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Deep Breathing Relaxation and Anxiety of Disabled Archery Athletes in Each Different Division

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ABSTRACT

In the training process, there are various psychological interventions that have been proven to provide benefits to the psychological condition of athletes, one of which is deep breathing relaxation. However, unfortunately, this method is still not widely used by disabled athletes in the archery branch, even though the use of this method can reduce the level of anxiety of disabled athletes in archery. This study aims to test the effectiveness of deep breathing relaxation training in reducing the anxiety level of disabled archery athletes in two divisions, namely National Standard and Compound. An experimental design was used with a pre-test and post-test control group. A total of 20 disabled athletes from the Indonesian National Paralympic Committee were involved in this study to measure changes in anxiety levels before and after deep breathing relaxation training was carried out. The training duration was 2 months, with a training frequency of 3 times a week. The results showed that deep breathing relaxation training significantly reduced anxiety levels. In addition, the National Standard and Compound divisions showed differences in anxiety levels, with the Compound division having lower anxiety levels due to the stability of the assistive devices. In the experimental group, the National Standard and Compound divisions experienced decreased anxiety levels. This study concluded that the application of the deep breathing relaxation method has been proven effective in improving the psychological and physical performance of disabled archers. Therefore, this technique is recommended to be included in a comprehensive training program for archers with disabilities.

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INTRODUCTION

Disabled athletes in archery require high precision, emotional stability, and optimal physiological control, but are often plagued by competitive anxiety that can significantly reduce performance (Pranoto et al., 2025). Competitive anxiety refers to feelings of nervousness, worry, and anxiety experienced by athletes before, during, or after competition (Li et al., 2025). This anxiety arises from pressure to excel, fear of failure, and anticipation of a previous poor performance, often triggered by the perception of competition as threatening or challenging (Correia & Rosado, 2018). These negative

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thoughts can lead to decreased concentration and focus, leading to a racing heart, trembling hands, stiff muscles, and irregular breathing, which disrupts postural stability and fine motor control, which are crucial in archery (Jannah, 2017). Posture plays a crucial role in executing good techniques for shooting arrows at the intended target, especially for disabled archers who have limb deficiencies that require them to work extra hard to maintain balance.

The majority of athletes with disabilities involved in archery are physically disabled, individuals with mobility limitations due to limited motor function in the arms or legs (Arkin & Budak, 2021). Often, athletes with disabilities in archery experience anxiety arising from internal and external pressures, including a lack of confidence in their own abilities, expectations from administrators, negative societal perceptions, and various other factors (Munawaroh & Mashudi, 2018). A previous study revealed that among athletes with disabilities from the NPCI East Java, pre-match anxiety, such as negative thoughts, difficulty concentrating, heart palpitations, and tremors, was negatively associated with their mental resilience. Their average anxiety score was quite high at 23.68, which resulted in reduced focus and concentration, disrupted sleep, and reduced performance (Maya & Jannah, 2022). This is not comforting for athletes in achieving success if left unchecked, because maximum performance can be achieved by an athlete who is truly ready to compete with all his abilities (Setyaningsih et al., 2022).

Anxiety left untreated in athletes can have significant negative impacts on their psychological well-being, such as increased cognitive anxiety that disrupts mental focus and emotional regulation, thus reducing the athlete's ability to cope with competitive pressure (Hudaniah & Nabila Masturah, 2024). A technique that should have been executed smoothly; if an athlete felt doubt and anxiety, they would have faltered and negatively impacted the results of the arrow hitting the intended target. Each division in the sport of archery has different shooting distances, and weather conditions, such as wind, also pose challenges for athletes when shooting. Therefore, athletes with disabilities must be able to control their minds and bodies well to avoid anxiety that can arise at any time and can affect the athlete's performance (Martin, 2015). Therefore, athletes need specific methods to be able to overcome the various psychological challenges they face, which we often refer to as psychological skills training (PST)(Saputra et al., 2022).

