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Comparative Socio-Demographic and Disease Related Characteristics between Anti-CCP Positive and Negative Rheumatoid Arthritis Patients

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Abstract **Original Research Article**

Background: As an autoimmune disease, rheumatoid arthritis (RA) is characterized by the production of autoantibodies specific for the disease like rheumatoid factor, antibodies against cyclic citrullinated peptides (Anti-CCP) and non-specific ones, like antinuclear autoantibodies (ANA). Comparative data regarding the socio-demographic and disease related characteristics between anti-CCP positive and negative RA patients are very potential components in the treatment arena of RA. ***Aim of the study:*** The aim of this study was to collect information regarding the socio-demographic and disease related characteristics between anti-CCP positive and negative RA patients. ***Methods:*** This was an observational cross sectional study which was conducted in the Rheumatology Out Patient Department and Medicine Indoor, Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh during the period from January 2009 to December 2010. This study was approved by the ethical committee of the mentioned hospital. In total 165 patients with RA attended the mentioned units with proper documents were finalized as the study population. A pre-designed semi-structured questioner was used in collecting patient data. All data were collected, processed, analyzed and disseminated by MS-Office and SPSS version 20 as per need. ***Result:*** There was no statistically significant difference in term of age (p=0.052), sex (p=0.461), marital status (p= 0.575), family history of RA (p=0.357), level of education (p=0.448), family income (p=0.400) between anti-CCP positive and negative groups. So all demographic characteristics were almost identically distributed between the study groups. The DAS 28 was significantly higher in anti-CCP positive patients than anti-CCP negative patients (6.3±0.92 vs. 5.9±0.8, p = 0.017). The number of tender joint count and swollen joint count were significantly higher in the anti-CCP positive group than those in the anti-CCP negative group (31±12 vs. 24±12, p=0.003; 6±5 vs. 3±2, p=0.002 respectively). ESR (mean±SD) was 61.7±31.4 in Anti-CCP positive group and 48.9±19.6 in Anti-CCP negative group, which was significantly higher in the Anti-CCP positive group (P=0.032). Anaemia was significantly higher in Anti-CCP positive group (55.3% vs. 33.3%, p=0.023). Patient's global assessment of disease activity and physician's global assessment of disease activity were also higher in the Anti-CCP positive group than negative group, which was nearly significant (57.0±15.4 vs. 52.7±9.8, p-0.054; 51.0±15.6 vs. 45.2±12.5, p= 0.053 respectively). On the other hand, there was no statistically significant difference in term of disease duration, VAS, HAQ, morning stiffness > 60 minutes, CRP, Haemoglobin, platelet count and joint deformity (p> 0.05). In comparison of disease activity indices level between Anti-CCP positive and negative patients with RA we observed DAS 28 was not associated with anti-CCP positivity (P=0.410), HAQ score < 1 was significantly less in patients with anti-CCP negativity (P=0.02), patient's global assessment and physician's global assessment score were much higher in the anti-CCP positive group and number of tender joint count was significantly higher in the former group. ***Conclusion:*** We observed, all demographic characteristics were almost identically distributed between the study groups. In disease activity analysis we found significant correlations between anti-CCP positive and negative RA patient groups in some parameters like DAS 28 score, tender joint count, swollen joint count, ESR, anaemia, Patient's global assessment of disease activity and physician's global assessment of disease activity. But when anti-CCP antibody status was compared with differing levels of disease activity parameters no significant association evident (P>0.05).

Keywords: Rheumatoid arthritis, Anti-CCP antibody, DAS 28, Disease Activity.

