

# ASSOCIATION OF PHYSICAL ACTIVITY WITH OPTIMISM OF RHEUMATOID ARTHRITIS PATIENTS

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## ABSTRACT

### Background:

An inflammatory illness that primarily impacts the hands and feet's tiny joints and causes inflammation, rheumatoid arthritis is a persistent condition. It could lead to both fatalities and severe disabilities. Rheumatologic criteria (RF and anti-CCP) were used in research investigations to make the diagnosis. Rheumatoid arthritis, which affects 3% of women and 1% of men across all age groups, affects between 0.5 and 1% of the general population directly.

### Objective:

To evaluate the association of physical activity with the optimism of rheumatoid arthritis patients.

### Methodology:

A cross-sectional study was conducted on 385 participants diagnosed with rheumatoid arthritis clinically in THQ Aziz Bhatti Hospital Gujrat. Males and females between the ages of 35 and 60 were recruited for this study using non-probability convenient sampling. Selected participants were those who matched the inclusion and exclusion requirements. Diagnostic techniques for assessment included the LOTR-R and IPAQ-SF. Version 27.0 of the SPSS software was employed for data entry and analysis, with a 95% confidence interval. In order to ascertain the relationship between Physical Activity and Optimism in Rheumatoid Arthritis Patients, the Spearman Correlation Coefficient was used.

### Results:

Out of 385 individuals, the results showed that 326 of them were female and 59 were male. The patients had RA in various stages, with stage 1 and stage 2 being the most common. According to the correlation between optimism and RA, the majority of participants in stages 1 and 2 agree with the assertions about the good character of things, with only a small minority disagreeing. The connection between global physical activity and RA claims the majority of participants in stages 1 and 2 spend most of five days a week engaging in moderate physical activity. A tiny percentage of individuals were also engaging in intense physical activity. There was a positive and very significant correlation between optimism and physical exercise with  $p < 0.001$ , respectively.

### Conclusion:

326(84.7%) women had rheumatoid arthritis, and only 59(15.3%) men had RA. The Spearman coefficient correlation( $r_s$ ) between two ordinal variables (optimism and international physical activity) was positive and highly significant as the value of  $r_s$  was 0.312 showing a positive correlation between optimism and international physical activity and the P-value was 0.00 which was  $< 0.001$  so it was highly significant so we can say that interpret that high physical activity leads to more optimistic about Rheumatoid Arthritis.

### Keywords:

*Rheumatoid Arthritis, optimism, international physical activity, correlation*

## INTRODUCTION

The chronic, symmetrical, inflammatory autoimmune illness known as rheumatoid arthritis (RA) first affects small joints, then larger joints, and finally the skin, eyes, heart, kidneys, and lungs. Joint bone and cartilage are frequently damaged, and tendons and ligaments become more fragile.<sup>1</sup> This illness typically begins between the ages of 35 and 60, with periods of remission and exacerbation. Since it affects the largest percentage of the population and its incidence and prevalence rates rise with advancing age.<sup>2</sup> Rheumatoid arthritis (RA) has been the subject of the majority of studies on the psychological effects of arthritis. According to estimates, RA affects 1- 2% of people in the West and 1% of people worldwide.<sup>3</sup> Rheumatoid Arthritis directly impacts 0.5 to 1% of the overall population, while its prevalence (across all age groups) is 3% in females, 1% in males.<sup>4</sup>

A chronic autoimmune condition called RA is characterized by inflammation of the joint tissues and a wide range of generalized symptoms like fever, stiffness in the morning, and weariness. Asymmetrical joint involvement may present clinically as arthralgia, edema, redness, or even a restriction in range of motion.<sup>5</sup> The most desirable outcomes (i.e., reduced joint destruction, less radiologic progression, no functional disability.<sup>6</sup> And disease-modifying anti-rheumatic drug (DMARD)-free remission) as well as nonsteroidal anti-inflammatory drugs (NSAIDs, such as diclofenac), and steroids, are thought to be best achieved with early diagnosis (such as prednisolone). According to Wolfe et al. (2001), these drugs help RA patients feel better physically and may also affect their mental health. cost-effectiveness, as the first 12 weeks following the onset of early symptoms are considered.<sup>7</sup>

Rheumatoid arthritis progresses through four stages: synovitis, pannus, fibrous ankylosis, and bony ankylosis. Early RA, or stage 1 RA, is characterized by joint tissue inflammation, which frequently results in joint pain, edema, stiffness, redness, and tenderness. Joint deterioration often does not happen in the early stages of RA. Within 12 weeks of the onset of early indicators of RA, a doctor should identify and start treating the condition for the greatest results.<sup>8</sup> People with stage 2 RA, also known as moderate RA, may suffer stage 1 symptoms that are more severe or last longer, as well as mobility or range of motion limitations that occur more frequently or last longer. Synovial inflammation in joints may begin to erode joint cartilage in stage 2 RA. Stage 3 RA, also known as severe RA, is characterized by significantly more frequent and severe joint swelling and other symptoms than stage 1 or stage 2 RA.<sup>9</sup>

When RA reaches stage 3, the inflammation is so bad

that it obliterates the cartilage and bones in the joints. A further reduction in range of motion and mobility, physical joint abnormalities like curved or knobby hands and toes, and the development of rheumatoid nodules around joints are additional signs of stage 3 RA. Joint tissue inflammation dramatically declines in this final stage of RA, also known as end-stage RA. Additionally, the disease worsens the function of normal joints.<sup>10</sup> Most patients with end-stage RA have similar symptoms to those who are in the earlier stages of the disease, but functional capacity issues are typically more severe, chronic, and disabling. People with end-stage RA typically have exhausted all medical alternatives that doctors use to treat patients with other stages of the disease. A person typically needs to rely on assistive mobility equipment when they lose their physical capabilities to carry out daily duties. Surgery may also be given to those with end-stage RA to restore body function and heal joint damage.<sup>10, 11</sup>

