

COMPARISON BETWEEN INTERFERONS AND PHYSIOTHERAPY TREATMENT ON QUALITY OF LIFE IN MULTIPLE SCLEROSIS PATIENTS

AUTHORS INFORMATION:

Author no. 1: Rajneet Kaur Sahni (M.P.T), Baba Farid University of Health Sciences, Fraidkot. Punjab, India.

Author no. 2: Upasana Vijh (B.P.T), Baba Farid University of Health Sciences, Fraidkot, Punjab, India.

Author no. 3: Shamadeep Kaur (B.P.T), Baba Farid University of Health Sciences, Fraidkot, Punjab, India.

Author no. 4: Simran Grewal (B.P.T), Baba Farid University of Health Sciences, Fraidkot, Punjab, India.

Author no. 5: Harpreet Singh (M.P.T), Baba Farid University of Health Sciences, Fraidkot, Punjab, India.

ABSTRACT

Background: Multiple Sclerosis (MS) is a chronic inflammatory disease of the central nervous system. The major factors that contribute to a patient's quality of life (QOL) are the ability to perform daily life activities, the level of well-being and of satisfaction with life. Patients with MS rate their health related QOL lower than general populations. Physical rehabilitation is generally accepted as useful for such MS patients. Interferons exert effects of potential relevance to multiple sclerosis.

Objectives: The main objective of this study is to see the effect of interferon, physiotherapy and their combine treatment on quality of life in Multiple sclerosis patients.

Methods: The study was comparative in nature. 30 subjects suffering from MS were selected by purposive sampling technique from in and around Ludhiana. The subjects were divided into 3 groups with 10 subjects each i.e. Group A taking physical therapy, Group B taking interferon therapy and Group C taking combination of both therapies. The quality of life of MS patients in different groups were assessed through a SF-36 health questionnaire.

Results: Data was analyzed using ANOVA as a descriptive measure. The results showed that there is a significant difference between the groups

Conclusion: This study concluded that physical therapy is much better than interferon therapy and the dual approach of both therapies is also performing well as compared to independent interferon therapy.

Keywords: Interferons, Physiotherapy, Quality of Life, Multiple Sclerosis.

INTRODUCTION

Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous system in which fatigue is one of the most frequent symptoms. It affects up to 80% of patients and persists over time, many times unrelated to the progress of physical disability.¹ Quality of life (QOL) is an individual's perception of their position in life in the context of culture and values system in which they live and in relation to their goal expectations, standards and concerns by world health organization.² The major factors that contribute to a

patient's quality of life (QOL) are the ability to perform daily life activities, the level of well-being and of satisfaction with life, and the effect of disease-specific symptoms on these parameters. Clearly many of the symptoms of MS, including increasing disability, may have direct and indirect effects on these parameters.³ Patients with MS rate their health related QOL lower than general populations, and also lower than patients with other chronic diseases such as epilepsy and diabetes.⁴ MS can be treated through different methods in which Interferons and physiotherapy play vital roles.

Interferon is a relatively small protein (approximately a tenth the size of immunoglobulin (IgG), which exerts its complex effects by inducing a multitude of genetic and metabolic processes. Interferon was postulated to reduce IgG synthesis and simultaneously modulating natural killer cell activity. This makes interferon an attractive agent for MS.⁵ Interferon beta is known to reduce greater active MRI lesions and, as a consequence, the accumulation of the MRI measured lesion burden. It affects the subsequent course of the disease, by decreasing the amount of inflammation.⁶ Use of interferons in multiple sclerosis has been studied for more than 20 years. Interferons exert effects of potential relevance to multiple sclerosis: their antiviral action, and their pleiotropic effects on the immune system and blood brain barrier, could benefit patients with MS.⁷

The leading non traumatic cause of neurologic disability in young adults is MS, with various combinations of impairments affecting different MS patients or the same patient over time. Physical rehabilitation is generally accepted as useful for such MS patients. A wide range of physiotherapeutic approaches is employed, ranging from more traditional strategies to newer techniques emphasizing the learning and practice of functional motor skills within a "task-specific" context.⁸ There is a direct and primary correlation between muscle strength and the performance of many everyday activities, such as walking, in people with MS. For this reason, it has been argued that using progressive resistance training (PRT) to increase muscle strength might help improve the performance of physical activities such as walking and thereby increase the health-related quality of life of people with MS.⁹

This study aimed to find the proper approach for treatment of Multiple Sclerosis as to whether Physiotherapy or Interferon therapy, or the dual approach is helpful in treating symptoms and improving quality of life of MS patients. In physiotherapy there are special programs of work out based on aerobic training which are very effective in reducing fatigue, enhancing mood and improving quality of life. On the flip side Interferons reduces the frequency and severity of attacks and the development of new brain lesions. In addition, they slow down the progression of MS, reducing future disability. Both have shown better results individually, however further researches are suggested to fully understand the effect of these treatment protocol and to conclude which is better either combination or individual treatments.