INTRODUCTION

As an autoimmune disease, rheumatoid arthritis (RA) is characterized by the production of autoantibodies specific for the disease like rheumatoid factor, antibodies against cyclic citrullinated peptides (Anti-CCP) and non-specific ones, like antinuclear autoantibodies (ANA). Comparative data regarding the

socio-demographic and disease related characteristics between anti-CCP positive and negative RA patients are very potential components in the treatment arena of RA. We have very few specific data regarding these issues. Rheumatoid arthritis (RA) is the most common autoimmune disease affecting approximately 1% of the world's populations [1]. Chronic inflammation of the involved joints results in progressive loss of function, which, together with the extra-articular manifestations and adverse events of therapy, may increase morbidity and mortality of patients with RA [2]. The onset is most frequent during the fourth and fifth decades of life with 80% of all patients developing the disease between the ages of 35-50 and women are affected approximately three times more often than men [3]. The overall prevalence of RA in Bangladesh is 0.7% in rural population and 0.4% in urban population [4]. Although the etiology and pathogenesis remain unclear, recent data suggest that RA generally results from acute and chronic inflammation in the synovium associated with a proliferative and destructive process in the joint. Affected areas may either heal without lasting structural defects, or be irreversibly damaged or destroyed if inflammation is severe and does not remit. Measures aimed at identifying early active disease and ameliorating inflammation are therefore essential and may be highly effective in modifying disease outcome. International research has become increasingly focused on the importance of both socio-demographic and psychosocial factors in disease outcome [5]. This South African study appears to be the first to conduct a comprehensive investigation into the way in which psychosocial factors are associated with socio-demographic factors, disease factors, and health-related quality of life. A sample obtained from a developing country such as South Africa, with its unique sociological patterns around family structure, cultural practices, religious beliefs and economic disparity between different groups of people, differs from a sample based in a developed country such as North America. Psychosocial and biomedical disease factors often account for variance in disease outcome. Although results from studies have varied, general support has been found for the disease-course hypothesis that takes into account the psychological response to RA experience. For example, there is often a poor correlation between disease status and disability in RA patients [6]. Frequently, patients with severe RA as measured by clinical assessments including X-rays and other radiographic measures, experience mild disability, whereas patients with mild disease present with severe disability [7]. It is important, therefore, to identify other variables responsible for affecting the variability in the health outcome measures of these patients. Psychological factors such as coping, social support, causal attribution, and cognitive illness representation are known to impact on health outcome [8]. Several composite indices are available to measure rheumatoid arthritis activity on a continuous scale. These include the Disease Activity Score (DAS), the DAS based on 28 joint counts (DAS 28), the Simplified Disease Activity Index (SDAI) and the Clinical Disease Activity Index (CDAI). These indices are essentially based on some attributes of RA: joint counts, the patient's evaluation of RA activity and acute phase reactants [9]. The DAS 28 score is used extensively to evaluate disease activity in patients with rheumatoid arthritis. DAS 28 is based on counts of tender and swollen joints (28 joints), the patient's global assessment of disease activity and the erythrocyte sedimentation rate (ESR). The 28 joint counts is a reliable and valid measure for joint assessment. It is easier to perform than the 66/68 joint count and it addresses the joint that are critically involved [10]. The modified DAS that include 28 joint counts are able to discriminate between high and low disease activity. The modified DAS (DAS 28) is as valid as disease activity scores that include more comprehensive joint count [11]. To assess the disease activity by composite indices (DAS 28, SDAI, CDAI) are time consuming and often not suitable to measure disease activity in out-patient setting and also based oil subjective and objective measure. As subjective measure of disease activity (i.e, joint count, physician's global assessment of disease activity and patient's global assessment of disease activity) based on individual judgment and may be influenced by different factors such as knowledge, experience and practice. On the other hand objective measure (i.e. acute phase reactant- ESR, CRP) are commonly used to measure disease activity are not specific for RA and are influenced by several other variables. With the availability of new biological agents and the introduction of the quality improvement movement into rheumatology, the development of valid and feasible measures of disease activity in RA has become an active research [8]. It is now established that duration of active disease is associated with joint damage and disability [12], there is a critical need for disease activity measures that can be performed in busy out-patient setting. So to identify the potential serological markers of RA activity especially autoantibodies, can optimize treatment of RA particularly in the early phase of the disease, thereby avoiding it's progression to erosive, destructive and disabling forms. Rheumatoid arthritis is associated with many auto-antibodies of diverse specificities, reflecting the humoral autoimmune aetiopathogenesis of RA. Rheumatoid factors (RF), the time honored serological maker has been around for more than 50 years. RF has a sensitivity of 70-80% in diagnosis of RA but specificity is poor as it found in several other conditions like other autoimmune disease, infections and 5-10% of healthy elderly individuals. However RF positivity is an independent predictor of erosive disease as shown in a cohort followed up for 5-12 years [13] and the presence of RF is considered to be a determinant of disease severity and activity [14]. The shortcomings of the RF assay have provided impetus for identification of other