The cause of the illness is unknown, and the majority of medical treatment is palliative. Pain reduction, disease process modification to reduce tissue damage, drug side effects minimization, and function preservation are all objectives of therapy.<sup>12</sup> Approximately 60% of RA patients experience occupational disability, and it is estimated that they collectively make up only between 27% and 48% of what people without arthritis make (Mitchell, Burkhaser, & Pincus, 1988). Due to the disease's three times greater likelihood of occurring in women than in males, it significantly changes the roles and activities of the family.<sup>13</sup>

People from all over the world suffer from RA. The general prevalence of RA rises to 5% in women over the age of 70. India is estimated to have 10 million persons with RA, putting the prevalence there at 0.7%.<sup>14</sup> RA has a wide-ranging influence since it can have an impact on almost every element of an individual's functioning. In the past ten years, research has started to focus on the level of psychological discomfort and social disruption that RA patients encounter as well as the personality traits and coping mechanisms that are most closely related to psychosocial adjustment.<sup>15</sup>

Because of the disease's financial, emotional, and physical effects, coping with RA is very difficult. "Cognitive and behavioral efforts to manage specific external and/or internal demands assessed as exhausting or beyond the resources of the individual" is the definition of "coping."<sup>16</sup> High levels of pain and fatigue are a regular occurrence for RA patients, which has an impact on their general well-being and capacity for everyday activities. Additionally, patients face the risk of joint deformity brought on by RA, loss of physical function, excessive healthcare costs, and job loss or diminution. RA patients experience higher levels of sadness and anxiety compared to the general population, which negatively affects their quality of life.<sup>17</sup>

According to Scheier, Carver, and Bridges (1994), optimism is a dispositional (i.e., temperamental) factor associated with adaptability to chronic illness. The opposite of helplessness is optimism. According to Seligman (2006), optimism is a technique to increase personal control since it

emphasizes responsibility, hope, and an overall optimistic outlook on life.<sup>18</sup>

Scheier and Carver (1992) make the case that optimism as a personality trait may be advantageous to health through a broader interest in the mechanisms underlying the self, which are significantly influenced by one's ideas about the likely outcomes of their actions.<sup>19</sup> Finally, optimism is described as a broad expectation of life's happenings. Life orientation, or a positive assessment of human life, is a crucial characteristic and vital part of human life.<sup>20</sup>

Optimistic people are more likely to continue their goal-directed efforts, whereas those who are pessimistic are more likely to stop making attempts passive, and even give up on reaching their objectives. Explanatory style optimism and dispositional optimism are two fairly different approaches to conceptualizing.<sup>21</sup> In contrast to dispositional optimism, which is the broad optimistic expectation that good things rather than terrible things will happen in the future, explanatory style optimism relates to the way a person explains the causes of unavoidable unfavorable life occurrences. The two different optimism measures do not appear to have a substantial correlation with one another, suggesting that they may evaluate various facets of psychological health.<sup>22</sup>

According to research conducted to date, positive psychological traits and attributes can help arthritis patients feel less stressed and respond well to their condition. In both cross-sectional and longitudinal research, optimism and benefit finding are two such traits that seem to be related to indicators of psychological and physical well-being.<sup>15</sup>

According to the WHO, physical activity is any skeletal muscle-driven movement involving energy use. Any movement, whether done for recreation, transportation to go to and from locations, or as part of a person's job, is considered physical exercise.<sup>23</sup> Both vigorous and moderate physical activity is beneficial to health. Walking, cycling, wheeling, sports, active recreation, and play are all common methods to be active that anyone may do for fun and at any ability level. The International Physical Activity Questionnaire (IPAQ) has been employed primarily for research purposes in rheumatic disorders.<sup>24</sup>

Due to local restrictions causing joint discomfort and impairment as well as systemic effects including weariness and sarcopenia, RA patients spend less time than controls engaging in high-intensity PA and moderately intense activities.<sup>24</sup> In addition to improving overall health, regular physical activity in RA patients may also have disease-specific advantages like decreased pain, increased muscle function, and delayed onset of impairment without negative consequences on joints.<sup>25</sup>

It's interesting to note that moderate-intensity PA has anti-inflammatory effects in both healthy people and people with different chronic conditions. Several clinical studies have been conducted to determine how PA affects RA patients. Numerous studies have found that any amount of exercise is preferable to doing none at all, but the precise exercise characteristics (intensity, duration, frequency, and kind) that lead to actual benefits have not yet been identified.<sup>26</sup>

There has been little bigger research on maintenance over longer periods, even though the prevalence of fulfilling physical activity requirements has been well investigated. Physical activity will enhance general health and may lessen the effects of some common comorbidities in RA patients. Healthcare can effectively guide patients with RA in behavior change by having a greater grasp of the factors that contribute to the maintenance, improvement, or deterioration of physical activity levels over time.<sup>27</sup>

According to earlier research, optimism is associated with increased levels of physical exercise and superior physiological resiliency to stress. The regulatory aspect of optimism may play a role in its potential positive effects on physical activity and stress response. An optimistic person tends to have more faith in the future, which increases the possibility that they will apply techniques to accomplish their goals, such as active goal engagement, problem-focused problem solving, and goal revision when they become unachievable. Effective and flexible use of these tactics certainly gives people more tools with which to deal with life's obstacles and encourages them to adopt more health-promoting habits.<sup>28</sup>