In this regard, the authors plan to pilot a psychological skills training (PST) believed to reduce anxiety levels experienced by disabled athletes in archery. Previous studies have found that deep breathing relaxation exercises are significantly effective in reducing stress and anxiety levels in the general population, including athletes, through voluntary respiratory regulation mechanisms that reduce somatic symptoms such as rapid heartbeat and muscle tension, and increase the parasympathetic response for better emotional balance (Bentley et al., 2023). Furthermore, other studies recommend deep breathing as a simple meditation technique for archery athletes to reduce tension by focusing on the breath, thereby achieving self-composure during competition (Pratama & Utami, 2024; Sari & Kurniawan, 2005). Previous studies specifically discuss this division and recommend breathing exercises as a mental management technique for compound archery athletes, which increases self-confidence, focus, and concentration by managing pre-shoot mental states

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to reduce anxiety (Ahmad, 2023). Deep breathing relaxation exercises not only support athletes' athletic performance but also play a vital role in their overall mental health (Rezavandzayeri, 2024). Unfortunately, psychological skills training, such as deep breathing and relaxation, is rarely implemented in archery athletes, especially those with disabilities. Coaches often focus too much on technical or physical training programs and other aspects, neglecting psychological interventions, which are equally important for supporting the success of athletes with disabilities. Therefore, a good understanding of deep breathing relaxation exercises is necessary. Psychological interventions without a good understanding can lead to persistent anxiety in athletes, leading to persistent self-doubt.

Based on the literature reviewed, it is shown that deep breathing relaxation exercises have many positive benefits for several psychological aspects, one of which is anxiety. Previous research also suggests that deep breathing relaxation exercises are highly recommended for athletes in various sports. However, the author has not found many studies specifically examining the effect of deep breathing relaxation exercises on reducing anxiety levels in disabled archery athletes in each division. The author believes this study is very important because it will help disabled archery athletes overcome the anxiety problem that is very common in each division and tends to interfere with performance, both during training and competitions (Reardon et al., 2019). Thus, athletes can be more focused during the training process, so they can display their best performance and achieve the highest achievements.

METHODS

The author used an experimental research method, a type of research that aims to prove the effect of a treatment on the consequences of that treatment. In other words, experimental research is a way to establish a causal relationship between two factors (Arib et al., 2024). The research design used was a pre-test and post-test control group design. A pre-test and post-test control group design is an experimental research design involving two groups: one experimental group receiving the treatment and one control group receiving no treatment (Alam, 2019). The abilities of both groups were measured before the treatment was administered and then again after the treatment was completed. The purpose of this design was to assess the impact of the treatment by comparing the changes that occurred between the treated and untreated groups. To measure the athletes' anxiety levels, the author used the Sport Anxiety Scale-2 (SAS-2) questionnaire.

The participants in this study were athletes with disabilities registered as active athletes with the Indonesian National Paralympic Committee (NPCI). They received special training under the auspices of the cities of Bandung and Cimahi. A total of 20 athletes, consisting of 17 male athletes and 3 female athletes, aged 19 to 53, participated. The authors observed that these athletes demonstrated a strong will and potential to achieve success, despite their psychological state being unstable due to various internal and external factors affecting athletes with disabilities.

The deep breathing relaxation training activity was conducted in five steps. The first step was an opening and introduction. The second step included a more in-depth

explanation of anxiety, the factors that cause anxiety, especially in athletes with disabilities, and the symptoms that may arise when facing anxiety. The third step explained how to perform deep breathing relaxation, the benefits of deep breathing relaxation exercises, and steps that can be taken to reduce anxiety. The fourth step was a guided deep breathing relaxation practice or training. The author then informed participants that the purpose of this deep breathing relaxation was to achieve a calmer and more peaceful feeling when athletes were under pressure. The author will conduct this deep breathing test on subjects using the 4-7-8 method, which has been proven effective in managing anxiety (Hariyati et al., 2022).

Subjects will be instructed to sit or stand with their spine straight, ensuring a comfortable posture. The right hand should be placed on the chest, and the left hand on the abdomen. This position helps athletes understand the movements associated with breathing. Inhale deeply through the nose for a count of 4, focusing on filling the abdomen, not just the chest. This technique is beneficial for increasing lung capacity. Next, hold your breath for a count of 7, allowing the body to absorb oxygen optimally. Exhale slowly through the mouth for a count of 8, ensuring the air is completely expelled from the lungs. This cycle should be repeated 5 to 10 times (Imania, 2017). Athletes can adjust the count duration to their comfort level while maintaining the established ratio. Once completed, remain seated for a moment to experience the relaxing effects of this exercise. This deep breathing relaxation technique can effectively reduce stress levels, create a state of calm, improve concentration, and strengthen mental resilience in preparation for competition.

