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EFFECT OF RELAXATION TECHNIQUESON INJURY REHABILITATION OUTCOMES OF ATHLETES IN NORTH-CENTRAL NIGERIA

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Abstract

This study examined the effect of relaxation techniques on injury rehabilitation outcomes among injured athletes in North-Central Nigeria, while also assessing the moderating influence of gender and sports type. A quasi-experimental pre-test, post-test non-equivalent control group design was adopted, involving two groups: an experimental group (Niger State) exposed to relaxation techniques and a control group (Kwara State) that received a placebo intervention in the form of a personal hygiene guide. The population consisted of 39 injured athletes undergoing rehabilitation (Niger: 18; Kwara: 21).. A total enumeration sampling technique was used to include all athletes undergoing rehabilitation who met the inclusion criteria. The experimental group participated in an eight-week structured relaxation program incorporating progressive muscle relaxation, diaphragmatic breathing, guided imagery, and mindfulness meditation, while the control group attended parallel sessions on hygiene education. Data were collected using the Adapted Injury–Psychological Readiness to Return to Sport Scale (I-PRRS) and the Athlete Injury Rehabilitation Screening Checklist (AIR_SC), both with high reliability coefficients of 0.92 and 0.81, respectively. Data were analyzed using Analysis of Covariance (ANCOVA) at a 0.05 significance level. The results revealed a significant effect of relaxation techniques on injury rehabilitation outcomes ($F = 91.86$, $p < 0.05$, partial $\eta^2 = 0.72$), indicating strong intervention effectiveness. However, gender and sports type showed no significant interaction effects, suggesting the intervention's universal applicability. It was concluded that relaxation techniques enhance psychological readiness and recovery across all athlete groups. The study recommends that coaches and sports psychologists integrate relaxation techniques into rehabilitation programs to promote holistic, efficient, and humane recovery among injured athletes.

Keywords: Relaxation Techniques, Injured Athlete, Gender, Type of Sports, North-Central Geopolitical Zone of Nigeria

Introduction

Injury is an inevitable situation in sports generally; an athlete cannot live their whole career without injury at one time or the other, but returning to the field of sports ang games is vital, as many injured athletes recover late or fail to fit immediately they return from injury. Hence, on major goal of sports science is to ensure the holistic well-being of athletes, particularly during periods of injury and recovery. In ideal settings, injured athletes are expected to undergo structured rehabilitation programs that promote both physical healing and psychological readiness towards future sports engagements. However, athletes often face limited access to psychological support, are exposed to cultural misconceptions surrounding mental health, and face economic barriers that are prevalent in the region. Effective rehabilitation must therefore adopt an integrative approach that includes Relaxation Techniques (RT), which have been shown to strengthen mental resilience, reduce psychological distress, and improve recovery outcomes.

Relaxation techniques are psychological strategies designed to reduce physiological tension, regulate emotional responses, and promote a state of calmness and mental clarity. During injury rehabilitation, athletes often experience heightened stress, anxiety, and physical discomfort that can interfere with the healing process and reduce engagement with physiotherapy routines. Relaxation techniques such as deep breathing, progressive muscle relaxation (PMR), and mindfulness meditation have been shown to lower physiological arousal, improve focus, and help athletes better manage pain and emotional distress. Wadey et al. (2020) emphasized that relaxation techniques assist in shifting the body from a heightened stress response to a recovery-oriented state, enhancing both psychological and physiological recovery. Teixeira et al. (2020) further noted that these methods are especially useful during critical moments in rehabilitation, such as before therapy sessions or after setbacks, as they promote emotional regulation and sustained motivation.

Obikwelu and Eze (2021) found that student-athletes who were introduced to deep breathing and PMR exercises demonstrated reduced anxiety levels and improved concentration during physiotherapy sessions in Southeastern Nigeria. Likewise, Adeyemi (2020) reported that mindfulness-based relaxation strategies significantly enhanced emotional stability and reduced perceived pain among athletes in Lagos-based sports clubs. These findings highlight the applicability of relaxation techniques within Nigerian rehabilitation settings, particularly in environments with limited psychological infrastructure. By promoting emotional calmness, enhancing self-awareness, and reducing physiological stress, relaxation techniques serve as a vital complement in this study's intervention model. More so, athletes also need structured behavioral strategies to sustain motivation, set recovery milestones, and maintain focus throughout rehabilitation.

