SUMMARY, CONCLUSIONS AND IMPLICATIONS
OF THE STUDY

SUMMARY

The primary aim of the study was to investigate the comparative efficacy of physical therapy and a combination of physical therapy and psychological counseling in rehabilitation of injured sportspersons. The sample of the study comprised of 200 injured sportspersons (upper limb, lower limb and back injuries) allocated at random to two groups in equal numbers, i.e., Experimental group (n=100) in which subjects were given physical therapy as well as counseling as psychological intervention and Control group (n=100) in which only physical therapy was administered. In addition, gender differences were also investigated for the total sample of both Experimental and Control groups at post-test.

Two hundred injured sportspersons (N=200), both males (n=112) and females (n=88) between the age group of 18-28 years, who fulfilled the inclusion criteria, were included in the present study. The injured sportspersons were from various sport disciplines, and with a wide range of sport injuries. The sample consisted of sportspersons with upper limb injuries (n=54) with males (n=34) and females (n=20); sportspersons with lower limb injuries (n=86) with males (n=50) and females (n=36); and sportspersons with back injuries (n=60) with males (n=28) and females (n=32). Further, the selected subjects had played at different levels, i.e., University (n=54), District (n=5), State (n=15), National (n=106) and International (n=20).

All the subjects were informed about the nature and aim of the investigation and their informed consent was obtained before they were enlisted as subjects. The following physiological and psychosocial variables were assessed viz:

The physiological variables of Heart Rate and Blood Pressure (Systolic and Diastolic) were measured. Measurements were also taken for age, height and weight; and BMI of the sample was calculated.

To measure pain, Visual Analogue Scale (VAS: Huskisson, 1983) was used and pain related disability was assessed by Pain Disability Questionnaire (PDQ: Anagnostis et al., 2004).
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The disability associated with different types of injuries involving upper extremity, lower extremity and back was assessed through specific questionnaires. The upper limb disability was assessed by Disabilities of the Arm, Shoulder and Hand Questionnaire (DASH: Hudak et al., 1996). It further has two modules: Work Module and Sports Module. Lower limb disability was assessed by Lower Extremity Functional Scale (LEFS: Binkley et al., 1999). The back disability was assessed by Modified Oswestry Low Back Pain Disability Questionnaire (Modified OSW: Fritz & Irrgang, 2001).

For measuring dimensions of state and trait anxiety, State-Trait Anxiety Inventory (STAI: Spielberger et al., 1970) was used. The State-Trait Anxiety Inventory (STAI) is comprised of separate self-report scales for measuring two distinct anxiety concepts: State Anxiety and Trait Anxiety.

The fear avoidance beliefs were measured by Fear Avoidance Beliefs Questionnaire (FABQ: Waddell et al., 1993). The FABQ consists of two subscales, viz. Physical Activity subscale (FABQPA) and Work subscale (FABQW). The fear of movement/kinesiophobia was measured by Tampa Scale for Kinesiophobia (TSK: Vlaeyen et al., 1995).

The Self-esteem was measured by Rosenberg Self-Esteem Scale (RSES: Rosenberg, 1965); Optimism was assessed by Life Orientation Test-Revised (LOT-R: Scheier et al., 1994); Self-efficacy was measured by Generalized Self-Efficacy Scale (GSE: Schwarzer & Jerusalem, 1995); and Social support was measured by Social Support Questionnaire (SSQ-6: Sarason et al., 1987) which has two subscales, viz. SSQ-N (Network size) and SSQ-S (Satisfaction).

The perceived success while adhering to the exercise program was assessed through a single item measure adapted from Shields et al. (2005).

The construct of Aggression was measured by Buss-Perry Aggression Questionnaire (BPAQ: Buss & Perry, 1992). The scale contains four subscales, viz. Physical Aggression, Verbal Aggression, Anger, and Hostility.

To measure stress, two tests were used: Perceived Stress Scale (PSS: Cohen et al., 1983) and Stress Symptoms Rating Scale (Heilbrun & Pepe, 1985).

The sport injury rehabilitation beliefs were measured by Sports Injury Rehabilitation Beliefs Survey (SIRBS: Taylor & May, 1996). It consists of the
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following components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value, and Severity.

The raw scores were analyzed using Descriptive statistics and t-tests. t-ratios were calculated to find out the significant differences between means of all the measured variables for both Experimental and Control groups. t-tests were run to find out both Intragroup and Intergroup comparisons. An independent-samples t-test was conducted to find the intergroup differences. A paired-samples t-test was conducted to find the intra group differences.

t-ratios

A comparison of mean scores, standard deviations and t-ratios at pre-test for upper limb injuries revealed that no significant differences emerged between the Control and Experimental groups.

