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A statistical analysis on the remission of pain and the intensity of depression in rheumatoid arthritis patients

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ABSTRACT

Rheumatoid arthritis and depression commonly concur. Although this is often known, people with arthritis often aren't diagnosed for depression, so it's not going to be treated. The main aim of the work is to evaluate the remission of pain and estimate intensity of depression in rheumatoid arthritis patients. We collected 40 cases of RA at VIRRD hospital and collected the details. By using Visual analogue scale we have estimated the pain remission and by using Beck Depression Inventory we evaluated intensity of depression. This study shows the Adults (Above 18 years) are affected more with RA than that of other age groups. This study reveals that people affected with RA are 80% of female. So that females are more affected. As chronic pain is the important symptom of RA we evaluated the remission of pain. We observed there is decrease in pain after using the medication which indicates that there is remission of pain in patients when they are on regular treatment. This study showed a strong relation between RA and succeeding risk of depression. Based on the study almost 62.5% RA patients have some level of depression. We suggest that for optimal care and better outcomes of RA patient, it is important to detect and treat depression based on their level as there is some level of depression in RA patient.

Keywords: Anti-Cyclic Citrullinated Protein; Beck Depression Inventory; Depression; Rheumatoid Arthritis (RA); Rheumatoid Factor; Visual Analogue Scale.

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INTRODUCTION

RA is a long – term autoimmune disease that can cause joint pain and damage throughout your body which results in severe disabilities and deformities. It occurs when your own immune system attacks the liner of the membranes that surround your joints

(synovium). Symptoms in RA include Stiffness, Swelling, Pain, Fatigue, fever and weight loss, Redness and warmth.

The generality of RA is comparatively constant in many populations, at 0.5-1.0% worldwide. However, a high generality of RA has been according within the Pima Indians (5.3%) and within the Chippewa Indians (6.8%). In distinction, low occurrences square measures according in population from china and Japan. This information supports a genetic role in sickness risk. Studies have to this point shown that the familial return in RA is small compared with different reaction diseases. The symptoms like inflammation, swelling and joint harm that characterize active RA square measure the top results of advanced reaction and inflammatory process that involves parts of each the innate and reconciling immune systems. In an exceedingly vulnerable individual, the interaction of genes ends up in a loss of tolerance of self-proteins that contain a citrulline residue. These proteins square measure generated via post travel alteration of essential amino acid residues to aminoalkanoic residues by the catalyst peptidyl arginine deiminase [1]. Patients with shared epitopes create citrullinated peptides that are not any longer admit as “self” by the system that consequently develops ACPAs against

them^[2]. Comparison of resonance imaging MRI and secretion diagnostic test information from healthy people with MRI and diagnostic test information from patients positive for RA and/or ACPA reveal that general anti body production precedes inflammation and adhesion molecule formation inside the tissue layer, indicating that may be some secondary event is needed to initiate involvement of the tissue layer in RA^[3]. The inside of the inflamed tissue layer (synovium) is hypoxic, presumptively as a results of proliferation of secretion cells and depletion in secretion capillary flow a result of raised fluid volume within the synovium^[4]. Hypoxia, in turn, stimulates growing within the tissue layer, may be incentive the formation of things that stimulate vessel formation like vascular epithelium growth factor^[5]. The significance of the reconciling immune pathway in RA is recommended by the presence of nerve fibre cells (dendritic cells), a important category of antigen- presenting cells that express a spread of cytokines, HLA category II molecules, and costimulatory molecules in shut proximity to cluster of T cells within the tissue layer and additionally function one element of T cell and activation method^[6]. Activation of T cells needs a pair of signals. The primary signal is antigen presentation to the T-cell receptor. The second signal, the costimulatory signal, needs interaction of the surface macromolecule CD80/86 on the antigen presenting (dendritic) cell with CD28 macromolecule on the lymphocyte^[7]. Blockade of the costimulatory signal through competitive inhibition of CD80/86 interferes with T-cell activation and downstream events. The effectiveness of CD80/86 blockade as a treatment for RA validates the thought that T cell play a full of life role within the pathophysiology of RA^[8].