Johansson et al. (2021) discovered that female athletes who took part in CBT felt better emotionally than male athletes, while the men showed more progress when they worked with goal-setting programs that focused on improving their performance. Similarly, a study by Tassignon et al. (2023) concluded that female athletes tend to benefit more from interventions that address anxiety and social support, while male athletes derive greater gains from self-determined, performance-related interventions. Recognizing gender differences in psychological recovery underscores the importance of tailoring rehabilitation programs accordingly, while also considering how the nature of sports, whether team-based or individual-based, may moderate the effect of psychological interventions on rehabilitation outcomes.

The type of sports is another variable that can influence injury profiles, rehabilitation experiences, and psychological intervention effectiveness. Different sports involve varying levels of physical contact, skill complexity,

and risk of re-injury, all of which shape athletes' psychological responses during recovery. For instance, contact sports like football, rugby, and basketball often involve acute, high-impact injuries and demand a quicker return to high-intensity play. Athletes in such sports may experience heightened performance anxiety and benefit significantly from interventions such as mental imagery and goal setting to enhance confidence and readiness to return (Williams & Krane, 2020). In contrast, athletes in non-contact sports like athletics, swimming, or tennis may experience overuse injuries and may benefit more from relaxation techniques to manage long-term stress and motivation during prolonged rehabilitation (Rees et al., 2020).

Alasinrin et al (2024) emphasized that the integration of psychological strategies such as goal setting and relaxation into sports activities improves athletes' motivation, concentration, and emotional control. Injured athletes often face periods of stagnation, frustration, and doubt, particularly when progress is slow or pain persists. Establishing clear, structured goals helps to mitigate these challenges by providing a sense of control and forward momentum. Athletes in individual sports may struggle with isolation during injury, making emotional support strategies and relaxation techniques particularly valuable. Physical and psychological demands of different sports (e.g., individual vs. team-based) may interact with these interventions in ways that affect rehabilitation outcomes. Hence, this research investigated the effect of relaxation techniques on injury rehabilitation outcomes of athletes in North-Central Geopolitical Zone of Nigeria.

Statement of the Problem

Since injury is inevitable and there is need for an athlete to return back to his full position after days, months or year injury, there should be a way of getting the injury athletes ready and fit at all time which is seen as a psychological therapy in solving issues with athletes. Existing research affirms the effectiveness of relaxation techniques in enhancing rehabilitation outcomes and psychological preparedness for return to sports. However, much of this research has been conducted in other regions and international contexts, leaving a gap in understanding how these interventions perform within North-Central Nigeria, where infrastructure, cultural beliefs, and access to mental health services differ significantly. Furthermore, the role of individual and contextual differences in moderating the effectiveness of psychological interventions is largely underexplored. Variables such as gender (male/female) and type of sports (team or individual) may influence how athletes experience and respond to psychological support. Male and female athletes may differ in coping styles and openness to mental training, just as the psychological demands of injury in team sports may differ from those in individual sports. These dimensions remain insufficiently addressed in existing literature, particularly in the Nigerian setting. The present study addressed these identified gaps and contributed to the body of knowledge in literature. Therefore, this study investigated the effect of relaxation technique on injury rehabilitation outcomes of athletes in North-Central Geopolitical Zone of Nigeria.

Research Hypotheses

The following null hypotheses were formulated and tested at the 0.05 level of significance.

H_{01}: There is no significant effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria.

H_{02}: There is no significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria based on gender.

H_{03}: There is no significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria based on sports type.

Methodology

This study adopted a quasi-experimental pre-test, post-test non-equivalent control group design to evaluate the effectiveness of relaxation techniques on injury rehabilitation outcomes among injured athletes. The study comprised two groups: the experimental group (Niger State) exposed to relaxation techniques and the control group (Kwara State) exposed to a placebo intervention in the form of a personal hygiene guide. A total enumeration sampling technique was employed due to the small and accessible population of injured athletes currently undergoing rehabilitation in both states. All athletes who met the inclusion criteria—being in an active rehabilitation phase, medically diagnosed with sports-related injuries, and exhibiting psychological challenges related to their injurieswere selected for participation. The experimental group received an eight-week structured relaxation training intervention designed to enhance psychological well-being, reduce anxiety, and improve readiness to return to sport. The control group participated in an eight-week personal hygiene education program intended to provide equivalent interaction and attention time without introducing psychological content.