A comparison of mean scores, standard deviations and t-ratios at pre-test for lower limb injuries revealed that no significant differences emerged between the Control and Experimental groups.

A comparison of mean scores, standard deviations and t-ratios at pre-test for back injuries revealed that no significant differences emerged between the Control and Experimental groups.

A comparison of mean scores, standard deviations and t-ratios at post-test for upper limb injuries revealed that significant differences emerged between the Control and Experimental groups on the following variables: Disabilities of the Arm, Shoulder and Hand and its modules, viz. Work Module and Sports Module, State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Self-esteem, Optimism, Self-efficacy, Kinesiophobia, Social Support-Network, Perceived Success, Aggression (total) and its subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility, Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

No significant differences emerged between Control group and Experimental group with upper limb injuries at post-test on Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, Pain (VAS), and Social Support-Satisfaction.
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A comparison of mean scores, standard deviations and t-ratios at post-test for lower limb injuries revealed that significant differences emerged between the Control and Experimental groups on the following variables: Pain (VAS), Lower Limb Disability, State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Self-esteem, Optimism, Self-efficacy, Kinesiophobia, Social Support-Satisfaction, Perceived Success, Aggression (total) and its subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility, Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

No significant differences emerged between Control group and Experimental group with lower limb injuries at post-test on Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, and Social Support-Network.

A comparison of mean scores, standard deviations and t-ratios at post-test for back injuries revealed that significant differences emerged between the Control and Experimental groups on the following variables: Diastolic Blood Pressure, Pain (VAS), Modified Oswestry Low Back Pain Disability, State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Self-esteem, Optimism, Self-efficacy, Kinesiophobia, Social Support-Network, Social Support-Satisfaction, Perceived Success, Aggression (total) and its subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility, Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

No significant differences emerged between Control group and Experimental group with back injuries at post-test on Heart Rate and Systolic Blood Pressure.

A comparison of mean scores, standard deviations and t-ratios from pre to post-test for upper limb injuries revealed that significant differences emerged in the Experimental group on the following variables: Heart Rate, Systolic Blood Pressure, Pain (VAS), Disabilities of the Arm, Shoulder and Hand and its modules, viz. Work Module and Sports Module, State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Self-
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esteem, Optimism, Self-efficacy, Kinesiophobia, Social Support-Satisfaction, Perceived Success, Aggression (total) and its subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility, Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

No significant differences emerged on Diastolic Blood Pressure and Social Support-Network in Experimental group with upper limb injuries from pre to post-test phase.

A comparison of mean scores, standard deviations and t-ratios from pre to post-test for upper limb injuries revealed that significant differences emerged in the Control group on the following variables: Heart Rate, Pain (VAS), Disabilities of the Arm, Shoulder and Hand and its modules, viz. Work Module and Sports Module, State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Kinesiophobia, Perceived Success, Aggression (total), Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

No significant differences emerged on Systolic Blood Pressure, Diastolic Blood Pressure, Self-esteem, Optimism, Self-efficacy, Social Support-Satisfaction, Social Support-Network, and Aggression subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility in Control group with upper limb injuries from pre to post-test phase.

A comparison of mean scores, standard deviations and t-ratios from pre to post-test for lower limb injuries revealed that significant differences emerged in the Experimental group on the following variables: Heart Rate, Systolic Blood Pressure, Pain (VAS), Lower Limb Disability, State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Self-esteem, Optimism, Self-efficacy, Kinesiophobia, Social Support-Network, Social Support-Satisfaction, Perceived Success, Aggression (total) and its subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility, Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components,
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viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

No significant differences emerged on Diastolic Blood Pressure in Experimental group with lower limb injuries from pre to post-test phase.

A comparison of mean scores, standard deviations and t-ratios from pre to post-test for lower limb injuries revealed that significant differences emerged in the Control group on the following variables: Heart Rate, Diastolic Blood Pressure, Pain (VAS), Lower Limb Disability, State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Kinesiophobia, Perceived Success, Aggression (total), Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Self-efficacy, Rehabilitation Value and Severity.

No significant differences emerged on Systolic Blood Pressure, Self-esteem, Optimism, Self-efficacy, Social Support-Satisfaction, Social Support-Network, Aggression subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility, and Sports Injury Rehabilitation Beliefs component, viz. Treatment Efficacy in Control group with lower limb injuries from pre to post-test phase.