Research has shown that daily moderate-intensity physical exercise (60–75 minutes) among older people appeared to abolish the elevated risk of death linked to sedentary behavior, adding to the body of evidence showing the advantages of physical activity in health promotion for healthy aging. According to Scandinavian research, a decline in daily living activities and cognitive abilities does not necessarily hurt well-being and happiness as people age, despite the fact that even though older people appear to be aging with better overall functional capacity. Additionally, research may indicate that having a more optimistic attitude on life improves.<sup>29</sup>

This study will determine the relationship between optimism in a varied sample of RA patients and objectively-measured physical behavior, including physical activity. Additionally, this connection may differ based on psychosocial characteristics. This study's benefit is to increase people's knowledge of muscular problems that are restricting their everyday activities and their treatments with exercise to ease the stress of handicaps. Independent of covariates, higher levels of PA were strongly linked to both increased optimism and increased positive affect. Although there is a relationship between exercise and optimism, rheumatoid arthritis who also experience fatigue should be encouraged to engage in more vigorous exercise and less sedentary behavior for the sake of their general health and psychological well-being. Even after taking into consideration the detrimental impacts of other psychological

variables, such as depression, physical activity can eventually increase optimism in young and middle-aged people. Optimism is correlated with self-esteem, confidence, happiness, and self-worth, all of which can be increased by physical activity. Exercise can have calming and anxiety-relieving effect that helps people feel more upbeat. It will assist in the discovery and assessment of methods for improving the comfort and quality of life for those who are suffering from this condition through supportive care. However, research on the relationship between physical activity and optimism is scant or nonexistent.

### OBJECTIVE

To evaluate the association of physical activity with the optimism of rheumatoid arthritis patients.

### MATERIAL AND METHODS

**Study Design:** A Cross-Sectional study

**Study Settings:** From the physiotherapist ward at Aziz Bhatti shaheed teaching hospital.

**Study population:** Females and Males diagnosed with Rheumatoid Arthritis (RA)

**Duration of Study:** The study was completed from March – July 2023.

**Sample Size:** A sample size of Three Hundred and Eighty-Five (N= 385) were enrolled in this study. It was calculated using the following formula:

$$\frac{(Z1-a/2)^2 (p) (1 - p)}{d^2}$$

**Z1-a/2** = is the standard normal variant at 95% confidence interval

**P** = Expected proportion in the population that was 0.50

**d** = Absolute Precision (d=0.05)

**n** = 385

### Sampling Technique:

Non-probability convenient sampling technique.

### Sample selection:

**Inclusion criteria:** Patient diagnosed with rheumatoid arthritis.<sup>3,56</sup> RA with stage 1(synovitis) and stage 2(pannus), fully conscious patients.<sup>57</sup>

**Exclusion criteria:** Had depression and anxiety, taking psychotropic drugs, Suffering from other severe illnesses<sup>57</sup>, reporting no physical activity.<sup>30</sup>

**Tools:** International Physical Activity Questionnaire- Short Form (IPAQ-SF).

Life Orientation Test-Revised (LOT-R).

### DATA COLLECTION PROCEDURE

This cross-sectional study was completed in four months after approval of the synopsis. Data was collected from Aziz Bhatti DHQ Hospital Gujrat among 385 females and males. Females and males aged between 35 to 60 years were included in this study by using non-probability convenient sampling technique. First of all, I introduced myself and purpose of the study to the participants. Then took consent form from the participants. Details about consent forms was explained to the participants prior

to filling the forms.

The outcome measures of my research were IPAQ-SF and LOT-R. Necessary demographic information such as gender and age were noted in the form. Demographic data was obtained at baseline. After getting consent forms, subjects were enrolled depending on our study criteria.

The International Physical Activity Questionnaire- Short Form (IPAQ-SF) was used to report the PA levels of RA patients. The IPAQ-SF is a self-reported questionnaire consisting of 7 questions about PA performed over the past seven days, including vigorous-intensity and moderate-intensity PA, walking, and sitting. Each type of PA was assigned an intensity code in units of metabolic equivalent (MET) values. For walking, the IPAQ-SF assigns a MET value of 3.3, moderate-intensity PA a value of 4.0 METs, and vigorous-intensity PA a value of 8.0 METs. Energy expenditure was estimated by multiplying the MET score by the number of minutes spent per week doing each activity and was expressed in MET minutes/week.<sup>58</sup> PA levels were divided into three categories, Namely, low PA (<600 MET-min/week) moderate PA(600 to <3000 MET-min/week), and high PA(≥3000 MET-min/week). A study of the reliability and validity of the IPAQ was conducted in 14 centers in 12 countries, and the results showed that the reliability and validity were good (Craig et al., 2003). In this study, the Chinese version of the IPAQ-SF introduced by Qu et al. was adopted, with a test-retest reliability of 0.626–0.887 and a criterion validity of 0.60.<sup>59</sup>

The Life Orientation Test-Revised (LOT-R), which had a high degree of validity (0.34 to 0.65) and internal consistency (Cronbach's alpha) ranged between 0.74 and 0.78.<sup>60</sup> It will be the exam most frequently used to measure optimism. Ten items make up the LOT-R, six of which are scored and four of which are filler. Among the 6 relevant elements, 3 are optimistic statements showing positive expectations of future life, and 3 statements are pessimistic ones presenting negative expectations. Each item is rated on a Likert scale of 1 to 5, with 1 denoting "very strongly disagree" and 5 denoting "very strongly agree." From 6 to 30 minutes from a and will serve as the patient is perceived to be more upbeat the higher the score.<sup>61</sup>

### List of dependent and independent variables:

**Dependent variable:** Rheumatoid Arthritis symptom reduction. **Independent variable:** Physical Activity and Optimism.

### STATISTICAL ANALYSIS

The statistical package for social sciences (SPSS) version 27 was implemented to enter and analyze the data. Data was assessed at baseline for outcome measures to check normality by using different Tests. For descriptive analysis, mean and standard deviation was calculated for quantitative variables whereas frequencies and percentages were calculated for qualitative variables. For inferential statistics Spearman correlation calculated. All results were calculated at 95% confidence interval and p-value<0.001 was considered as significant value.