Data were collected using two validated instruments: the Adapted Injury–Psychological Readiness to Return to Sport Scale (I-PRRS) and the Athlete Injury Rehabilitation Screening Checklist (AIR_SC). The relaxation intervention was adapted from Jacobson's Progressive Muscle Relaxation framework and expanded to include diaphragmatic breathing, 4-7-8breathing, guided imagery, and mindfulness meditation. Each session lasted one hour and was conducted weekly over eight weeks by trained research assistants under the supervision of the researcher. The control group followed a parallel schedule using the Personal Hygiene Guide, focusing on health and cleanliness education. Both instruments were validated by experts in Sports Psychology and Measurement and Evaluation, with Cronbach Alpha coefficients of 0.92 for the I-PRRS and 0.81 for the AIR_SC, indicating high internal consistency. Data collection occurred in three phases, pre-test, treatment, and post-test, and data analysis was conducted using Analysis of Covariance (ANCOVA) to determine the effect of relaxation techniques on the psychological rehabilitation outcomes of the athletes compared to the control condition.

Results

Research Hypothesis One: There is no significant effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria.

Table 1: Summary of ANCOVA on the significant effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Remarks
Corrected Model	13716.41[a]	2	6858.20	56.63	0.00	0.76	
Intercept	2272.85	1	2272.85	18.77	0.20	0.34	
Presttest	3085.19	1	3085.19	25.48	0.13	0.41	
Group	**11124.28**	**1**	**11124.28**	**91.86**	**0.03**	**0.72**	***Sig.**
Error	4359.59	36	121.10				
Total	448051.00	39					
Corrected Total	18076.00	38					

Table one above revealed that Relaxation Techniques had a significant effect on injury rehabilitation outcomes of injured athletes in North-Central Nigeria ($F = (1,39)\ 91.860$, $p < 0.05$). The effect size for the influence of Relaxation Techniques on injury rehabilitation outcomes was large (partial $\eta^2 = .72$), indicating that approximately 72% of the variance in rehabilitation outcomes was attributable to the Relaxation Techniques intervention. This means that using relaxation techniques greatly helped injured athletes in North-Central Nigeria recover better from their injuries. Hence, there is a significant effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria. This result implies that relaxation techniques can be effectively used to speed up recovery and improve rehabilitation outcomes for injured athletes in North-Central Nigeria.

Research Hypothesis Two: There is no significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria based on gender.

Table 2: Summary of ANCOVA on the significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria based on gender.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Remarks
Corrected Model	13822.68[a]	4	3455.67	27.62	0.00	0.77	
Intercept	2176.61	1	2176.61	17.40	0.00	0.34	
Presttest	3121.16	1	3121.16	24.95	0.15	0.42	
Group	11158.70	1	11158.70	89.20	0.00	0.72	
Gender	41.97	1	41.97	0.34	0.57	0.01	
Group * Gender	**71.73**	**1**	**71.73**	**0.57**	**0.45**	**0.02**	***Not Sig.**
Error	4253.32	34	125.10				
Total	448051.00	39					
Corrected Total	18076.00	38					

Table two indicates that gender did not significantly influence outcomes ($F = (1,39)\ 0.57$, $p > 0.05$). This implies that the effect of relaxation techniques on rehabilitation was consistent across male and female athletes, with no differential impact based on gender. Therefore, there is no significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria based on gender. Relaxation techniques can be applied equally to both male and female athletes without needing gender-specific adjustments in rehabilitation programs.

Research Hypothesis Three: There is no significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria based on sports type.

Table 3: Summary of ANCOVA on the significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria based on sports type.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Remarks
Corrected Model	13749.61[a]	4	3437.40	27.01	0.00	0.76	
Intercept	2249.71	1	2249.71	17.68	0.00	0.34	
Presttest	2844.14	1	2844.14	22.35	0.19	0.40	
Group	8801.85	1	8801.85	69.17	0.00	0.67	
Sports_Type	23.65	1	23.65	0.19	0.67	0.01	
Group * Sports_Type	**11.63**	**1**	**11.63**	**0.09**	**0.76**	**0.87**	***Not Sig.**
Error	4326.39	34	127.25				
Total	448051.00	39					
Corrected Total	18076.00	38					

Table three shows that there is no significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria based on sports type ($F = (1,39)\ 0.09$, $p > 0.05$). The effect size for the interaction between Relaxation Techniques and sports type on injury rehabilitation outcomes was negligible (partial $\eta^2 = .87$), indicating that the combined influence of the two variables explained virtually none of the variance in rehabilitation outcomes. This indicates that the effectiveness of relaxation techniques on rehabilitation outcomes was consistent across athletes in both individual and team sports, with no differential effect based on sports type. Hence, there was no significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes of injured athletes in North-Central Nigeria based on sports type.