A comparison of mean scores, standard deviations and t-ratios from pre to post-test for back injuries revealed that significant differences emerged in the Experimental group on the following variables: Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, Pain (VAS), Modified Oswestry Low Back Pain Disability, State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Self-esteem, Optimism, Self-efficacy, Kinesiophobia, Social Support-Network, Social Support-Satisfaction, Perceived Success, Aggression (total) and its subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility, Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

A comparison of mean scores, standard deviations and t-ratios from pre to post-test for back injuries revealed that significant differences emerged in the Control group on the following variables: Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, Pain (VAS), Modified Oswestry Low Back Pain Disability, State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Self-esteem, Optimism, Self-efficacy, Kinesiophobia, Social Support-Network, Social Support-Satisfaction, Perceived Success, Aggression (total) and its subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility, Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.
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Activity, Fear Avoidance Beliefs-Work, Kinesiophobia, Perceived Success, Aggression (total), Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

No significant differences emerged on Self-esteem, Optimism, Self-efficacy, Social Support-Satisfaction, Social Support-Network, and Aggression subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility in Control group with back injuries from pre to post-test phase.

**t-ratios for gender differences**

A comparison of means, standard deviations and t-ratios comparing post-test differences between males and females revealed that significant differences emerged in the Control group on the following variables: Perceived Stress and Stress Symptoms.

No significant differences emerged between males and females of Control group at post-test on Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, Pain (VAS), State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Self-esteem, Optimism, Self-efficacy, Kinesiophobia, Social Support-Network, Social Support-Satisfaction, Perceived Success, Aggression (total) and its subscales, viz. Physical Aggression, Verbal Aggression, Anger and Hostility, and Sports Injury Rehabilitation Beliefs (total) and its components, viz. Susceptibility, Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

A comparison of means, standard deviations and t-ratios comparing post-test differences between males and females revealed that significant differences emerged in the Experimental group on the following variables: Sports Injury Rehabilitation Beliefs (total) and its component, viz. Susceptibility.

No significant differences emerged between males and females of Experimental group at post-test on Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, Pain (VAS), State Anxiety, Trait Anxiety, Pain Disability, Fear Avoidance Beliefs-Physical Activity, Fear Avoidance Beliefs-Work, Self-esteem, Optimism, Self-efficacy, Kinesiophobia, Social Support-Network, Social Support-Satisfaction, Perceived Success, Aggression (total) and its subscales, viz. Physical...
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Aggression, Verbal Aggression, Anger and Hostility, Perceived Stress, Stress Symptoms, and Sports Injury Rehabilitation Beliefs components, viz. Treatment Efficacy, Self-efficacy, Rehabilitation Value and Severity.

The results of the present study indicate that no significant gender differences emerged on most of the variables in both Control and Experimental groups at post-test intervention phase.

CONCLUSIONS

The findings of the present study revealed the following for Intergroup, Intragroup and Gender comparisons:

Intergroup Comparisons

1. On comparing Experimental and Control groups post intervention, non significant results were observed for physiological variables, which implies that both the interventions were successful in reducing Heart Rate and Blood Pressure, differentially.

2. On comparing Experimental and Control groups post intervention, it was observed from the findings that Experimental group was more effective in showing improvements on physical functional status as compared to Control group.

3. On comparing Experimental and Control groups post intervention, it was observed from the findings that Experimental group was more effective in lowering Pain, Anxiety, and Stress as compared to Control group.

4. On comparing Experimental and Control groups post intervention, it was observed from the findings that Experimental group was more effective in lowering Fear Avoidance Beliefs and Kinesiophobia as compared to Control group.

5. On comparing Experimental and Control groups post intervention, it was observed from the findings that Experimental group was more effective in increasing the scores on Self-esteem, Optimism, and Self-efficacy as compared to Control group.

6. On comparing Experimental and Control groups post intervention, it was observed from the findings that Experimental group was more effective in increasing the scores on Social Support as compared to Control group.

7. On comparing Experimental and Control groups post intervention, it was observed from the findings that Experimental group was more effective in enhancing
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Perceived Success and Sports Injury Rehabilitation Beliefs as compared to Control group.

8. On comparing Experimental and Control groups post intervention, it was observed from the findings that Experimental group was more effective in decreasing Aggression as compared to Control group.

Intragroup Comparisons

1. Both the Experimental and Control groups showed improvement in scores of physiological variables from pre to post-test.

2. Both the Experimental and Control groups showed improvement in scores of physical functional status from pre to post-test.

3. Both the Experimental and Control groups showed reduction in scores of Pain, Anxiety, and Stress from pre to post-test.

4. Both the Experimental and Control groups showed reduction in scores of Fear Avoidance Beliefs and Kinesiophobia from pre to post-test.

