients will be carefully observed for the presence of any extra-articular manifestations and the findings will be documented.

• Venous blood samples will be collected in the fasting state from the patients and will be investigated for erythrocyte sedimentation rate (ESR), rheumatoid factor (IgG), C reactive protein (CRP) and lipid profile. X-ray hands will be also conducted.

Detailed procedure cont..

- A professional ultra-sonographer will blinded to the study and assess the right and left carotid arteries with high-resolution B-mode ultrasound.

- cIMT ultrasound examination will be carried out at the room temperature. Patients coffee consumption and cigarette smoking will be restricted in the day of the study.

- cIMT of the CCA will be recorded while the subject in the supine position and the head slightly extended. cIMT will be measured on the far wall for both right and left carotid arteries.

Detailed study procedure cont..

- The cIMT will be recorded three times of each side with anterior, lateral oblique and posterior oblique views to increase the visualization of the arc of carotid wall and the recording session will be usually 30 minutes.
- When suitable images will be obtained (at end-diastole), these will be frozen on the ultrasound monitor for capture.
- The beginning of the dilatation of the distal CCA will be served as a reference point for the start of the measurement. cIMT will be defined as the distance from the leading edge of the first echogenic (bright) line to the leading edge of the second line.

Statistical analysis

- The data will be analyzed via Statistical Package for the Social Sciences (SPSS, version 26.0, Chicago, IL) software.
- Qualitative variables will be described by frequency and percentage, while quantitative variables will be described by the mean and standard deviation.
- Difference of means between the two groups will be tested by unpaired ‘t' test. Chi-square test will be applied for categorical data.
- The statistical significance will be evaluated as an appropriate probability level $p < 0.05$ for all tests.

Utilization of the study

i) The study will determine the subclinical atherosclerosis RA patients.

ii) The study will be helpful to take necessary steps for prevention of cardiovascular disease in RA patients.

Ethical Implications

- At first permission will be taken from the Institutional Review Board (IRB) of Rajshahi Medical College (RMC), Rajshahi. Keeping compliance with Helsinki Declaration for Medical Research Involving Human Subjects 1964, revised in 2013, all the study subjects will be informed verbally about the study design, the purpose of the study and potential benefits derived and risks involved from the study. They will also be assured that they will have full rights to withdraw themselves from the study at any time for any reasons what-so-ever. Participants who will give informed consent to participate in the study will be included as study sample.

References

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Thank You!

Informed Written Consent Form

Study title:

A Study of Carotid Intima-Media Thickness in Patients with Rheumatoid Arthritis.

Principal Investigator: Dr. Uzzal Kumar Biswas

Place and period of the study:

The study will be conducted in the Department of Medicine, Rajshahi Medical College Hospital, Rajshahi over a period of one year from January, 2025 to June, 2026.

Type and purpose of the study:

Rheumatoid arthritis is a long-term, autoimmune disease that mainly affects the joints. It is an autoimmune disease in which the body's immune system attacks its own tissues. Symptoms of the disease include pain, swelling, stiffness and bruising. These patients are more prone to cardiovascular diseases. These patients die soon because of this cardiovascular disease. However, the hope is that atherosclerosis of the carotid artery can be detected by ultrasonography long before the final stage of cardiovascular disease. As a result, cardiovascular disease can be prevented before it reaches its final stage. The purpose of this study is to diagnose atherosclerosis in the carotid artery in patients with rheumatoid arthritis and compare it with the thickness of the carotid artery in healthy people.

Selection of sample:

After matching inclusion and exclusion criteria, 80 clinically diagnosed rheumatoid arthritis patients as well as healthy individuals will be included in the study.

Expectation from the study population:

They will help in the study by giving information spontaneously.

Risks:

The study will not involve physical, social or psychological risks. No drug or placebo will be used for the purpose of the study. There was minor risk of needle prick injury such as haematoma, bruish, swelling and pain. The study will help you to know the current health situation of your body.