The treatment in this study will consist of 24 sessions, with training taking place three times per week. Each session will last 15 minutes. This approach is based on previous research conducted by Prasetyo (2016), which showed improved scores in archery athletes after deep breathing relaxation training. The authors will administer the Sport Anxiety Scale-2 (SAS-2) questionnaire both before and after the treatment to assess the anxiety levels of archery athletes with disabilities. The training protocol involves a series of scheduled deep breathing relaxation exercises, performed three times per week over two months.

The instrument used in this study was the Sport Anxiety Scale-2 (SAS-2), a questionnaire designed to assess athletes' anxiety levels. A questionnaire is a data collection method that involves providing respondents with a series of written questions or statements to answer (Romdona et al., 2025). Data collection was conducted by distributing the questionnaires to respondents. This questionnaire uses four response options: not at all, a little, quite a bit, and very much. The questionnaire was completed using a Likert scale and has undergone validity (.279) and reliability (.708) tests, confirming its suitability for this study (Purnamasari & Novian, 2021; Tomczak et al., 2022). The use of this instrument in this study is an adaptation of previous research conducted by Putra et al. (2021). Adoption in research refers to the use of an existing instrument developed by another researcher without substantial changes to its content (McAlpin et al., 2022). Furthermore, the research instrument in the form of a

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questionnaire will be distributed twice, namely before and after the intervention is given to the subjects, using Google Forms as the medium.

The data analysis used by the author in this study utilised SPSS (Statistical Package for the Social Sciences) software as a statistical tool. This study employed a t-test for data analysis. The t-test is a statistical technique used by researchers to confirm differences (Kim, 2015). Specifically, the t-test evaluates the existence of statistically significant differences or changes (Syuhada et al., 2025). Since this method can be used to test hypotheses regarding the difference between two means, this study used the t-test technique to test the hypothesis of a difference between the two means.

RESULTS AND DISCUSSION

Result

The results of pre-test and post-test research on the effect of deep breathing relaxation training on reducing anxiety levels in disabled archery athletes in each different division.

Table 1.
Demographic Data of Research Subjects

Group	Division	Age (year)	
		Mean	Standard Deviation
Experiment	Standard Bow	32	9.808
	Compound	35	11.100
Control	Standard Bow	46	7.829
	Compound	28	7.014
Overall	Standard Bow	67	20.908
	Compound	74	14.844

Table 1 shows the demographic data of the research subjects. In the experimental group, the average age was 32 years for the national standard division, and the average age in the compound division was 35 years. Meanwhile, in the control group, the National Standard division had an average age of 46 years, while the Compound division had an average age of 28 years, indicating variations in age composition between groups that could affect performance. Overall, there were more subjects in the Compound division, namely 74, than the National Standard division at 67, with a higher total standard deviation in the National Standard division, namely 20.098, compared to the compound division at 18.844, indicating different training intensity or experience between divisions. Furthermore, the author presents a statistical description of the study in Table 2.

Table 2.
Statistical Description

Group	Division	N	Pre-Test		Post-Test	
			Mean	Standard Deviation	Mean	Standard Deviation
Experiment	Standard Bow	5	29.00	8.093	21.20	5.630
	Compound	5	27.80	3.768	19.20	3.768
Control	Standard Bow	5	27.40	6.309	27.80	7.328
	Compound	5	26.60	7.328	29.00	7.071

Table 2 presents the statistical description. The National Standards experimental group showed a decrease in mean scores from pre-test of 29.00 to post-test of 21.20, with a narrowing standard deviation of 8.093 to 5.630, indicating a positive effect of the intervention in reducing anxiety and improving performance consistency. The National Standards control group also experienced a decrease in scores from 27.80 to 19.20, but the Compound control group actually experienced an increase in scores from 26.60 to 29.00, with a stable deviation. Furthermore, the authors present the research statistical description in Table 3.