serological assays for R.A. Citrullinated peptides (fillaggrin, keratin, vimentin etc.) are considered to be potential autoantigens driving the immune response in RA. Auto-antibodies against citrullinated antigen % have, been shown to be highly specific for RA. Anti-cyclic citruninated peptide (Anti. CCP) antibodies, first described in 1998, were shown to be highly specific (95%) in the diagnosis of RA and slightly less sensitive than RF (60-80%) [15]. Serum concentration of antibodies against CCP (anti CCP) seems to be just as sensitive as and more specific than RF for diagnosing of RA and predicting its progression (Kristine 2007). In patient with undifferentiated arthritis, anti-CCP antibodies may predict those who are more likely to develop RA [16]. Several studies that have followed up cohorts of early RA patients for up to 6 yrs. have shown that anti CCP antibodies are an independent factor in predicting development of erosion [17]. There are number of reports from different studies observed that anti-CCP antibodies positivity has been found to be associated with greater disease activity in rheumatoid arthritis patients [18]. However, there are some studies where the authors failed to found association between anti-CCP antibodies positivity and disease activity in rheumatoid arthritis [19]. Although the presence of anti-CCP is accepted to be a reliable diagnostic and prognostic tool in RA [20], its association with disease activity remains unclear. Moreover the usefulness of anti-CCP antibodies in the prediction of disease activity has not been studied in our population. So in the present study, association of anti-CCP antibodies with disease activity in rheumatoid arthritis patients in our population will be addressed.

OBJECTIVES

General Objective

- To collect information regarding the socio-demographic and disease related characteristics between anti-CCP positive and negative RA patients.

Specific Objective

- To collect information regarding the frequency of anti-CCP positivity in active rheumatoid arthritis.
- To collect information regarding disease related characteristics of RA patients.

METHODOLOGY & MATERIALS

This was an observational cross sectional study which was conducted in the Rheumatology Out Patient Department and Medicine Indoor, Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh during the period from January 2009 to December 2010. In total 165 patients with RA attended the mentioned units with proper documents were finalized as the study population. A pre-designed semi-structured questioner was used in collecting patient data. Morning stiffness >1 hr for 6 weeks or more, arthritis of 3 or more joint areas for 6 weeks or more, arthritis of hand joints for 6 weeks or more, symmetrical arthritis for 6 weeks or more, rheumatoid nodules, serum rheumatoid factor and radiographic changes are considered as the indicators for defining RA. The presence of at least four indicators (Positive association) are considered for defining RA. According to the inclusion criteria patients fulfilled American College of Rheumatology (ACR) 1987 revised criteria for rheumatoid arthritis and patients of age of ≥18 to ≤70 years were included in this study. On the other hand, according to the exclusion criteria of this study, Patients having an overlap of RA with other rheumatic disease like systemic lupus erythematosus, systemic sclerosis etc. clinically, smokers, pregnant women, Known cases of diabetes mellitus, chronic renal failure, heart diseases and patients not providing consent were excluded from this study. The Rheumatoid Arthritis Disease Activity Score (DAS 28) was used to define disease activity in our population, where a DAS 28 score ≤ 2.6 is considered to reflect inactive disease and score > 5.1 indicate high active disease. Disease severity was also assessed using the visual analogue score (VAS). Severity was scored from 0 to 100 mm on three separate scales. The first and second visual analogue score were done by patient who report on the pain (0 mean no pain, 100 mean extreme pain) and the global assessment of RA activity respectively (0 mean no active disease, 100 mean highly active disease). Bengali Health assessment questioner (HAQ) is a questioner to patients whether he/she can perform his/her daily house hold activities e.g. holding something, dressing, cooking, bathing etc. and it was assessed by 0-3 points where 0 means no disability and 3 means extreme disability. All data were collected, processed, analyzed and disseminated by MS-Office and SPSS version 20 as per need.