In particular, a small change in gene expression in immune cells is frequently associated with production and secretion of inflammatory mediators in response to a particular stimulus. Secretion of those mediators into the extracellular milieu leads to further amplification and/or modification of the first signal.

Risk factors include Age, Family history, Environment, Gender, Obesity, Smoking.

Complications include Sjogren's syndrome, rheumatoid nodules, Pericarditis, Vasculitis, Pleuritis, COPD, Scleritis, Sexual dysfunction.

Diagnosed by Physical Examination, Blood Tests for antibodies linked with RA, Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) level are markers of inflammation, Antibodies Rheumatoid factor (RF) anti-cyclic citrullinated peptide (anti-CCP) occurs primarily in patients with RA, Imaging Tests X-ray.

Treatment: Patients with RA are not tested for depression and hence they are not treated. It is not clear whether are not depression and anxiety in RA patients are a result of their physical symptoms, or if depression is however an additional symptom gives rise to chronic, systemic inflammation of RA^[9].

MATERIALS AND METHODS

This project is completed at Sri Venkateswara institute of research and rehabilitation for the disabled (VIRRD) hospital Timmapuram village, Dwaraka Tirumala mandel, Andhra Pradesh, under the guidance of Dr. Bhavya Chand (Ms, Ortho).

To evaluate the remission of pain: The measurement of remission of pain is done by using VAS^[10].

Visual analogue scale:

The visual analogue scale (VAS) may be a psychological response scale which may be employed in questionnaires. It's a measurement instrument for subjective attitude that cannot be directly measured. The primary and presumptively used scale in hospitals for assessing adult and old verbal adults to assess the pain is known as Wong – baker faces scale^[11].

Figure 1: Visual analogue scale

This scale goes from zero (No pain) to Ten (The worst pain) you'll imagine. It indicates some facial expressions that are simplified facial expressions that will facilitate a patient however they need bother properly distinguishing the extent of pain.

Figure 2: VAS indicating Type of Pain

The above image indicates type of pain. The patient pain is scored from 0 no pain to 10 worst pains based on their facial expressions. Score is used to indicate the intense of pain in particular patient.

To estimate the intensity of depression

The BDI is also a series of questions developed to measure the intensity, severity, and depth of depression in patients with psychiatric diagnoses. The long style of the BDI consists of twenty one quires every with four possible responses. Each response is appointed a score starting from zero to three, indicating the severity of symptom. Individual questions of the BDI assess mood, pessimism, and sense of failure, self-dissatisfaction, guilt, punishment, self-dislike, self-accusation, self-destructive concepts, crying, irritability, social withdrawal, body image, work difficulties, insomnia, fatigue, appetite, weight loss, bodily

preoccupation, and loss of concupiscence. Things one to thirteen assess symptoms that are psychological in nature, whereas things to fourteen to twenty one assess additional physical symptoms ^[12].