Rights of the participating patients:

The subject has the freedom of choice to withdraw herself or withhold information at any time during the study. This will not affect the quality of the care and treatment that she is already receiving from the institution.

Cost:

You will not pay or not benefitted from the study.

Confidentiality:

Both during research and in the future, confidentiality will be maintained. The name of the participant will not be disclosed. Each participant will be assigned identification number by the researcher. Data will be protected by coding and personal records will be maintained accordingly. Research findings will be used only for scientific presentation

and publications anonymously. Data obtained through this research project will not be handed over to anybody else not involved with it. Unintentional disclosure will be avoided by carrying out consultations where it cannot be overheard and by avoiding discussion between the professional staff in places where they might be overheard.

Participation in the study:

Your participation in this study is completely voluntary. You may refuse to participate in the study or withdraw you from the study at any time during the study. Signing this form will not affect any of your legal rights.

Obligation to participate:

If you do not participate in the proposed study or withdraw your name at any time, it will not affect your treatment.

Questions:

If you have any questions, please ask. We will do our best to answer them. If you have any additional questions in the future, you can contact the study doctor.

Permission letter:

After having comprehended the full nature, objective, method and utility of this research. I am giving my consent to its ethical value. I have not been coerced into participating in this research by any person or anybody/group and neither have my basic human rights been violated. Therefore, one the basis of the above discussed matters, I am providing and authorizing my signature through self-motivation.

Dr. Uzzal Kumar Biswas	Signature/thumb impression	Signature/thumb impression
Principal Investigator	Witness Name:	Name of legal guardian:
	Relation:	Code No:

অবহিতক্রমে সম্মতিপত্র

এই সম্মতি পত্রের উদ্দেশ্য হল আপনাকে প্রয়োজনীয় তথ্য প্রদান করা, যে তথ্যগুলো আপনাকে সিদ্ধান্ত নিতে সাহায্য করবে, আপনি এই গবেষণায় অংশ গ্রহণ করবেন কি না।

গবেষণার শিরোনামঃ

A Study of Carotid Intima-Media Thickness in Patients with Rheumatoid Arthritis.

গবেষকের নামঃ ডাঃ উজ্জ্বল কুমার বিশ্বাস।

স্থান ও গবেষণার সময়কালঃ মেডিসিন বিভাগ, রাজশাহী মেডিকেল কলেজ, রাজশাহী। সময়কাল জানুয়ারী ২০২৫ হতে জুন ২০২৬।

গবেষণার উদ্দেশ্য এবং ধরণঃ

রিউমাটয়েড আর্থ্রাইটিস একটি দীর্ঘমেয়াদী, স্বয়ংক্রিয় রোগ যা মূলত অস্থিসন্ধিকে প্রভাবিত করে। এটি একটি অটোইমিউন রোগ, যেখানে শরীরের রোগ প্রতিরোধ ক্ষমতা শরীরের নিজস্ব টিস্যুর উপর আক্রমণ করে। এই রোগে অস্থিসন্ধিতে প্রদাহ, ব্যথা, ফোলা এবং শক্ত হয়ে যাওয়ার মতো লক্ষণ দেখা যায়। এই রোগীদের পরবর্তীতে কার্ডিওভাসকুলার রোগ বেশি হতে দেখা যায়। এই কার্ডিওভাসকুলার রোগের জন্য এই রোগীরা অচিরেই মৃত্যুবরণ করে। তবে আশার কথা হচ্ছে কার্ডিওভাসকুলার রোগ চূড়ান্ত পর্যায়ে পৌছানোর অনেক আগে থেকেই ক্যারোটিড আর্টারিতে এথেরোসক্লেরোসিস দেখা যায় যা আল্ট্রাসোনোগ্রাফীর মাধ্যমে নির্ণয় করা যায়। ফলশ্রুতিতে কার্ডিওভাসকুলার রোগ চূড়ান্ত পর্যায়ে পৌছানের পূর্বেই তা প্রতিরোধ করা যায়। এই গবেষণার উদ্দেশ্য হলো রিউমাটয়েড আর্থ্রাইটিস রোগীদের মধ্যে ক্যারোটিড আর্টারিতে এথেরোসক্লেরোসিস নির্ণয় করা এবং তা সুস্থ মানুষের ক্যারোটিড আর্টারির পুরুত্বের সাথে তুলনা করা।