Table 3.
Normality Test Results

Group	Division	df	Pre-test		Post-test	
			Statistic	Sig.	Statistic	Sig.
Experiment	Standard Bow	5	.906	.443	.922	.543
	Compound	5	.850	.194	.956	.783
Control	Standard Bow	5	.945	.700	.930	.598
	Compound	5	.927	.579	.965	.844

The results of the normality test in Table 3 show that all data, both in the experimental and control groups, for the national standard and compound divisions, have a significance value greater than .05. This data is consistent with the previous table, where a decrease in anxiety scores was seen in the experimental group. The assumption of normality strengthens the interpretation of the intervention effect. This indicates that the data are normally distributed, thus meeting the assumptions for parametric statistical analysis. Next, the authors present the results of the pre- and post-treatment effect test in Table 4.

Table 4.
Results of the Pre- and Post-Treatment Effect Test

Group	Division	t	df	Sig.
Experiment	Standard Bow	4.474	4	.011
	Compound	5.852	4	.004
Control	Standard Bow	-.189	4	.859
	Compound	-1.395	4	.235

Based on the results of the pre- and post-treatment effect test in Table 4, significant differences were found in the experimental group. In the national standard division, a two-sided p-value of .011 ($p < .05$) indicated a substantial decrease in anxiety levels after treatment. Similar results were also shown in the compound division, with a two-sided p-value of .004 ($p < .05$), indicating that the treatment had a stronger effect in reducing athletes' anxiety levels. Conversely, in the control group, in both the national standard and compound divisions, no significant differences were found between the pre-test and post-test ($p > .05$), indicating no significant change in anxiety levels without treatment. Next, the authors present the results of the homogeneity test and differences in effects between groups and divisions in Table 5.

Table 5.
Results of the Homogeneity Test and Differences in Effects between Groups and Divisions

Group	F	Sig.	t	df	Sig.
Experiment	1.646	.235	.660	8	.528
Control	.013	.911	-.263	8	.799

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Furthermore, the results of the homogeneity test and the differences in influence between groups and divisions in Table 5 indicate that the data between groups are homogeneous, both in the experimental group and the control group, with a significance value of each greater than .05. In addition, the results of the difference test between groups and divisions show no significant differences, which indicates that the data variance between groups is in an equal condition and the results of the analysis can be compared validly. Next, the author presents the Percentage Reduction in Anxiety Levels in Figure 1.

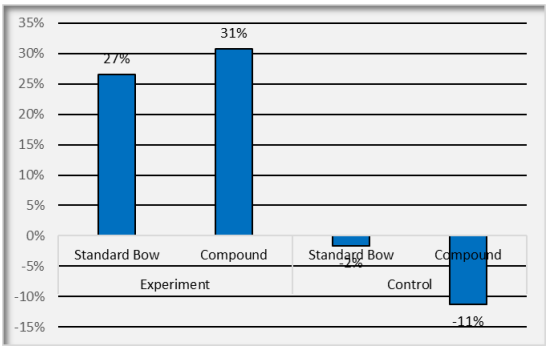

Figure 1.
Percentage Reduction in Anxiety Levels

These statistical findings are reinforced by Figure 1, which shows the percentage reduction in anxiety levels. In the experimental group, the reduction in anxiety levels was quite significant, at 27% in the national standard division and 31% in the compound division. Conversely, in the control group, anxiety levels increased, at 2% in the national standard division and 11% in the compound division. These results indicate that the treatment was effective in reducing anxiety levels in archery athletes with disabilities, particularly in the experimental group, with greater effectiveness in the compound division.