MATERIAL AND METHODOLOGY

The study was comparative in nature. 30 subjects suffering from multiple sclerosis with no evidence of post and para-infectious encephalomyelitis and no causes other than inflammatory demyelination on radiological, biochemical and microbiological tests and were selected by purposive sampling technique from in and around Ludhiana. The subjects were divided into 3 groups - Group A, B and C with 10 subjects each based on different treatment approaches. The subjects taking physical therapy were assigned as Group A, Interferon therapy as Group B and combination of both therapies as Group C. The quality of life of MS patients taking interferon therapy, physical therapy and combination of both therapies were assessed through a SF-36 health questionnaire. The SF-36 Health scale measures the physical functioning, role limitations because of physical health problems, bodily pain, social functioning, general mental health, role limitation because of emotional problems, vitality, general health perceptions. Cronbach's coefficient value was >0.70 .

The data was analyzed by descriptive statistics using ANOVA for comparison between the three groups.

Figures and tables:

Table and Figure 1. shows the mean value of age group A i.e 35.40, group B 32.80 and group C 37.60 and standard deviation of group A 10.222, group B 8.244 and group C 10.002 respectively. F test is done which shows value of 0.637 and p value 0.537, therefore result is not significant.

Table and Figure 2. shows frequency distribution of gender which showed that in group A male were 20% and female 80%, group B male were 10% and female 90% and in group C male were 40% and female 60%.

Table and Figure 3. shows the mean value of limitation of activities of group A i.e 635.00 group B 385.00 group C 515.00 and standard deviation of group A 206.895, group B 124.833 group C 154.650 respectively. F test is done which shows value 5.698 and p value 0.009 therefore result is significant.

Table 4 and Figure 4 shows the mean value of physical health problems of group A i.e 222.00 group B 50.00 group C 230.00 and standard deviation of group A 103.280, group B 84.984 group C 94.868 respectively. F test is done which shows value 11.417 and p value 0.000 therefore result is significant.

Table and Figure 5 shows the mean value of emotional health problems of group A i.e 220.00 group B 60.00 group C 160.00 and standard deviation of group A 63.246, group B 96.609 group C 84.327 respectively. f test is done which shows value 9.587 and p value 0.001 therefore result is significant.

Table and Figure 6 shows the mean value of energy and emotions of group A i.e 588.00 group B 284.00 group C 408.00 and standard deviation of group A 55.936, group B 79.331 group C 66.800 respectively. f test is done which shows value 50.485 and p value 0.000 therefore result is significant.

Table and Figure 7 shows the mean value of social activity of group A i.e 200.00 group B 340.00 group C 242.00 and standard deviation of group A 59.268, group B 40.000 group C 42.635 respectively. F test is done which shows value 22.205 and p value 0.000 therefore result is significant.

Table and Figure 8 shows the mean value of pain of group A i.e 130.00 group B 52.50 group C 92.50 and standard deviation of group A 25.820, group B 27.513 group C 20.582 respectively. F test is done which shows value 24.395 and p value 0.000 therefore result is significant.

Table and Figure 9 shows the mean value of general health of group A i.e. 51.50 group B 123.50 group C 82.50 and standard deviation of group A 17.803, group B 22.117 and group C 23.363 respectively. F test is done which shows value 28.943 and p value 0.000 therefore result is significant.

Table 1 Comparison between age of subjects.

ANOVA	Age		
	Group A	Group B	Group C
Mean	35.40	32.80	37.60
S.D.	10.222	8.244	10.002
Number	10	10	10
Maximum	50	47	52
Minimum	19	23	23
Range	31	24	29
F test	0.637		
Table Value at 0.05	3.354		
P value	0.537		
Result	Not Significant		

Pairwise Comparison Mean Difference & Result>	A	
	B	B
	C	4.8NSig
	2.6NSig	
	2.2NSig	

Table 2 Comparison of gender between the groups

Frequency Distribution	Gender		
	Group A	Group B	Group C
Male%	20%	10%	40%
Female %	80%	90%	60%

Table 3 Comparison of limitation of activities between the groups

ANOVA	LIMITATIONS OF ACTIVITIES		
	Group A	Group B	Group C
Mean	635.00	385.00	515.00
S.D.	206.895	124.833	154.650
Number	10	10	10
Maximum	850	600	750
Minimum	100	150	300
Range	750	450	450
F test	5.698		
Table Value at 0.05	3.354		
P value	0.009		
Result	Significant		

Pairwise Comparison
Mean Difference &
Result>

A		
B	250Sig	B
C	120NSig	130Sig

Table 4 Comparison of physical health problems between the subjects

ANOVA	PHYSICAL HEALTH PROBLEMS		
	Group A	Group B	Group C
Mean	220.00	50.00	230.00
S.D.	103.280	84.984	94.868
Number	10	10	10
Maximum	400	200	400
Minimum	0	0	100
Range	400	200	300
F test	11.417		
Table Value at 0.05	3.354		
P value	0.000		
Result	Significant		