### DISCUSSION

An inflammatory illness that mainly affects the small joints of the hands and feet and causes inflammation, rheumatoid arthritis is a persistent condition. It could lead to both fatalities and severe disabilities. Rheumatoid arthritis, which affects 3% of females and 1% of males across all age groups, affects between 0.5 and 1% of the general population directly.<sup>62</sup>This research was conducted to find the association between physical activity with optimism so that it would be helpful in formulating rehabilitation protocols for those patients who have Rheumatoid Arthritis.

In a study conducted by researchers in 2020 found that different types of exercise should be selected based on RA patients' symptoms in order to maximize the benefits of exercise. Although the ideal type, frequency, and duration of exercise have not been identified, any exercise is better for RA patients than no exercise. The next step is to customize the best exercise programme for RA patients with their unique symptoms, which requires figuring out the exercise guidelines to maximize the health benefits while ensuring safety.<sup>38</sup>

In time line of 2019-2020 a study conducted which main topic of discussion was Intra-personal psychological factors like motivational force, self-efficacy, and a positive outlook on ageing had a substantial impact on older individuals' involvement in LTPAs. We made the suggestion as a result of this that, in order to better support physical exercise treatments for the ageing population, we should develop and distribute persistent psychological resources of independence, hope, and fortitude. Additionally, our research demonstrates that psychosocial fluency can vary based on the LTPA type. The results demonstrated that exercise and sport involvement were significantly more closely related to inner-oriented values than to perceived social and environmental factors, whereas leisure walking was significantly more closely related to inner-oriented values. This demonstrates the need to consider the variety of psychosocial impacts on older people's engagement in LTPAs.<sup>39</sup>

In 2018-year, research conducted for seven days straight, 54 female rheumatoid arthritis patients self-reported their optimism (once), daily pain, and daily positive and negative influence. Simple slopes analysis revealed that low optimism was linked to a less significant relationship between daily suffering and daily negative effects than higher optimism. Regardless of the intensity of the pain, greater optimism was also associated with greater positive daily impacts. These results suggest that rather than high optimism acting as a protective element, low optimism may act as a vulnerability element in the connection between daily pain and daily effect..<sup>40</sup>

Research was conducted whose main discussion was there was a relationship between the independent variables of optimism, pessimism, motivation, and

self-determination and their impact on the dependent variable of achieving physical activity goals among 86 senior patients who were receiving physical therapy treatments. Using multiple regression analysis, it was found that there was no statistically significant difference between those with low vs high levels of optimism, pessimism, self-determination, and motivation in the number of physical therapy goals attained following discharge. The findings of this study urge further research into the connection between declining cognitive and physical abilities and health with ageing. More research is needed to clarify earlier findings that high levels of optimism, self-determination, and motivation account for a successful outcome in treatment, the rehabilitation process, and goal achievement in contrast to the conflicting findings presented in this research study as a result of social change.<sup>41</sup>

In 2016 the main discussion of the article was thorough analysis of the interactions between physical and psychological processes in RA, it is important to comprehend the numerous levels at which this interaction may occur. It is crucial to comprehend how a patient adapts to RA within the context of their general social environment because interpersonal stresses and support can have both short- and long-term effects on one's physical health, coping mechanisms, and treatment responses. Future models that incorporate multiple layers of analysis into a complete approach could result in illuminating empirical and therapeutic data. For example, taking into account physical exam findings and laboratory results, as well as the psychosocial factors unique to each patient, could increase the effectiveness of current treatments, slowing disease activity and promoting long-term psychological health and physical function.<sup>42</sup>

A study was conducted which main discussion was the incremental impact of depression on the health and well-being of arthritis patients, examining physical activity, disability, arthritis-attributable burden, and HRQOL. Physical activity plays an important role in arthritis management, but low levels of physical activity observed among patients with depression highlights the need for health care professionals to address this issue. Policy makers should consider developing physical activity interventions targeted toward arthritis patients with depression. Depression has a negative impact on physical activity, disability, arthritis-attributable burden, and HRQOL among arthritis patients, and should be managed and treated.<sup>63</sup>

## CONCLUSION

326(84.7%) women had rheumatoid arthritis and only 59(15.3%) men with RA. The Spearman co-efficient correlation( $r_s$ ) between two ordinal variables (optimism and international physical activity) is positive and highly significant as the value of  $r_s$  was 0.312 showed a positive correlation between optimism and international physical activity and the P-value was 0.00 which was <0.001 so it is highly significant so we can say that interpret that high physical activity leads to more optimistic about Rheumatoid Arthritis.

Recommendations: This study covers only Gujrat area, but

it is advised that additional research on the association of physical activity with optimism of all stages of RA patients be done in other Pakistani cities.

Healthcare professionals are urged to inform patients positively about the advantages of exercise and be positive about your disease that incredibly little chance of damage.

The relationship between exercise and optimism can be strengthened by maintaining a positive outlook and using mindfulness practice e.g., deep breathing exercises, yoga, and meditation can help you relax, manage stress and maintain positive mindset.

For more accurate results, a high sample size should be used. In the future, probability sampling should be performed instead of non-probability sampling for better selection.

**Limitations:** The limitation of this study is that it was not carried out in a larger scale, it was just done on patient related to this disease in Gujrat.

Only the first two stages of RA patients are covered in this study, and insufficient data on next two stages.

Non-probability sampling was performed because we lacked access to the data.