Discussion of Findings

The findings of the study revealed that Relaxation Techniques had a significant effect on injury rehabilitation outcomes of injured athletes in North-Central Nigeria. This indicates that structured relaxation practices, such as progressive muscle relaxation, breathing techniques, and guided imagery, helped athletes reduce stress, fear of re-injury, and anxiety, thereby enhancing their recovery. A possible explanation is that relaxation techniques regulate physiological arousal, improve concentration, and promote emotional stability, all of which are essential for effective rehabilitation. This finding is in line with Oladejo (2021) reported that relaxation significantly reduced anxiety and improved athletes' confidence and concentration. Similarly, a study on athletes in Cross River State by Okon and Bassey (2023) confirmed that relaxation techniques contributed positively to sports performance and psychological readiness. Emoghene (2023) stressed that stress management strategies, including relaxation, are vital for sustaining athletes' psychological well-being in a competitive sports environment. This finding implies that relaxation techniques should be integrated as a standard component of injury rehabilitation programs in Nigeria. By equipping injured athletes with relaxation skills,

rehabilitation specialists can enhance coping, reduce psychological distress, and facilitate more holistic and sustainable recovery outcomes.

The findings of the study revealed that there was no significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes based on gender. This suggests that both male and female athletes benefited equally from relaxation methods, and gender did not moderate the effectiveness of the intervention. A possible explanation is that the mechanisms of relaxation, such as reducing physiological arousal, lowering anxiety, and improving emotional control, are universal processes that do not depend on gender differences. Moreover, the psychological stressors associated with injury, such as fear of re-injury, anxiety about return-to-play, and reduced self-confidence, are common experiences shared by both male and female athletes. This aligns with the study by Adegbesan and Owoeye (2021), who found that relaxation methods enhanced coping and reduced stress across male and female student-athletes with no observable differences in outcome. Similarly, Oladejo (2021) reported that relaxation techniques were equally effective for enhancing concentration and reducing competitive anxiety among athletes regardless of gender. This finding implies that relaxation techniques can be broadly applied across genders without the need for specific modifications, thus making them a cost-effective and efficient psychological tool in injury rehabilitation programs.

The findings of the study revealed that there was no significant interaction effect of Relaxation Techniques on injury rehabilitation outcomes based on sports type. This indicates that athletes in both team and individual sports responded similarly to relaxation interventions, and sports type did not moderate the effectiveness of the technique. A possible reason is that relaxation addresses fundamental physiological and psychological processes, such as tension reduction, improved focus, and enhanced emotional balance, which are beneficial across all sporting contexts, regardless of whether the sport emphasizes individual performance or collective teamwork.This result is consistent with prior research, which found relaxation techniques to be broadly applicable across different sports types. Oladejo (2021) reported that relaxation interventions improved athletes' confidence and readiness to perform across multiple sports without significant variation by type. Okon and Bassey (2023) similarly observed that relaxation methods contributed positively to the performance of both individual and team athletes, highlighting their universal application. Emoghene (2023) noted that stress management models, including relaxation, can be applied across various sporting domains with comparable outcomes. This finding implies that relaxation techniques represent a universally effective intervention for athletes across sports types. Rehabilitation specialists and sports psychologists can therefore implement relaxation training without the need to design sports-specific modifications, ensuring efficiency while still achieving meaningful improvements in recovery outcomes.

Conclusion

The findings underscore the vital role of relaxation techniques as an effective and inclusive psychological intervention in the rehabilitation of injured athletes. Regardless of gender or sports type, relaxation practices foster emotional balance, reduce anxiety, and promote readiness to return to play, key elements in achieving holistic recovery. These outcomes affirm that when athletes are supported not only physically but also mentally and emotionally, their path to healing becomes complete and more humane. Therefore, integrating relaxation techniques into standard rehabilitation protocols is not just a scientific recommendation but a compassionate approach that honors the athlete's well-being in its entirety.

Recommendations

The following recommendations were made based on the findings of the study.

1. Coaches should integrate relaxation techniques into rehabilitation programs to help athletes manage stress, anxiety, and pain during recovery.
2. Coaches should use Relaxation Techniques for both male and female athletes, as gender did not significantly affect their outcomes.
3. Sports psychologists should implement relaxation techniques across all sports without sports-specific adjustments, since sports type did not moderate its effectiveness.

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