RESULT

In this study the total participants were 165 in number. The mean (±SD) age was 40.8±11.6 years and the age range of the participants was 18 to 70 years. In this current study 2.56%, 17.31%, 25.64%, 30.13%, 21.79% and 8.33% participants were from 18-20, 21-30, 31-40, 41-50, 51-60 and 61-70 years' age groups respectively. Male-female ratio of total participants was 1:5.1. So female were dominating in number. In total 95.76% participants of this study was married whereas 4.24% were unmarried. In only 17.58% participant family history of RA was found. Most of the participants (69%) was literate. Monthly family income of most of the participants (87%) was <10,000. According to the Anti-CCP test 80% participants were found as Anti-CCP positive whereas 20% were found as negative. There was no statistically significant difference in term of age (p=0.052), sex (p=0.461), marital status (p= 0.575), family history of RA (p=0.357), level of education (p=0.448), family income (p=0.400) between anti-CCP positive and negative groups. So all demographic characteristics were almost

identically distributed between the study groups. Out of 165 patients, 80% were Anti-CCP positive and 73.3% patients were RF (Rheumatoid factors) positive. Among the 44 RF negative patients 52.3% patients were Anti-CCP positive. In this study we found, more than 82% of the Anti-CCP positive cases were RF positive as opposed to 36.4% of Anti-CCP negative cases (P<0.001). Comparison of disease and disease activity related variables between Anti-CCP positive and Anti-CCP negative groups are illustrated. The DAS 28 was significantly higher in anti-CCP positive patients than anti-CCP negative patients (6.3±0.92 vs. 5.9±0.8, p = 0.017). The number of tender joint count and swollen joint count were significantly higher in the anti-CCP positive group than those in the anti-CCP negative group (31±12 vs. 24±12, p=0.003; 6±5 vs. 3±2, p=0.002 respectively). ESR (Mean±SD) was 61.7±31.4 in Anti-CCP positive group and 48.9±19.6 in Anti-CCP negative group, which was significantly higher in the Anti-CCP positive group (P=0.032). Anaemia was significantly higher in Anti-CCP positive group (55.3% vs. 33.3%, p=0.023). Patient's global assessment of disease activity and physician's global assessment of disease activity were also higher in the Anti-CCP positive group than negative group, which was nearly significant (57.0±15.4 vs. 52.7±9.8, p-0.054; 51.0±15.6 vs. 45.2±12.5, p= 0.053 respectively). On the other hand, there was no statistically significant difference in term of disease duration, VAS, HAQ, morning stiffness > 60 minutes, CRP, Haemoglobin, platelet count and joint deformity (p> 0.05). In this study, when categories disease activity parameter, DAS 28 was not found to be associated with anti-CCP positivity (p=0.410). HAQ score < 1 was significantly less in patients with anti-CCP positivity than that in patients with anti-CCP negativity (p=0.02). VAS score for pain was almost identically similar between the groups (p>0.05). Patient's global assessment and physician's global assessment scores were much higher in the anti-CCP positive group. Number of tender joint count was significantly higher in the former group, though the swollen joint count was almost similar in both groups. ESR > 80 mm in 1st hour was much higher in the former group than that in the latter group (p < 0.05).