Table 1: BDI Scale

Sl.No	Questioner	Options
1	I don't feel unhappy	I feel sad. I'm unhappy all the time and that I can't snap out of it. I'm therefore unhappy and sad that I can't stand it.
2	I'm not significantly discouraged regarding the long term.	I feel discouraged regarding the long term. I feel I even have nothing to appear forward to. I feel the time to return is hopeless that things cannot improve.
3	I don't desire a failure.	I feel I even have failing quite the standard person. As I think back on my life, all I will see could also be heaps of failures. I feel I'm complete failure as someone.
4	I get the utmost amount satisfaction out of things as accustomed.	I don't relish things the manner I accustomed. I don't get real satisfaction out of something any longer. I'm disgruntled of everything
5	I don't feel significantly guilty.	I feel guilty a decent a part of the time. I feel quite guilty most of the time. I feel guilty all the time.
6	I don't feel I'm being punished.	I feel I could be punished. I expected to be punished. I feel I'm being punished
7	I don't feel unsuccessful in myself.	I'm disappointed in myself. I'm tired of with myself. I hate myself.
8	I don't feel I'm worse than anybody else.	I'm important of myself for my weakness or mistakes. I blame myself all the time for my faults. I blame myself for everything dangerous that happens.
9	I don't have any thoughts of killing myself.	I even have thoughts of killing myself, however I'd not carry them out. I might prefer to kill myself. I'd kill myself if I had the prospect.
10	I don't cry any further than usual.	I cry a lot of currently than before. I cry all the time currently. I accustomed be able to cry, however currently I can't cry albeit I might prefer to.
11	I'm a lot of irritated by things than I ever was.	I'm slightly a lot of irritated currently than usual. I am quite irritated a decent deal of the time. I feel irritated all the time.
12	I even have not lost interest in people.	I'm less interested by individuals than i accustomed be. I even have lost most of my interest in individuals. I even have lost all my interest in people.
13	I make decisions about also as well as I ever could.	I set back creating choices quite I accustomed. I even have larger problem in creating choices quite I accustomed. I can't make decisions at all anymore.
14	I don't feel that I look any worse than I accustomed.	I'm troubled than I am looking unattractive. I feel there are permanent changes in my look than create me looking unattractive. I think that I look ugly.
15	I can work out as well as before.	I take an additional effort to urge started at doing one thing. I even have to penalise myself terribly onerous to try and do something. I can't do any work at all.
16	I will sleep moreover as before.	I don't sleep moreover as I accustomed. I awaken 1-2 hours before usual and realize it onerous to urge back to sleep. I awaken many hours before I accustomed and can't .go back to sleep.
17	I don't get a lot of tired than usual.	I get tired a lot of simply than I accustomed. I get tired from doing virtually something. I'm too tired to try and do something.
18	My carving isn't any worse than usual.	My carving isn't pretty much as good because it accustomed be. My carving is way worse currently. I even have no carving in the slightest degree any longer.
19	I haven't lost a lot of weight, if any, lately.	I even have lost quite five pounds. I even have lost quite ten pounds. I even have lost quite fifteen pounds.

20	I'm not a lot of troubled regarding my health than usual.	I'm troubled regarding physical issues like aches, pains, constipation. I'm terribly troubled regarding physical issues and it's onerous to believe of a lot of else. I'm therefore troubled regarding my physical issues that I cannot believe something.
21	I even have not noticed any recent change in my interest in sex.	I'm less interested by sex than I accustomed. I even virtually no interest in sex. I even have lost interest in sex fully.

Based on the patient answer we score them as 0, 1, 2, or 3. The patients score is the sum of total items and are used to estimate the extension of depression [13].

Table 2: Estimation of Level of Depression

Total score	Levels of depression
1-10	The ups and downs are considered as normal
11-16	Mild mood disturbance
17-20	Borderline clinical depression
21-30	Moderate depression
31-40	Severe depression
Over 40	Extreme depression

Table 3: Data on Effect of RA Based on Age

Age group	No of patients
1 – 10	0
11 – 20	1
21 – 30	6
31 – 40	4
41 – 50	13
51 – 60	11
61 – 70	5