অংশগ্রহণকারী রোগীদের বাছাইঃ

প্রাপ্ত বয়স্ক ৮০ জন পুরুষ ও মহিলা যারা রিউমাটয়েড আর্থ্রাইটিস নিয়ে রাজশাহী মেডিকেল কলেজের মেডিসিন বিভাগে আসবে এবং এর সাথে সুস্থ মানুষকেও অন্তর্ভুক্ত করা হবে।

অংশগ্রহণকারীদের হতে প্রত্যাশা এবং তাদের করণীয়ঃ

অংশগ্রহণকারীরা স্বেচ্ছায় তাদের তথ্য দিয়ে গবেষণায় সাহায্য করবেন।

গবেষণায় অংশ গ্রহণের ঝুঁকি ও উপকারিতাঃ

এই গবেষণায় অংশগ্রহণ করে আপনি প্রাথমিকভাবে আপনার রোগ সম্পর্কে জানতে পারবেন। এই গবেষণাটি রিউমাটয়েড আর্থ্রাইটিস রোগীদের জন্য নতুন তথ্য দিয়ে সাহায্য করবে।

বিকল্পঃ

এই গবেষণায় অংশগ্রহণ করা কিংবা না করার ব্যাপারে বা অংশগ্রহণ করার পর যে কোন সময় আপনি নিজেকে গবেষণা থেকে সরিয়ে নিতে পারবেন।

খরচঃ

এই গবেষণায় অংশগ্রহণের জন্য অতিরিক্ত কোন খরচ নেই বা আপনাকে কোন টাকা পয়সা দেয়া হবে না।

তথ্যের গোপনীয়তা রক্ষাঃ

এই গবেষণায় অংশগ্রহণকারীদের যথাযথ তথ্য গোপন রাখা হবে। অংশগ্রহণকারীর ব্যক্তিগত তথ্য যেমন নাম, বয়স, ঠিকানা ইত্যাদি আলাদা কাগজে কোড সংখ্যা দিয়ে রাখা হবে যা তার মূল ডাটার সাথে মিল থাকবে এবং গবেষণাকারী নিজ দায়িত্বে তা তালাবদ্ধ করে রাখবেন। সকল মেডিকেল রেকর্ড গোপন রাখা হবে এবং অংশগ্রহণকারীর লিখিত অনুমতি ব্যতীত কোন তথ্য প্রকাশ করা হবে না।

গবেষণায় অংশগ্রহণঃ

এই গবেষণায় আপনার অংশগ্রহণ সম্পূর্ণ স্বেচ্ছামূলক। আপনি গবেষণায় অংশগ্রহণে অস্বীকৃতি জানাতে পারেন অথবা গবেষণা চলাকালীন যে কোন সময় গবেষণা থেকে নিজেকে প্রত্যাহার করে নিতে পারেন।এই ফরমে স্বাক্ষর করলে আপনার আইনগত কোর অধিকার খর্ব হবে না।

অংশগ্রহণে বাধ্যবাধকতাঃ

প্রস্তাবিত গবেষণায় অংশগ্রহণ না করলে অথবা যেকোন সময়ে নাম প্রত্যাহার করলে তা আপনার উপর কোন প্রভাব ফেলবে না।

প্রশ্নাবলী:

যদি আপনার কোন প্রশ্ন থাকে তবে দয়া করে জিজ্ঞাসা করুন। আমরা তার উত্তর প্রদান করার যথাযথ চেষ্টা করবো। যদি ভবিৎষ্যতে আপনার অতিরিক্ত কোন প্রশ্ন থাকে তাহলে গবেষণারত ডাক্তারের সাথে যোগাযোগ করতে পাবেন।

সম্মতি জ্ঞাপনের স্বীকারোক্তি/ সম্মতি দানঃ

আমি গবেষণায় নিয়োজিত চিকিৎসক এর সাথে এই গবেষণা নিয়ে আলোচনায় সন্তুষ্টি প্রকাশ করছি।আমি এটা বুঝেছি যে গবেষণায় অংশগ্রহণ স্বেচ্ছামূলক এবং আমি যে কোন সময় কোন বাধ্যবাধকতা ছাড়াই গবেষণা থেকে নিজেকে বিরত রাখতে পারি।আমি উপরোক্ত শর্তগুলো পড়েছি/ আমার সম্মুখে পঠিত হয়েছে এবং স্বেচ্ছায় গবেষণায় অংশগ্রহণ করতে সম্মতি জ্ঞাপন করছি।

ডাঃ উজ্জ্বল কুমার বিশ্বাস
প্রধান গবেষক

স্বাক্ষর/বৃদ্ধাঙ্গুলির ছাপ
স্বাক্ষীর নামঃ
সর্ম্পকঃ

স্বাক্ষর/বৃদ্ধাঙ্গুলির ছাপ
গবেষণায় অংশগ্রহণকারীর নামঃ
কোড নংঃ

Data Collection Form

(Dept. of Medicine, Rajshahi Medical College, Rajshahi)

Study Title: A Study of Carotid Intima-Media Thickness in Patients with Rheumatoid Arthritis.

Sl. No…… Date…….

Name of respondents……Address …….....

Variables:

1.	Group	1=RA group	2=Healthy control group	
2.	Age	……years		/_____/
3.	Sex	1=Male	2=Female	
4.	Religion	1=Muslim	2=Hindhu	/_____/
		3=Christian	4=Buddhist	
		5=Others……. (Please mention)		
5.	Residence	1=Rural	2=Urban	/_____/
		3=Semi-urban		

6.	Educational status	1=Illiterate/Read & write	2=Primary	/_____/
		3=Secondary	4= Higher secondary	
		5=Honors/Masters	6=Graduate plus	
		7=Others…….. (Please mention)		
7.	Occupational status	1=Housewife	2=Day labour	/_____/
		3=Farmer	4=Govt. service	
		5=NGO worker	6=Businessman	
		7=Others…….. (Please mention)		
8.	**Symptoms**			
8.1	Morning stiffness	0=No	1=Yes	/_____/
8.2	Constitutional symptoms	0=No	1=Yes	/_____/
8.3	Rheumatoid nodule	0=Absent	1=Present	/_____/
8.4	Purpura	0=No	1=Yes	/_____/

8.5	Patients on treatment	0=No	1=Yes	/_____/
8.6	Joint deformity	0=No	1=Yes	/_____/
8.7	Swollen joint	0=No	1=Yes	/_____/
8.8	Deformed joint	0=No	1=Yes	/_____/
8.9	Number of joints involvement	……..		/_____/
8.10	Erosions on x-ray	0=No	1=Yes	/_____/
9.	**Laboratory findings**			
9.1	CBC	……		/_____/
9.2	ESR	……		/_____/
9.3	CRP	……		/_____/
9.4	Serum creatinine	……		/_____/
9.5	RA titre	……		/_____/

9.6	DAS28 score	.....		/_____/
10.	Intima-media thickness in right common carotid artery	.....		/_____/
11.	Intima-media thickness in left common carotid artery	.....		/_____/
12.	Presence of plaque	0=No	1=Yes	/_____/
13.	Size of plaque	.....		/_____/
14.	Calcification	0=No	1=Yes	/_____/

(Signature of the Investigator)