Table-1: Demographic characteristics of participants (N=165)

Characteristics	**n**	**%**
Age in years		
18-20	4	2.56
21-30	27	17.31
31-40	40	25.64
41-50	47	30.13
51-60	34	21.79
61-70	13	8.33
Mean ± SD	40.8±11.6	
Range (Years)	18-70	
Sex		
Male	27	16.36
Female	138	83.64
Male-Female ratio	01:05.1	
Marital Status		
Married	158	95.76
Unmarried	7	4.24
Family history of RA		
Present	29	17.58
Absent	136	82.42
Level of education		
Illiterate	51	30.91
Literate	114	69.09
Family income (Tk./Month)		
<10,000	144	87.27
>10,000	21	12.73

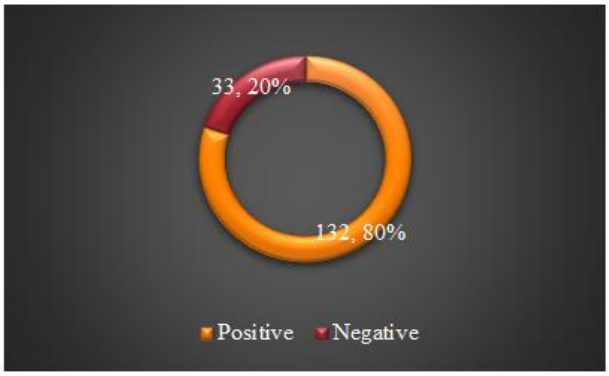

Fig-1: Distribution of the participants regarding Anti-CCP (n=165)

Table-2: Comparison of demographic characteristics of RA patients between Anti-CCP positive and negative groups (N=165)

Characteristics	Anti-CCP				P value
	Positive (n=132)		Negative (n=33)		
	n	%	n	%	
Age in years					
18-20	2	1.52	2	6.06	0.052
21-30	25	18.94	2	6.06	
31-40	32	24.24	8	24.24	
41-50	36	27.27	11	33.33	
51-60	27	20.45	7	21.21	
61-70	10	7.58	3	9.09	
Mean ± SD	40.3±11.6		42.4±11.3		0.347
Sex					
Male	23	17.42	4	12.12	0.461
Female	109	82.58	29	87.88	
Marital Status					
Married	126	95.45	32	96.97	0.575
Unmarried	6	4.55	1	3.03	
Family history of RA					
Present	25	18.94	4	12.12	0.357
Absent	107	81.06	29	87.88	
Level of education					
Illiterate	39	29.55	12	36.36	0.448
Literate	93	70.45	21	63.64	
Family income (Tk./Month)					
<10,000	116	87.88	28	84.85	0.4
>10,000	16	12.12	5	15.15	

Table-3: Disease related characteristics or RA patients (N=165)

Parameters		n	%
Disease duration in month (Mean±SD)		44.0±38.4	
Disease duration types	Early	8	4.85
	Intermediate	50	30.3
	Long	107	64.85
DAS 28 score (Mean±SD)		6.2±0.9	
DAS 28 score	Moderate disease activity	22	13.33
	High disease activity	143	86.67
VAS score in mm		56.1±15.5	
Patient's Global Assessment score (mm)		56.1±14.5	
Physician's Global Assessment score (mm)		49.9±15.2	
Tender Joint Count		30.0±12.0	
Swollen Joint Count		6.0±5.0	
HAQ score		1.0±0.5	
Morning stiffness	<60 min	23	13.94
	≥60 min	142	86.06
ESR (mm in 1st hour)		59.1±29.8	
CRP (mg /L)		29.7+3.7	
Haemoglobin (gm/dl)		11.3±5.2	

Table-4: Comparison of disease and disease activity related variables between Anti-CCP positive and negative patients with RA (N=165)

Parameters	Anti-CCP		P value
	Positive (n=132)	Negative (n=33)	
Disease duration (Month)	43.5±37.7	46.0±41.8	0.741
DAS 28 score	6.3±0.92	5.9±0.8	0.017
VAS score in mm	57.1±15.6	52.4±15.0	0.125
Patient's Global Assessment score (mm)	57.0±15.4	52.7±9.8	0.054
Physician's Global Assessment score (mm)	51.0±15.6	45.2±12.5	0.053
Tender Joint Count	31±12	24± 12	0.003
Swollen Joint Count	6±5	3±2	0.002
HAQ score	1.1±0.5	0.9±0.4	0.081
Morning stiffness ≥ 60 min	68.8%	93.8%	0.37
Anaemia	55.3%	33.3%	0.023
ESR (mm in 1st hour)	61.7±31.4	48.9+19.6	0.032
CRP (mg /L)	30.2+3.1	27.7±6.8	0.73
Haemoglobin (gm/dl)	11.3±5.8	11.3+5.2	0.962
Platelet	335±82	298+78	0.541
Joint deformity	11.4%	9.1%	0.701