Figure 3: Effect of rheumatoid arthritis on Age

Table 4: Data on Effect of RA Based on Gender

Male	Female
8	32

Figure 4: Effect of Rheumatoid Arthritis on Gender

Table 5: Data of Pain Scales

No of patients	Age	Pain scale	
		First month	Third month
1	28	8	6
2	41	6	3
3	50	6	4
4	45	7	5
5	47	4	2
6	43	8	6
7	47	5	4
8	59	5	4
9	50	4	4
10	29	5	2
11	43	8	6
12	23	7	5
13	21	2	2
14	40	4	3
15	64	3	4
16	55	5	4
17	60	6	6
18	52	6	5
19	45	6	6
20	40	8	6
21	64	6	6
22	30	3	3
23	45	10	8
24	55	5	4
25	17	4	2
26	66	9	6
27	60	8	7
28	60	3	2
29	55	6	5
30	35	8	7
31	55	7	4
32	65	7	5
33	46	8	6
34	68	5	2
35	59	8	6
36	40	6	4
37	53	5	3
38	26	6	4
39	50	9	7
40	43	8	7

The data was analysed by using T paired Test and the results were generated.

- Null hypothesis (H0): There is no pain remission in all patients.
- Alternative hypothesis (H1): There is pain remission in all patients.

- Level of significance (LOS): 0.05%

Table 6: Data analysis on remission of pain
t-Test: Paired Two Sample for Means

	Variable 1	Variable 2
Mean	6.1	4.625
Variance	3.579487179	2.804487179
Observations	40	40
Pearson Correlation	0.853789319	
Hypothesized Mean Difference	0	
df	39	
t Stat	9.453778621	
P(T<=t) one-tail	6.126E-12	
t Critical one-tail	1.684875122	
P(T<=t) two-tail	1.2252E-11	
t Critical two-tail	2.022690901	

Comparison: Table value is more than the test value. Hence, it accepts the Alternative hypothesis and rejects the null hypothesis. Conclusion: The Alternative hypothesis (H0) indicates there is remission of pain in every patient.

Figure 5: Area graph of pain remission

The above graph shows pain scale values on y-axis and no of patients on x-axis. It indicates that there is reduction in pain after using medication.

Table 7: Data of level of depression

Type	Level	No of patients
Normal	1 – 10	15
Mild	11 – 16	9
Boderline	17 – 20	7
Moderate	21 – 30	3
Severe	31 – 40	5
Extreme	Over 40	1

Figure 6: Percentage of level of depression

DISCUSSION

We have collected about 40 cases of patients, there details. This study shows the Adults (Above 18 years)

are affected more with RA than that of other age groups. Most of the patients are at the age of 41 - 50 years.

Sex differs in the generality of RA. To assess the influence of gender in the quality of life of RA patients Female RA patients have lower quality of life levels than their male counter parts. This study reveals that people affected with RA are 80% of female. So that females are highly affected than males.

The intention of work is to estimate the remission of pain and evaluate the intensity of depression in rheumatoid arthritis patient. The remission of pain is estimated by substantial decrease in symptom of pain by using VAS for assessment of impact of pain in RA patient. As chronic pain is the important symptom of RA.

We used VAS to estimate pain and the outcome after using the medication. We monitored the total 40 patients for 3 months. We observed there is decrease in pain after using the medication which indicates that there is remission of pain in patients when they are on regular treatment.

Depression is one of the major complications in RA patient. There was a strong association between RA and the level of depression. This study showed a strong relation between RA and future risk of depression.

The main aim is to evaluate depression as it is highly prevalent in RA. Based on the study almost 62.5% RA patients have some level of depression. We suggest that for optimal care and better outcomes of RA patient, detection and control of depression is important.

CONCLUSION

Based on our study and discussion we concluded that:

- Most of the patients are at age of 41 - 50years.
- Females are highly affected than males.

There is remission of pain and some level of depression in RA patients. As there is some level of depression in RA patient so we suggest that the treatment should be based on their levels that may include patient counselling and anti-depressants.

The reasons supporting the above conclusion are:

- Decreased in Pain scale from First month to Third month.
- Some level depression in RA patients.