5. Experimental group was effective in increasing the scores on Self-esteem, Optimism, and Self-efficacy whereas the Control group did not show any significant improvement on these variables from pre to post-test.

6. Experimental group was effective in increasing the scores on Social Support whereas the Control group did not show any significant improvement in the scores of Social Support from pre to post-test.

7. Both the Experimental and Control groups showed increased scores on Perceived Success and Sports Injury Rehabilitation Beliefs from pre to post-test.

8. Experimental group was effective in decreasing Aggression whereas the Control group did not show much improvement from pre to post-test.

Gender Differences

1. For gender differences, both males and females of Experimental and Control groups did not show statistically significant differences on most of the variables at post-test.
LIMITATIONS

Even though the researcher feels that it is important to continue this line of research, but still there are certain limitations of this study:

1. The sample size of the study pertaining to number of males and females was unequal.
2. The influence of socio-demographic variables, such as education level, occupation, and marital status could not be controlled.
3. The environmental variations such as ambient temperature and humidity, which might have affected the recovery, were not under control.
4. Dietary practices and physical activity routine of the subjects during the study period could not be controlled.
5. There was no follow up in the study post intervention and only one post measurement was taken. The changes after a variable period of time were not studied.
6. The interactions of other psychological, physiological factors and self-motivation during the experiment were beyond the control of researcher.
7. Minor variations in the extent of injury which might have affected the recovery process were beyond the control of researcher.

THERAPEUTIC IMPLICATIONS

The clinical significance of the present study is manifold. The present research work provides information to doctors, physiotherapists and all those who are responsible for the treatment of injured athletes to understand and acknowledge the benefits of psychological counseling in athletic injury rehabilitation.

The present research provides a reason to believe that the use of psychological counseling alongside physical rehabilitation may improve the success and recovery rates experienced by the injured athletes. The problem of sport injury and rehabilitation bridges the gap between sports medicine and sport psychology. The research study has attempted to provide appropriate information with regards to the use as well as effectiveness of counseling as psychological skill underlying the recovery and rehabilitation from sport injury.
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The findings of the study provide scientific evidence with regards to the beneficial effect of combination of physical therapy and counseling as a means of expediting the recovery following sport injuries. This might pave the way or have the potential to broaden the area of application of counseling and physical therapy among athletes with injuries.

FUTURE SUGGESTIONS

Stemming from the present research work, the researcher suggests following considerations for future research:

1. The protocol of the present study may be used as an efficient tool in the primary prevention strategies to reduce the risk as well as to prevent the occurrence of sport injuries.

2. It is suggested that the future studies may replicate the protocol of the present study on a larger sample as it is fit to constitute a fundamental component of the rehabilitation and pre-habilitation protocol of novice and elite athletes both at individual level and in team work.

3. The future studies on the basis of the present study may design relevant protocols for referrals, advice, and guidance so as to advocate appropriate, sensitive protection policies within the sport system.

4. It would be interesting to carry out a longitudinal study about the effect of psychosocial variables on the injury prevention, followed by the impact on psychosocial profile of athlete getting injured first time than one with a history of injury. These effects should be explored to opine the models for prevention.

5. The influence of socio-demographic variables, such as education level, occupation, marital status on sport injury rehabilitation process may also be explored in future studies.

6. It would also be interesting to engage in multivariate research designs to study the role of mediating factors like psychosocial variables, nutrition, demographic and professional profile on to the nature of injuries and also the injury recovery process.

7. There exists a need to cross validate the findings of this study on larger sample in field setup. That is, a longitudinal study may be carried out to gauge the performance of the players after optimal sport injury rehabilitation.
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8. The present research work provides a composite capsule of physical, physiological and psychosocial variables which when deliberated upon with the physical and psychological interventions offers a structured approach for evaluation as well as rehabilitation of sport injury. Clinically, it could be used as a psychological screening tool to identify the injured athletes with problems in order to provide appropriate and timely interventions.

9. The provisional recommendations made from the findings of the present study may help evolve an alternative to other existing regimens, which would be useful to those injured athletes who express reservation for discussing their psychological issues, on account of various reasons.

10. Apart from professional athletes, the findings would also be useful to other groups encountering injuries like military personnel, industrial workers and novice fitness enthusiasts for optimizing their recovery. Thus, future studies may replicate the protocol of the present study on these populations.

The results of the present investigation warrants the general conclusion that the physical therapy shall be more effective if coupled with psychological counseling. In its own humble way, this study ushers in a new era of collaboration and cooperation between sports medicine and sport psychology for a faster and more effective recovery and rehabilitation of the sportspersons.