Pairwise Comparison
Mean Difference &
Result>

A		
B	170Sig	B
C	10NSig	180Sig

Table 5 Comparison of emotional health problems between the groups

ANOVA	EMOTIONAL HEALTH PROBLEMS		
	Group A	Group B	Group C
Mean	220.00	60.00	160.00
S.D.	63.246	96.609	84.327
Number	10	10	10
Maximum	300	300	300
Minimum	100	0	0
Range	200	300	300
F test	9.587		
Table Value at 0.05	3.354		
P value	0.001		
Result	Significant		

Pairwise Comparison
Mean Difference &
Result>

	A	
B	160Sig	B
C	60NSig	100Sig

Table 6 Comparison of energy and emotions between the groups

ANOVA	ENERGY AND EMOTIONS		
	Group A	Group B	Group C
Mean	588.00	284.00	408.00
S.D.	55.936	79.331	66.800
Number	10	10	10
Maximum	640	400	500
Minimum	480	120	260
Range	160	280	240
F test	50.485		
Table Value at 0.05	3.354		
P value	0.000		
Result	Significant		

Pairwise Comparison
Mean Difference
&Result>

	A	
B	304Sig	B
C	180Sig	124Sig

Table 7 Comparison of social activity between the groups

ANOVA	SOCIAL ACTIVITY		
	Group A	Group B	Group C
Mean	200.00	340.00	242.00
S.D.	59.628	40.000	42.635
Number	10	10	10
Maximum	300	400	280
Minimum	80	260	140
Range	220	140	140
F test	22.205		
Table Value at 0.05	3.354		
P value	0.000		
Result	Significant		

Pairwise Comparison
Mean Difference & Result>

		A	
B	140Sig	B	
C	42Sig	98NSig	

Table 8 Comparison of pain between the groups

ANOVA	PAIN		
	Group A	Group B	Group C
Mean	130.00	52.50	92.50
S.D.	25.820	27.513	20.582
Number	10	10	10
Maximum	150	100	125
Minimum	75	0	50
Range	75	100	75
F test	24.395		
Table Value at 0.05	3.354		
P value	0.000		
Result	Significant		

Pairwise Comparison
Mean Difference & Result>

		A	
B	77.5Sig	B	
C	37.5Sig	40Sig	

Table 9 Comparison of general health between the groups

ANOVA	GERENALHEALTH		
	Group A	Group B	Group C
Mean	51.50	123.50	82.50
S.D.	17.803	22.117	23.363
Number	10	10	10
Maximum	70	160	110
Minimum	25	90	45
Range	45	70	65
F test	28.943		

Table Value at 0.05	3.354
P value	0.000
Result	Significant

Pairwise Comparison
Mean Difference &
Result>

	A	
B	72Sig	B
C	31Sig	41Sig

Figure 1 Comparison between age of subjects.