Table-5: Comparison of disease activity indices level between Anti-CCP positive and negative patients with RA (N=165)

Parameters	Anti-CCP				P value
	Positive (n=132)		Negative (n=33)		
DAS 28 score					
3.2-5.1	18	13.6	4	12.1	0.41
>5.1	114	86.4	29	87.9	0.41
HAQ score					
0-1	75	56.8	25	75.8	0.02
1-2	52	39.4	7	21.2	0.03
2-3	5	3.8	1	3.0	0.41
VAS score for pain (mm)					
0-30	6	4.5	3	9.1	0.16
30-60	92	69.7	25	75.8	0.23
60-90	34	25.8	5	15.2	0.09
Patient's Global Assessment score (mm)					
0-30	13	9.8	1	3.0	0.1
30-60	81	61.4	30	90.9	0.00
60-90	38	28.8	2	6.1	0.00
Physician's Global Assessment score (mm)					
0-30	19	14.4	6	18.2	0.24
30-60	89	67.4	26	78.8	0.13
60-90	24	18.2	1	3.0	0.02
Tender Joint Count					
0-10	12	9.1	8	24.2	0.05
10-20	44	33.3	10	30.3	0.01
>20	76	57.6	15	45.5	0.01
Swollen Joint Count					
0-10	120	90.9	32	97.0	0.05
10-20	8	6.1	1	3.0	0.11
>20	4	3.0	0	0.0	0.2
ESR (mm in 1st hour)					
0-20	10	7.6	2	6.1	0.38
20-40	35	26.5	11	33.3	0.22
40-60	28	21.2	14	42.4	0.01
60-80	24	18.2	4	12.1	0.20
>80	35	26.5	2	6.1	0.01
CRP (mg /L)					
0-5	27	20.5	5	15.2	0.25
5-10	25	18.9	12	36.4	0.02
10-15	13	9.8	0	0.0	0.03
15-20	9	6.8	5	15.2	0.06
>20	58	43.9	11	33.3	0.13