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REFERENCES

- McInnes, I. B., & Schett, G. (2011). The pathogenesis of rheumatoid arthritis. *The New England Journal of Medicine*, 365(23). <https://doi.org/10.1056/nejmra1004965>
- Balsa, A., Cabezon, A. & Orozco, G., et al. (2010). Influence of HLA DRB1 alleles in the susceptibility of rheumatoid arthritis and the regulation of antibodies against Citrullinated proteins and rheumatoid factor. *Arthritis Research & Therapy*, 12(2), R62. <https://doi.org/10.1186%2Far2975>
- Van de Sande, M. G., de Hair, M. J., & van der Leij, C., et al. (2011). Different stages of rheumatoid arthritis: features of the synovium in the preclinical phase. *Annals of the Rheumatic Diseases*, 70(5), 772-777. <https://doi.org/10.1136/ard.2010.139527>
- Paleolog, E. M. (2002). Angiogenesis in rheumatoid arthritis. *Arthritis Res*, 4(suppl 3):S81-S90. <https://doi.org/10.1186%2Far575>
- Akhavani, M. A., Madden, L., Buysschaert, I., Sivakumar, B., Kang, N., & Paleolog, E. M. (2009). Hypoxia upregulates angiogenesis and synovial cell migration in rheumatoid arthritis. *Arthritis Research & Therapy*, 11(3), R64. <https://doi.org/10.1186/ar2689>
- Lebre, M., Jongbloed, S., Tas, S., Smeets, T. J., McInnes, I. B., & Tak, P. P. (2008). Rheumatoid arthritis synovium contains two subsets of CD83-DC-LAMP- dendritic cells with distinct cytokine profiles. *The American Journal Of Pathology*, 172(4), 940-950. <https://dx.doi.org/10.2353%2Fajpath.2008.070703>
- Podojil, J.R., & Miller, S. D. (2009). Molecular mechanisms of T-cell receptor and co stimulatory molecule ligation/blockade in autoimmune disease therapy. *Immunological Reviews*, 229(1), 337-355. <https://doi.org/10.1111/j.1600-065x.2009.00773.x>
- Kallberg, H., Padyukov, L., & Plenge, RM. (2007). Gene-gene and gene-environment interactions involving HLA-DRB1, PTPN22, and smoking in two subsets of rheumatoid arthritis. *American journal of human genetics*, 867-875. <https://doi.org/10.1086/516736>
- Margaretten, M., Julian, L., Katz, P., & Yelin, E. (2011). Depression in patients with rheumatoid arthritis: description, causes and mechanisms. *International journal of clinical rheumatology*, 6(6), 617-623. <https://doi.org/10.2217/ijr.11.6>
- Massy, W. N., Ahern, M., & Krishnan, J. (2005). A visual analogue scale for assessment of the impact of rheumatoid arthritis in the hand: validity and repeatability. *Journal of hand therapy: official journal of the American society of hand therapist*, 18(1), 30-31. <https://doi.org/10.1197/j.jht.2004.10.003>
- Domenic, A. D., Bradley, S. L., Nickolas, B., Patrick, C. M., Robbins, A. B., Michael, R. M., & Joshua, D. H. (2018). Validation of Digital Visual Analogy Scale Pain Scoring With a Traditional Paper-based Visual Analogy Scale in Adults. *Journal of the American Academy of Orthopaedic Surgeons Global Research and Reviews*, 2(3), e088. <https://doi.org/10.5435%2FJAAOSGlobal-D-17-00088>
- Matcham, F., Rayner, L., Steer, S., & Hotopf, M. (2013). The prevalence of depression in rheumatoid arthritis: a systematic review and meta-analysis. *Rheumatology (Oxford)*, 52(12), 2136-2148. <https://doi.org/10.1093/rheumatology/ket169>
- Imran, M. Y., Saira khan, E. A., Ahmad, N. M., Raja, S. F., Saeed, M. A., & Haider, I. I. (2015). Depression in rheumatoid arthritis and its relation to disease activity. *Pakistan journal of medical sciences*, 31(2), 393-397. <https://doi.org/10.12669%2Fpjms.312.6589>