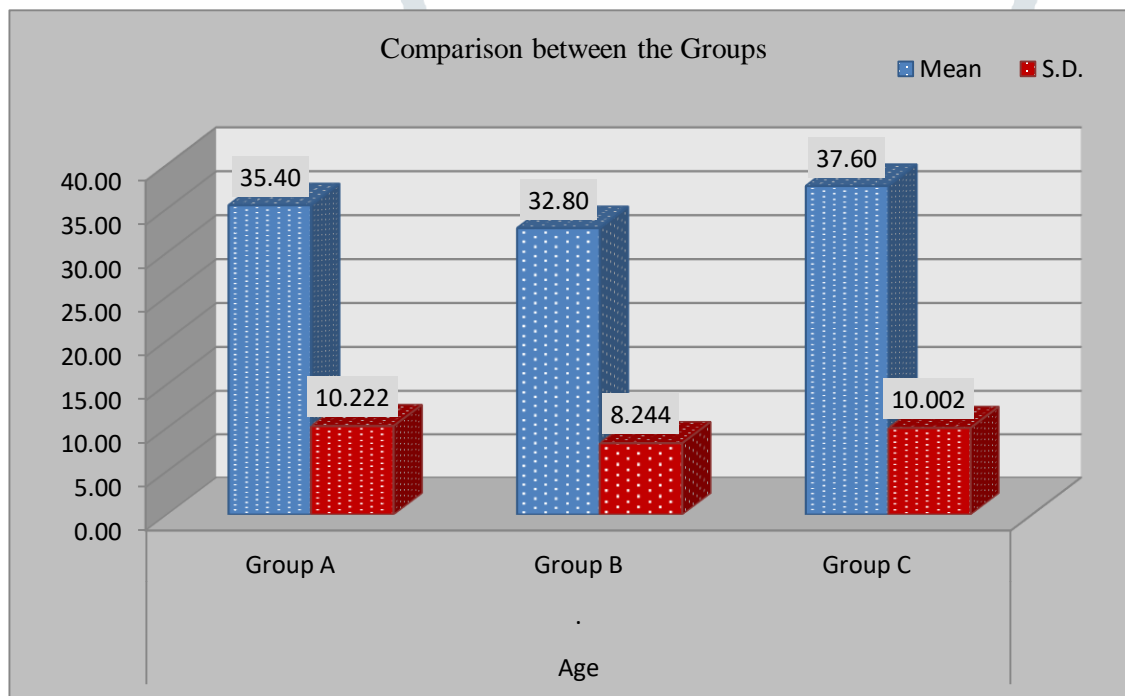


Figure 2 Comparison of gender between the groups

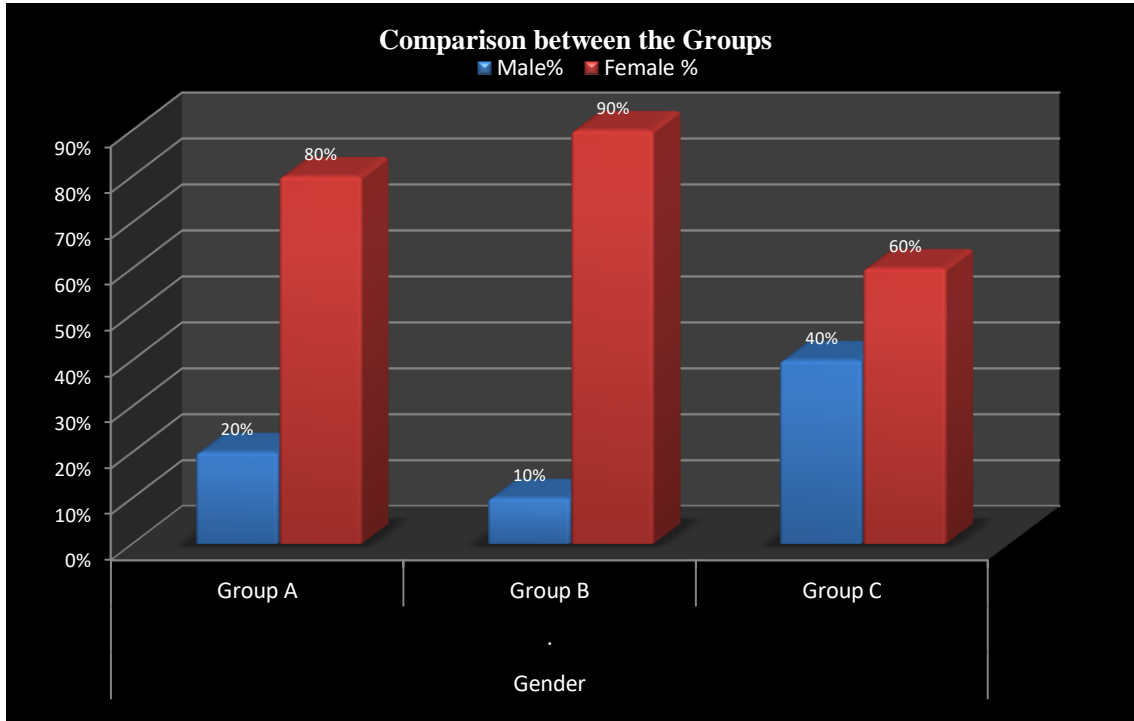


Figure 3 Comparison of limitation of activities between the groups

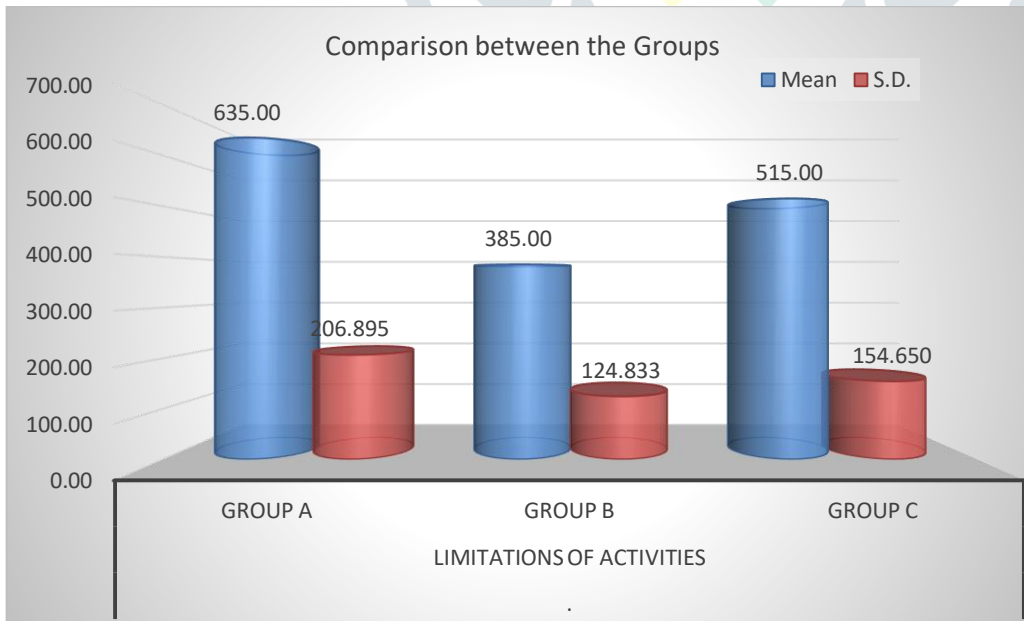


Figure 4 Comparison of physical health problems between the subjects

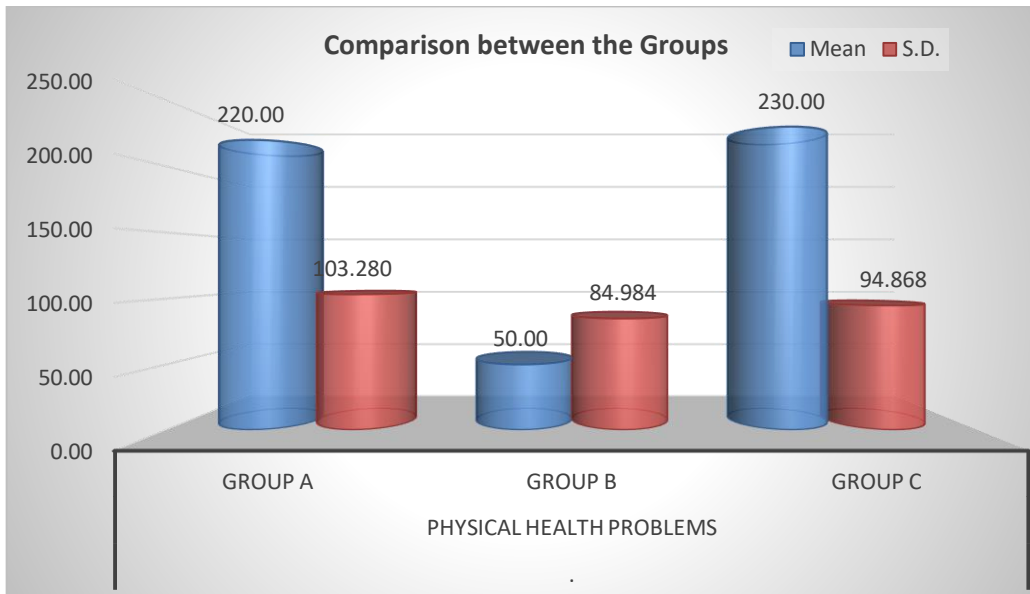


Figure 5 Comparison between emotional health problems between the groups

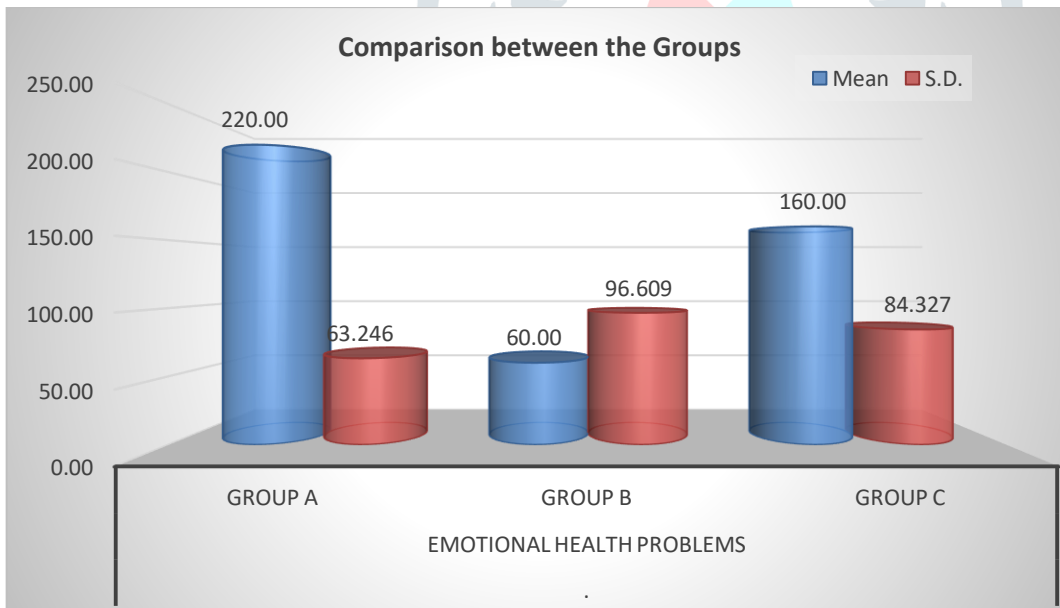