DISCUSSION

The aim of this study was to collect information regarding the socio-demographic and disease related characteristics between anti-CCP positive and negative RA patients. In RA, socio-economic decline is associated with a greater prevalence of the disease [21]. The ERAS study group based in the UK, which investigated socio-economic deprivation and RA, found that socio-economic factors were associated with a worse clinical course of rheumatoid disease.[22] Individuals in the study who came from deprived circumstances were found to have more severe disease, as assessed by the HAQ and joint scores. Furthermore, it was reported that women appeared to be more at risk [22]. Previous research has confirmed that those individuals engaged in paid work have better health status [23]. Being able to work despite having a disease helps to increase an individual's self-worth, thereby buffering or reducing existing symptoms such as pain as well as depression. Research outcomes also report an increased incidence of pain and depression among women with RA who have suffered work loss, face the threat of work loss, or who are work disabled, and suggest that these outcomes are related more to a loss of social role than to disease activity that has disrupted work [24]. In the present study, we observed DAS-28, tender joint count, swollen joint count, patient's global assessment of disease activity, physician's global assessment of disease activity, ESR and RF positivity to be associated with anti-CCP positivity but no significant association of anti-CCP was found with duration of disease, morning stiffness, VAS, HAQ, CRP, haemoglobin, platelet count and joint deformity which was similar with several other studies. The value of anti-CCP antibodies for predicting the outcome of RA, clinical signs of disease activity and the severity of radiographic joint damage have been investigated recently. In addition to the predictive value of anti-CCP antibodies concerning radiological damage [25], showed that anti-CCP is a good predictor of disease activity. Anti-CCP was found even better than RF in predicting disease activity after 3 years since the diagnosis of recent onset RA. Bas et al., [26] showed an association of RF and anti-CCP antibodies with clinical signs of disease activity. Onder [27] also observed that anti-CCP positivity was associated with higher scores of DAS-28 longer duration of morning stiffness, RF positivity, while it was not associated with disease duration, VAS, HAQ, ESR, CRP and haemoglobin. In this study, although the mean value of DAS-28 was observed to be significantly higher in patients with positive anti-CCP. But as DAS 28 was categorized into different levels of disease activity, these levels were not found to be associated with anti-CCP positivity. Low HAQ score (< 1) was significantly less in patients with anti-CCP positivity than that in patients with anti-CCP negativity but moderate HAQ score (1-2) was significantly higher in anti-CCP positive patients. This score may be attributed to subjective bias leading to over or underestimates. Patient's global assessment and physician's global assessment scores were much higher in the anti-CCP positive group. However, these two indices may vary from individual to individual as they depend on knowledge, experience and level of education. Number of tender joint count was significantly higher in the former group, though the swollen joint count was almost similar in both groups. This variation between tender and swollen joint count might be due to the influence of NSAIDs and/or steroids. Though ESR > 80 mm in 1St hour was much higher in the former group than that in the latter group but other different levels of ESR were almost identical. Thus, the findings of the present study signify that that anti-CCP antibody Positivity was associated with diseases severity. In our study, we found anti-CCP antibodies titer significantly correlated with DAS 28, patient's global assessment, physician's global assessment, VAS, HAQ, ESR and RF but no significant con-elation with morning stiffness, tender joint count, swollen joint count, haemoglobin and CRP. With regards to anti- CCP titers, recent studies have showed that higher serum levels of anti-CCP correlate with higher DAS-28, enhanced inflammatory indices and more severe radiological pictures.[18] Rezaei et al. observed that anti-CCP antibody titers were strongly positively correlated with titer of RF, ESR, DAS score but was not correlated with physician's global assessment, presence of radiographic erosions, disease duration and CRP. These findings are in agreement with findings of the present study. But as we arbitrarily divided the anti-CCP antibody titer level into three categories, the disease activity indices were not found to be associated with anti-CCP antibody titer, except low HAQ score and higher CRP. Though most of the disease activity related variables demonstrated significant correlation with anti-CCP antibodies titer when they were compared between the groups as quantitative variables. But as the same variables were compared among anti-CCP positive patients with three different antibody titer level, they no longer emerged as significant indicating that level of anti-CCP antibody titer is independent of disease severity. The present study revealed significant correlation, between anti-CCP titer and RF levels. Serdaroglu et al., [28] observed a small but significant correlation between RF and anti-CCP antibody, which was similar to our study. It is well-known that RF positivity is associated with more aggressive and erosive disease [3]. All these findings suggest that anti-CCP antibodies may be a potential prognostic indicator. In our logistic regression analysis, we observed that RF positivity was associated with almost 8 times greater chance of being anti-CCP positive. Onder and associates [27], in a logistic regression analysis of multiple parameters, observed that higher DAS- 28 scores and RF positivity carried 2 times and 9.89 times greater risk of being anti-CCP positive respectively.

Conclusion and Recommendations

We observed, all demographic characteristics were almost identically distributed between the study groups. In disease activity analysis we found significant correlations between anti-CCP positive and negative RA patient groups in some parameters like DAS 28 score, tender joint count, swollen joint count, ESR, anaemia, Patient's global assessment of disease activity and physician's global assessment of disease activity. But when anti-CCP antibody status was compared with differing levels of disease activity parameters no significant association evident (P>0.05). These findings may be helpful in further similar studies and in the treatment arena of RA. But this was a single centered study with a small sized sample. So the findings of this study may not reflect the exact scenario of the whole country. For getting more specific findings we would like to recommend for conducting more studies regarding the same issue.

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