### RESULTS

Out of 385 participants, 326(84.7%) women were rheumatoid arthritis. And only 59(13.5%) men were rheumatoid arthritis and according to the age group, 22(5.7%) were between the age of 26 to 35, and 154(40%) were between the age of 36 to 45. 165(42.9%) were between the age of 46 to 55 and 44(11.4%) were between the age of 56 to 60 above. Results indicate that according to the questions of the optimism questionnaire, most participants 236(1.30%) agree about in uncertain times, I usually expect the best which given positive nature only a few participants disagree and some was neutral. In the same way, most participants 213(55.3%) were agree and 101(26.23%) participants strongly agree to relax about the disease, few disagree and 61(15.8%) was neutral. Most participants strongly disagree 207(53.77 %), and disagree 85(22.08%) about If something can go wrong, it will. And few were agreed and neutral about it. In the same way, most 252(65.45%) were Agree and only 4(1.04%) participants SD, 7(1.82%) was D, 80(20.78%) was Neutral, and 42(10.91%) were SA about always optimistic about future. Most participants 276(71.69%) were Agree about enjoy friends a lot, only 3(0.78%) were SD, 1(0.23%) were D, 50(12.99%) were Neutral, and 55(14.29%) were SA. It's important for me to keep busy most participants 256(66.49%) gives a Neutral answer and others 8(2.08%) were SD, 105(27.27%) were D,15(3.90%) was Agree, and only 1(0.26%) were SA. At hardly ever expect things to go my way, most participants 223(4.68%) Agree about the statement other only 6(2.6%) were SD, 10(56.36%) were D,111(35.84%)

were Neutral, and 35(0.52%) were SA. At I don't get upset too easily most participants 272(2.60%) were disagree(D). Other 66 (28.83%) were Neutral,16(1.56%) was SD, 29(5.7%) were Agree. And only 2 (9.09%) were SA. At rarely count on good things happening most participants 272(70.65%) were disagree and other 16(4.165%) were SD,66(17.14%) was Neutral, 29(7.53%) were Agree and only 2(0.52%) were SA. In expect more good things to happen than bad mostly 188(48.83%) given Agree answer and other 6(1.56%) give SD ,22(5.71%) was D, 95(24.48%) were Neutral and 74(19.22%) were given SA answer. Results also give percentages of these questions with stages of RA, which showed an association between optimism and RA

Results indicate according to Physical activity performed during RA, only 9(2.34%) Vigorous physical activity performed, 225 (58.4%) Moderate Physical activity performed, 31(8.1%) Low physical activity performed, and only 4(1.0%). Time Spent on walking, only 1 (0.3%) time spent on sitting and 27(7.0%) are not sure about it. Most Moderate Physical activities were performed by RA Patients in most 5 days/week 159(41.3%).RA with stages men 18(19.6%) had STAGE 1(Mild RA), 27(11.5%) had STAGE 2(Moderate RA), 1(3.8%) had STAGE 3(Severe RA) and 13(61.9%) had STAGE 4(End stage). Overall, 59(15.3%) men had rheumatoid arthritis. women 74(80.4%) had STAGE 1(Mild RA).

219(89.0%) had STAGE 2(Moderate RA), 25(96.2%) had STAGE 3(Severe RA) and 8(38.1%) had STAGE 4(End stage). participants with stage 1, only 59(67.0%) some sort of all physical activities, and Moderate PA 33(17.4%) performed, other activities like VPA, LPA, walking, and sitting were in 0% ratio. Participants with stage 2 spent time more doing Moderate PA 188(83.6%), and little time spent on all physical activities, 29(33.0%), and other activities were in little percentages. Participants with stage 3 spent time doing only LPA and other activities in a very small ratio. Participants with stage 4 only performed 3(1.3%) MPA, 7(22.6%) LPA and 11(40.7%) were not sure.

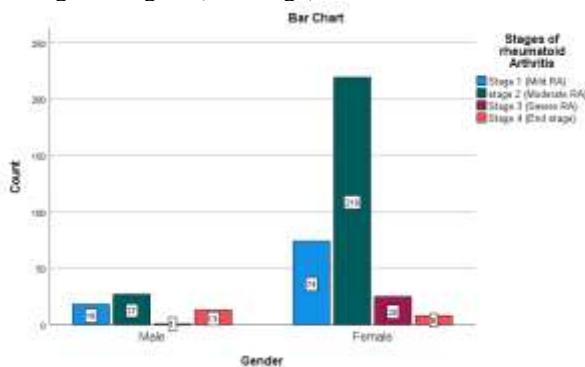
The result indicates the correlation between optimism and international physical activity which given the Spearman co-efficient correlation( $r_s$ ) between two ordinal variables (optimism and international physical activity) was positive, and highly significant as the value of  $r_s$  was 0.312 showed a positive correlation between optimism and international physical activity and the P-value was 0.00 which was <0.001 so it was highly significant so we can say that interpret that high physical activity leads to more optimistic about Rheumatoid Arthritis.

**Table 5.1: Demographics characteristics of participants**

Variables	Responses	n	%
Gender	Male	59	15.3%
	Female	326	84.7%
Age of participants in years	15 to 25	0	0.0%
	26 to 35	22	5.7%
	36 to 45	154	40.0%

	46 to 55	165	42.9%
	56 to 60 above	44	11.4%
Stages of Rheumatoid Arthritis	Stage 1 (Mild RA)	92	23.9%
	stage 2 (Moderate RA)	246	63.9%
	Stage 3 (Severe RA)	26	6.8%
	Stage 4 (End stage)	21	5.5%
<b>Total</b>		<b>385(100%)</b>	

This table 5.1 shows that according to gender of the participants, 59(15.3%) were males and 326(84.7%) were females. According to age groups of the participants, 22(5.7%) were between the age of 26 to 35, 154(40%) were between the age of 36 to 45. 165(42.9%) were between the age of 46 to 55 and 44(11.4%) were between the age of 56 to 60 above. According to Stages of rheumatoid arthritis, 92(23.9%) were among the stage 1(Mild RA), 246(63.9%) were among the stage 2(Moderate RA), 26(6.8%) were among the stage 3(Severe RA) and only 21(5.5%) were among the stage 4 (End stage).