Figure 6 Comparison of energy and emotions between the groups

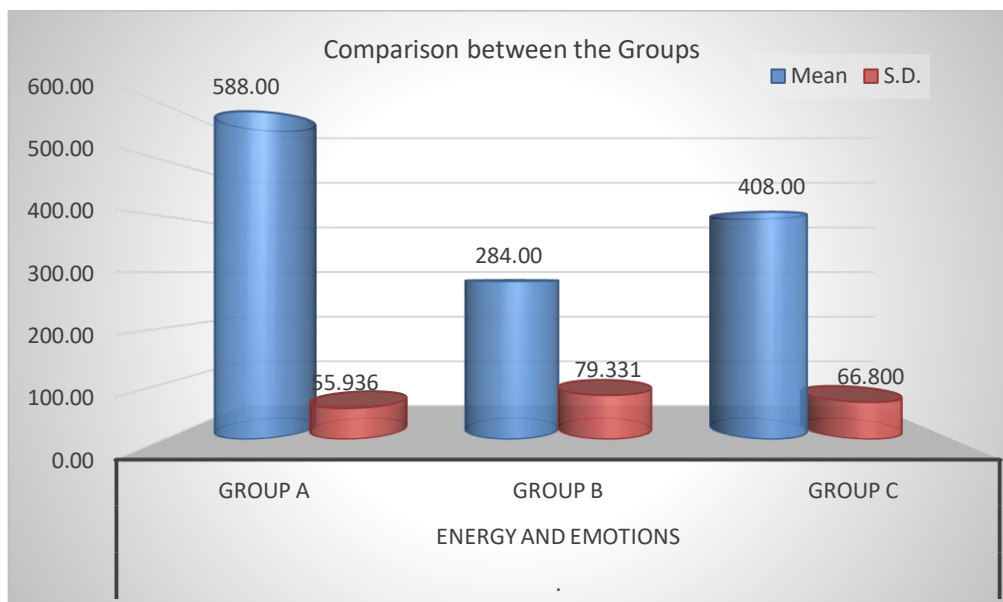


Figure 7 Comparison of social activity between the groups

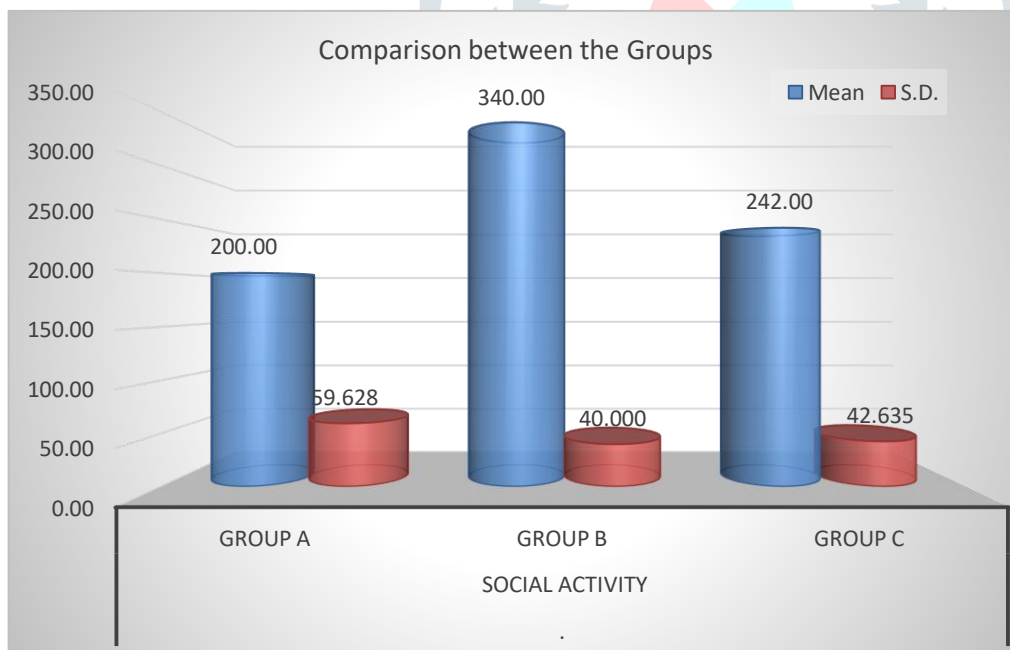


Figure 8 Comparison of pain between the groups

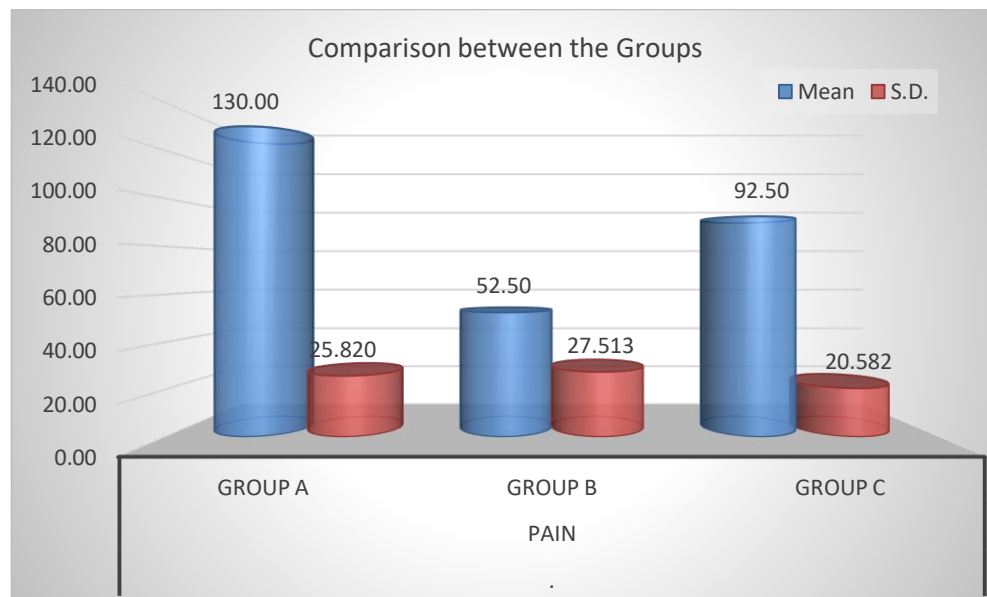
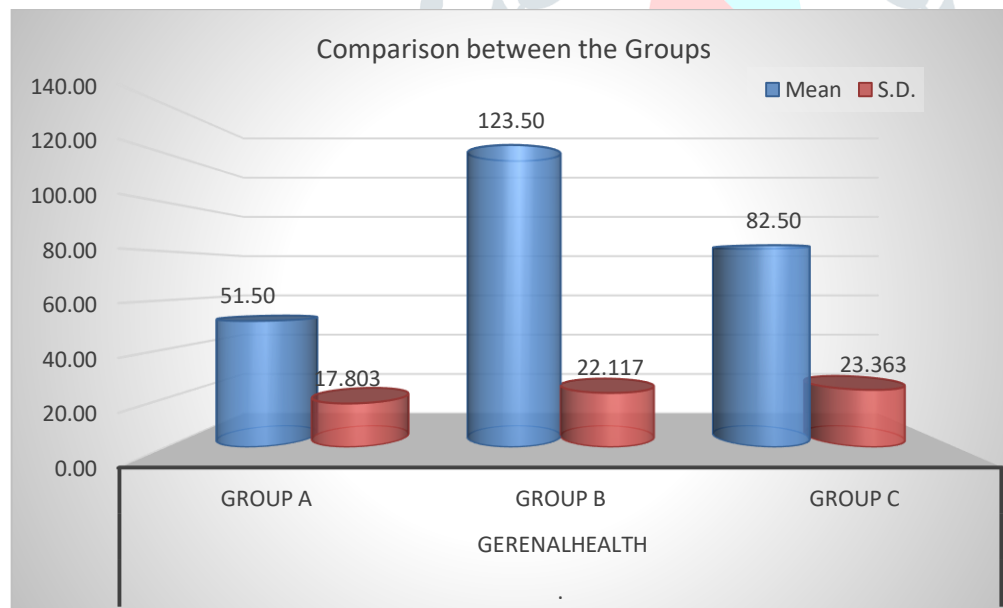


Figure 9 Comparison of general health between the groups



DISCUSSION

In the present study, youngest and oldest cases reported being 19 to 52 years old, respectively and the mean age of Group A is 31, Group B is 24 and Group C is 29 as shown in the Table 1. In group A the ratio of males to females are 2:8 and in group B the ratio is slightly higher than A which was 1:9. It indicates that females were more prone to MS as compared to males. Whereas in Group C where subjects took both the treatment as combination the ratio was 4:6 which is quite similar. But overall in this study number of female subjects were higher. There's less difference in the rate of MS among children before puberty, but in older children and adults the trend changes, striking more females in adolescence and adulthood. A study proves that Multiple

sclerosis strikes up to four times as many women as men. This is because of the fact that females are susceptible to MS produce higher levels of a blood vessel receptor protein, S1PR2, than males and that the protein is present at even higher levels in the brain areas that MS typically damages.¹⁰