**Figure 5.1: Rheumatoid Arthritis (Stages) among men and women**

This figure 5.1 shows that males 18(19.6%) had STAGE 1(Mild RA), 27(11.5%) had STAGE 2(Moderate RA), 1(3.8%) had STAGE 3(Severe RA) and 13(61.9%) had STAGE 4(End stage). Overall, 59(15.3%) males had rheumatoid arthritis. Females 74(80.4%) had STAGE 1(Mild RA), 219(89.0%) had STAGE 2(Moderate RA), 25(96.2%) had STAGE 3(Severe RA) and 8(38.1%) had STAGE 4(End stage). Overall, 326(84.7%) females had rheumatoid arthritis.

**Table 5.2: Descriptive analysis of LOTR (Optimism)**

Variables	category	f (%)	Mean ± SD
Q1: In uncertain times, I usually expect the	SD	6(1.56%)	3.98 ± 0.818
	D	20(5.19%)	
	Neutral	36(9.35%)	
	Agree	236(1.30%)	
	SA	87(22.60%)	

best			
Q2: It's easy for me to relax	SD	1(1.56%)	4.04 ± 0.776
	D	4(1.04%)	
	Neutral	61(15.84%)	
	Agree	213(55.3%)	
	SA	101(26.23%)	
Q3: If something can go wrong for me, it will	SD	85(22.08%)	2.10 ± 0.835
	D	207(53.77%)	
	Neutral	67(17.40%)	
	Agree	23(5.97%)	
	SA	3(0.78%)	
Q4: I'm always optimistic about my future	SD	4(1.04%)	3.83 ± 0.676
	D	7(1.82%)	
	Neutral	80(20.78%)	
	Agree	252(65.45%)	
	SA	42(10.91%)	
Q5: I enjoy my friends a lot	SD	3(0.78%)	3.98 ± 0.595
	D	1(0.26%)	
	Neutral	50(12.99%)	
	Agree	276(71.6%)	
	SA	55(14.29%)	
Q6: It's important for me to keep busy	SD	8(2.08%)	2.73±0.577
	D	105(27.27%)	
	Neutral	256(66.49%)	
	Agree	15(3.90%)	
	SA	1(0.26%)	
Q7: I hardly ever expect things to go my way	SD	6(2.60%)	2.44 ± 0.651
	D	10(56.36%)	
	Neutral	111(35.8%)	
	Agree	223(4.68%)	
	SA	35(0.52%)	
Q8; I don't get upset too easily	SD	16(1.56%)	3.70 ± 0.733
	D	272(2.60%)	
	Neutral	66(28.83%)	
	Agree	29(57.92%)	
	SA	2(9.09%)	
Q9: I rarely count on good things happening to me	SD	16(4.16%)	2.30 ± 0.689
	D	272(70.6%)	
	Neutral	66(17.14%)	
	Agree	29(7.53%)	
	SA	2(0.52%)	
Q10: Overall, I expect more good things to happen to me than bad	SD	6(1.56%)	3.78 ± 0.874
	D	22(5.71%)	
	Neutral	95(24.68%)	
	Agree	188(48.8%)	
	SA	74(19.22%)	

This table 5.2 indicates the Frequency and percentage of LOTR Questions which laid in different categories like strongly agree, disagree, neutral agree, and strongly agree. In

Q1 mostly participants laid in Agree 236(1.30%) category, other categories like SD 6(1.56%), D 20(5.19%), Neutral 36(9.35%), and SA 87(22.60%). In Q2 most participants laid in Agree 213(55.3%) category other categories like SD was only 1(1.56%), D was 4(1.04%), 61(15.8%) were neutral about this statement,101(26.235) were SA about this statement. In Q3 most participants were D 207(53.77 %), and participants 85(22.08%) laid in the SD category,67(17.4%) laid in the Neutral category,23(5.97%) laid in Agree category, and only 3(0.78%) laid in SA category. In Q4 most participants 252(65.45%) laid at Agree category, and only 4(1.04%) participants laid in the SD category, only 7(1.82%) laid at D category,80(20.78%) was Neutral, and 42(10.91%) were SA. At Q5 most participants 276(71.69%) were Agree ,3(0.78%) was SD, 1(0.23%) were D, 50(12.99%) were Neutral, and 55(14.29%) were SA. At Q6 most participants 256(66.49%) given Neutral answer and others 8(2.08%) were SD, 105(27.27%) were D,15(3.90%) was Agree, and only 1(0.26%) were SA. In Q7 most participants 223(4.68%) were Agree about the statement, and other only 6(2.60%) were SD, 10(56.36%) were D,111(35.84%) were Neutral, and 35(0.52%) were SA. In Q8 most participants 272(2.60%) gave a D answer. Other 66 (28.83%) were Neutral,16(1.56%) was SD, 29(5.7%) were Agreed, and only 2 (9.09%) were SA. At Q9 most participants 272(70.65%) given a D statement and other 16(4.16%) were SD,66(17.14%) was Neutral, 29(7.53%) were Agree and only 2(0.52%) were SA. In Q10 mostly 188(48.83%) were Agree about statement and other 6(1.56%) given SD ,22(5.71%) was D, 95(24.48%) were Neutral and 74(19.22%) were given SA statement. This table shows the values of Mean ± std. deviation most of the participants were agree with most of the statements (Q1, Q2, Q4, Q5, Q8, Q10) those given positive nature except (Q3, Q7, and Q9) had values of mean and std. deviation which gave negative nature, and Q6 had neutral nature.

**Table 5.3: Association between Rheumatoid Arthritis and optimism**

Optimism	RA	Category				
	S	SD	D	N	A	SA %
Q1: In uncertain times, I usually expect the best	S1	0%	10%	0%	10.6%	74.7
	S2	0%	0%	52.8%	86.9%	25.3
	S3	33.3%	60.0%	27.8%	0.8%	0%
	S4	66.7%	30%	19.4%	1.7%	0%
Q2: It's easy for me to relax	S1	0%	0%	8.2%	8.9%	67.3
	S2	0%	0%	42.6%	87.8%	32.7
	S3	33.3%	25%	36.1%	0.5%	0%
	S4	66.7%	75%	13.1%	28%	0%
Q3: If	S1	75.3%	8.7%	14.9%	0%	0%

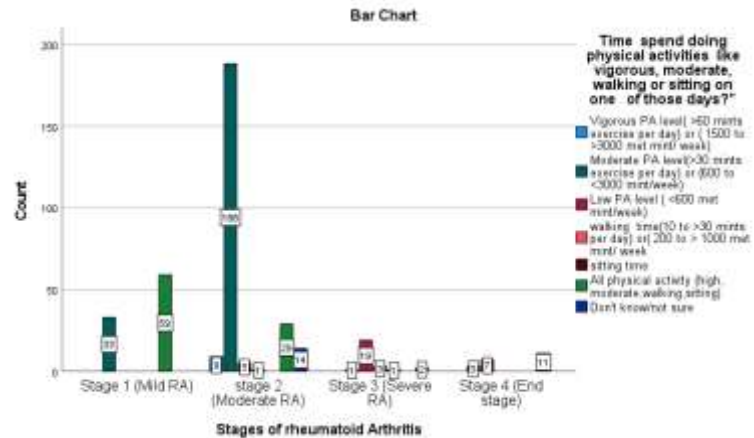
something can go wrong for me, it will	S2	24.7%	88.4%	61.2%	4.3%	0%
	S3	0%	1%	10.4%	69.6%	33.3
Q4: I'm always optimistic about my future	S4	0%	1.9%	13.4%	26.1%	66.7
	S1	0%	0%	10%	26.6%	40.5
	S2	0%	0%	46.3%	73.0%	59.5
Q5: I enjoy my friends a lot	S3	50%	57%	23.8%	0.4%	0%
	S4	50%	42.9%	20%	0%	0%
Q6: It's important for me to keep busy	S1	0%	0%	80%	23.6%	41.8
	S2	0%	0%	44.0%	69.6%	58.2
	S3	33.3%	0%	22%	5.1%	0%
	S4	66.7%	n=1	26/0%	1.8%	0%
Q7: I hardly ever expect things to go my way	S1	37.5%	20%	26.2%	6.7%	0%
	S2	62.5%	75.2%	59.8%	53.3%	n=1
	S3	0%	2.9%	7.4%	26.7%	0%
	S4	0%	1.9%	6.6%	13.3%	0%
Q8: I don't get upset too easily	S1	60%	15.7%	37.7%	0%	0%
	S2	30%	82.5%	46.4%	0%	0%
	S3	10%	0.5%	6.5%	83.3%	0%
	S4	0%	1.4%	9.4%	16.7%	n=2
Q9: I rarely count on good things happening to me	S1	0%	20%	14.4%	27.8%	34.3%
	S2	33.3%	40%	58%	69%	60%
	S3	16.7%	10%	17.1%	2.2%	0%
	S4	50%	30%	9.9%	0.9%	5.7%
Q10: Overall, I expect more good things to happen to me than bad	S1	43.8%	25.4%	21.2%	6.9%	0%
	S2	50%	72%	48.5%	34.5%	0%
	S3	6.3%	1.8%	10.6%	44.8%	0%
	S4	0%	0.7%	19.7%	13.8%	n=2
Q10: Overall, I expect more good things to happen to me than bad	S1	0%	0%	24.2%	13.8%	58.1%
	S2	0%	13.6%	55.8%	84.6%	41.9%
	S3	33.3%	72.7%	7.4%	0.5%	0%
	S4	66.7%	13.6%	12.6%	1.1%	0%

**RA\*(Rheumatoid Arthritis),S\*(Stage),D\*(Disagree),N\*(Neutral),A\*(Agree), SA\*(Strongly Agree)**  
 This table shows that the Participants with stage 1, 2(10%) D. 25(0.6%) agree and 65(74.7%) were SA. Participants with stage 2, 19(52.8%) Neutral, 205(86.9%) Agree and 22(25.3%) were SA. Participants with Stage 3, 2(33.3%) SD, 12(60.0%) D, 10(27.8%) Neutral,2 (0.8%) Agree. Participants with stage 4, 4(66.7%) SD, 6(30%) D, 7(19.4%) Neutral, and 4 (1.7%) were agree about usually except the best of optimism. Participants with Stage I, only 5(8.2%) Neutral, 19(8.9%) Agree and 68(67.3%) SA. Participants with stage 2, 26(42.6%) Neutral, 187(87.8%) Agree and 33(32.7%) were