Individuals with multiple sclerosis have demonstrated that the overall wellbeing is not a simple manifestation of impairment or disability¹¹. In limitation of activities the mean and standard deviation of Group A is higher among the other groups, indicates that the patients or subjects treated by physiotherapy can do their activities better. In group B and group C the, subjects under the combined treatment are having more mean and SD value than the subjects taking Interferons only shown in Table 3. Neurologic rehabilitation is a valuable component of MS treatment. This treatment might have a positive effect in patients with RR-MS who can be benefic during and after the acute phase, and between relapses. It has a positive impact on many symptoms, disability, handicap, and many aspects of quality of life. The neurologic rehabilitation process should be continuous throughout the evolution of the disease¹². Exercise training intervention was associated with a small improvement in walking mobility for patients with multiple sclerosis same as balance training in a standing position helps for improving activities that mainly use the lower extremities, such as gait, and training in a sitting position as somewhat helpful for improving balance ability¹³⁻¹⁴. Exercise interventions aimed to improve daily functioning of patients with MS are effective according to many studies¹⁵.

MS experience a wide range of symptoms that affect their quality of life, specific problems that are addressed are weakness, spasticity, mobility, cognition, mood, pain, speech and swallowing, as well as bladder, bowel and sexual dysfunction¹⁶. Patients on Interferons (Group B) have more physical health related problems as compared to Group A and Group B. It is shown in Table 4 that patient on rehabilitation protocols give better prognosis. Primary aims of rehabilitation for patients with multiple sclerosis (MS) is to reduce their levels of disability and handicap¹⁷. There is a strong evidence demonstrating that exercise used as part of a rehabilitation programme can increase activity and improve the health and well-being of people with MS. In addition there is an emerging body of evidence to say that physiotherapists, as part of a specialist neurorehabilitative service, have a key role in managing specific symptoms of MS including pain, spasticity and the prevention of secondary complications such as contracture. It also benefits in muscle strength, cardiovascular fitness, aerobic thresholds and activity levels and functional improvements, such as walking ability. Exercise is generally highly valued by patients who report impairments in mood and quality of life¹⁸. Aerobic exercise training with low to moderate intensity can result in the improvement of aerobic fitness and reduction of fatigue in MS patients affected by mild or moderate disability. MS patients can positively adapt to resistance training which may result in improved fatigue and ambulation¹⁹. The emotional health problems in group B (only Interferons) are more than the Group A (physiotherapy) and Group C (combination therapy). The patients taking physiotherapy either alone or in combination are emotionally good, indicates the positive effect of rehabilitation on the MS in table 5. Similarly in Table 6 shows that patient having interferons are less energetic. But the patients on rehabilitation are more energetic and have better well-being. But in Table 7, the patients of group B are socially more active. Patient experiencing more pain when they are on Interferons completely, and the patient on physical therapy shows better results for pain illustrates in 8. IFN-beta has been shown to have beneficial effects on the course of MS. Since the aim of IFN-beta treatment is not to cure but to slow down the disease in first 6 months of interferon-b treatment in patients with MS could provide MS patients with an increase in role-physical functioning.²⁰ Table 9 shows that patients taking Interferons have better general health as compared to Group A and Group B.

In this study we can see that the effect of physical therapy and interferons therapy varies according to the patients. We cannot say that which treatment is better over the other treatment. But overall, the effect of combined therapy (Interferons and Physical Therapy) shows the better results. The rehabilitation of

progressive neurological disorders, such as Multiple Sclerosis (MS) requires comprehensive, expert management which is demanding of both time and resources²¹. Patients with MS require comprehensive management that incorporates the expertise appropriate to their symptoms and is sufficiently flexible to respond rapidly to their changing pattern of need. They require information and support to facilitate their involvement in the management of their own condition, retain a sense of control, and maximise their independence²². Education and self management in rehabilitation is ideally suited to meet the needs of people with this fluctuating, unpredictable, and incurable condition, thorough understanding of the mechanisms underlying disability and recovery in MS²³. So, it equally important to realize any contraindications and precautions to exercise. Recent research shows statistically significant gains in functional ability when exercising patients with MS. Some studies show no conclusions pertaining to the benefits of exercise for the severely disabled due to the inability exercise these patients at a moderate intensity. Clinicians are reminded to prioritize the safety of their patients, as well as to closely monitor their symptoms before and after exercise. Physical therapists should establish short and long term exercise goals with their patients, and ensure patient adherence through verbal contract. The patient is more likely to experience psychosocial gain if they can achieve mini- milestones during rehabilitation.²⁴

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ABBREVIATIONS:

MS	Multiple sclerosis
QOL	Quality of life
IgG	Immunoglobulin
PRT	progressive resistance training
SD	Standard Deviation.
PRMS	Progressive Remitting Multiple sclerosis
IFN-beta	Interferon-beta