SA. Participants with Stage 3, 2(33.3%) SD, 1(25%) D, 221(36.1%) Neutral and (0.5%) were Agree. Participants with stage 4, 4 (66.7%) SD, 3(75%) D, 86(13.1%) Neutral, and (28%) were agree about to be relax of optimism. Participants with stage 1, 64(75.3%) SD, 18 (8.7%) D, 10(14.9%) were Neutral. Participants with Stage 2, 21(24.7%) SD, 183(88.4%) D, 41(61.2%) Neutral and 1(4.3%) are Agree. Participants with stage 3, 2(1%) D, 7(10.4%) Neutral, 16(69.6%) Agree and 1(33.3%) were SA. Participants with Stage 4, 4(1.9%) D, 9 (13.4%) Neutral, 6 (26.1%) Agree and 2(66.7%) were SA about wrong for me it will of optimism. Participants with Stage 1, 8(10.0%) Neutral, 67 (26.6%) Agree, and 17(40.5%) Strongly Agree. Participants with stage 2, 37(46.3%) Neutral, 184(73.0%) Agree and 25 (59.5%) were strongly agreed. Participants with Stage 3. Only 2(50%) Strongly disagree, 4(57.1%) Disagree, 19(23.8%) Neutral, and only 1 (0.4%) Agree. Participants with stage 4. 2 (50%) strongly agree, 3 (42.9%) Disagree, 16(20%) Neutral, about always optimistic about future. Participants with stage 1, only 4(8%) Neutral, 65 (23.6%) Agree and 23(41.8%) were strongly agree. Participants with Stage 2, 22 (44.0%) Neutral, 192(69.6%) Agree and 32 (58.2%) were strongly agree. Participants with Stage 3, only 1 (33.3%) strongly disagree, 11 (22.0%) Neutral and 14(5.1%) Agree. Participants with Stage 4, 2 (66.7%) strongly disagree, 1 (100.0%) Disagree, 13 (26.0%) Neutral and 5 (1.8%) Agree about enjoy with friends a lot. Participants with stage 1, Only 3 (37.5%) SD, 21 (20.0%) D, 67 (26.2%) Neutral and 1 (6.7%) agree, Participants with stage 2, 5(62.5%) SD, 79 (75.2%) D. 153 (59.8%) Neutral, 8 (53.3%) and 1 (100.0%) SA. Participants with Stage 3, 3(2.9%) D, 19 (7.4%) Neutral, and 4 (26.7%) Agree. Participants With Stage 4 only 2 (1.9%) D, 17(6.6%) Neutral, 2 (13.3%) Agree, about to keep busy. Participants with stage 1, 6(60.0%) SD, 34 (15.7%) D, 52 (37.7%) Neutral. Participants with Stage 2, 3(30.0%) SD, 179 (82.5%) D, and 64(46.4%) were Neutral. Participants with Stage 3, 1(10%) SD, 1 (0.5%). D, 9 (6.5%) Neutral, 15(83.3%) Agree. Participants with stage 4, 3(1.4%) D, 13(9.4%) Neutral, 3(16.7%) Agree and 2(100.0%) was SA about hardly ever expect things to go my way of optimism. Participants with stage 1, 2(20.0%). D, 16(14.4%) was Neutral, 62(27.8%) Agree, and 12 (34.3%) were SA. Participants with Stage 2, 2 (33.3%) SD, 4(40.0%) D, 65 (58.6%) Neutral, 154 (69.1%) Agree, 21(60.0%) SA. Participants with stage 3, 1 (16.7%) SD, 1 (10.0%) D, 19 (17.1%) Neutral, 5(2.2%) Agree. Participants with stage 4, 3(50.0%) SD, 3 (30.0%) D. 11 (9.9%) Neutral, 2 (0.9%) Agree and 2(5.7%) were SA about upset too easily of optimism. Participants with Stage 1, 7(43.8%) SD, 69 (25.4%) D, 14(21.2%) Neutral, 2 (6.9%) Agree. Participants with stage 2, 8 (50.0%) SD, 196 (72.1%) D, 32(48.5%) neutral, and 10(34.5%) agreed. Participant with Stage 3, 1(6.3%) SD, 5 (1.8%)

D, 7(10.6%) neutral and 13(44.8%) were agree. Participants with Stage 4, 2 (0.7%) D, 13 (19.7%) Neutral, 4 (13.8%) Agree and 2 (100.0%) were SA about rarely counting on good things happening. Participants with stage 1, 23(24.2%) Neutral, 2.6(13.8%) Agree and 43(58.1%) SA. Participants with stage 2, 3 (13.6%) D, 53(55.8%) were Neutral, 159 (84.6%) Agree and 31 (41.9%) were SA. Participants with stage 3, 2(33.3%) SD, 16(72.7%) D, 7(7.4%) Neutral and 1 (0.5%) were Agree. Participants with stage 4, 4 (66.7%) SD, 3(13.6%) D, 12 (12.6%) Neutral and 2(1.1%) Agree about expecting more good things to happen to me than bad.



**Figure 5.2: Association between International Physical Activity and Rheumatoid Arthritis**

Graph 5.2 shows that participants with stage 1 only spent time on all physical activity 59(67.0%) and Moderate PA 33(17.4%) other activities like VPA, LPA, walking, and sitting were in 0% ratio. Participants with stage 2 spent time more doing Moderate PA 188(83.6%), and little time spent on all physical activities, 29(33.0%) and other activities were in little percentages. Participants with stage 3 spent time doing only LPA and other activities were in a very small ratio. Participants with stage 4 only performed 3(1.3%) MPA ,7(22.6%) LPA and 11(40.7%) were not sure.

**Table 5.4: Spearman Rank-Order Correlation between Optimism and International Physical Activity**

Correlation	Optimism	International physical activity
Optimism		$r_s = 0.312$
International physical activity		$p\text{value} = 0.00 (< .001)$

\*\* . Correlation is significant at the 0.01 level (2-tailed)

This table 5.6 shows that Spearman's correlation co-efficient ( $r_s$ ) between two ordinal variables (optimism and international physical activity) as in the table, the value of  $r_s$  was 0.312 showed a positive correlation between optimism and international physical activity and the P-value was 0.00 which was  $<0.001$  so it was highly significant so we can say that interpret that high physical activity leads to more optimistic.

### Conflict of Interest

There was no conflict of interest.

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### Data availability

Data will be provided on the demand by corresponding author.

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