Discussion

Previous research has shown a significant effect of deep breathing relaxation training on reducing anxiety levels in disabled archery athletes in each division. Performing deep breathing relaxation training on disabled archery athletes helps them regulate their physiological and psychological functions simultaneously. Controlled deep breathing relaxation can reduce stress-related sympathetic nervous system activity and increase parasympathetic activation, which promotes a sense of calm (Verkerk, 2024). This process promotes emotional balance, improves concentration, and stabilises the heart rate, enabling athletes to manage stress during competition better (Oladejo, 2021). Increasing heart rate variability (HRV) and autonomic nervous system balance improves the ability to manage competitive pressure during competition (Migliaccio et al., 2023). In archery, athletes cope with stressful competition situations by calming their minds, reducing muscle tension, and ensuring the arrow is released at the right time, thereby improving accuracy and mental resilience (Prasetyo, 2016). In athletes with disabilities, relaxation training can address the extra motoric constraints that exacerbate somatic anxiety, making it easier to manage competitive pressure through physiological stabilisation similar to that of non-disabled athletes. Integrating these techniques

enhances Paralympic performance by reducing emotional tension and enabling the arrow to be released at the ideal heart rate (Dhiman & Kapri, 2024).

In contrast to the treatment group, the group of disabled archers who only underwent conventional training experienced increased anxiety levels due to the lack of psychological interventions, such as deep breathing relaxation, to address their psychological issues. This is because physical or technical training alone does not address the somatic and cognitive components of stress that trigger increased heart rate and muscle tension (Febri, 2024). This condition leaves athletes vulnerable to the "fight or flight" response, which disrupts concentration and movement precision, especially in sports like archery, where emotional stability is crucial for scoring (Hendrayana et al., 2021). As a result, athlete performance often declines under competitive pressure, as evidenced by research showing that a control group without relaxation failed to achieve improved scores compared to a group receiving psychological intervention (Kim & Kim, 2021). This leaves athletes in a constant cycle of anxiety that can trigger stress without knowing how to cope, which can indirectly impact their performance. Archery athletes with disabilities often experience higher levels of anxiety and stress than athletes without disabilities due to internal factors such as motor impairments that limit precise coordination and a lack of confidence due to unusual physical adaptations (Febriyani et al., 2022). External factors such as the pressure of Paralympic competition, social stigma against disability achievement, and a less inclusive competition environment further exacerbate the stress response, causing more significant impairments in focus and shooting accuracy compared to non-disabled athletes (Aganta & Subroto, 2024). These conditions emphasise the need for specific interventions such as deep breathing relaxation to balance the heavier psychophysiological burden on archers.

The results of the study indicate that each division in the archery sport, including the compound and national standard divisions, has a different level of anxiety. Even the slightest somatic disturbance, such as tremors or a racing heartbeat, can cause "choking" on the crucial final shot of the set (Lee & Hwang, 2024). The national standard division showed a slightly higher level of anxiety than the compound division. This is due to the demand for manual precision between the bow and archer without mechanical assistance, which triggers greater somatic disturbances. The national standard bow is made of wood, the resulting whip is much slower than the compound division, with three shooting distances played: 30M, 40M, and 50M. The national standard division requires manual precision between the bow and archer without mechanical assistance, so if the athlete cannot control the existing anxiety, it can affect the shooting results because the national standard division has a higher rate of technical failure (Wattimena, 2015).

Meanwhile, the compound division showed slightly lower anxiety levels compared to the national standard division. This is due to the mechanical stability of the bow, which reduces physical strain. This is because the compound bow has a pulley at the end of the string, which makes the bow lighter after being fully drawn, allowing athletes to hold their aim longer without feeling fatigued (Kridasuwarso et al., 2020). Athletes can have more time to catch their breath, then relax and focus on aiming. Although the compound

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division has a shooting distance of 50 meters, which is longer than the national standard division, the compound division has a lower technical failure rate than the national standard due to the good mechanical stability of the bow (Sung et al., 2018). In this study, athletes in the compound division experienced a higher reduction in anxiety levels compared to the national standard division. This tends to be biomechanical and physiological, such as postural stability, muscle strength, and endurance (Mónus, 2024). Compound bows are easier to hold at full draw due to the let-off mechanism, which technically reduces the need for physical strength when aiming compared to national standard bows, so that compound athletes with disabilities have the opportunity to aim more easily while controlling their breathing (Sulistiyani, 2024).

The association between anxiety in the compound division and the national standards of archery for people with disabilities found in this study suggests that the use of psychological techniques such as deep breathing relaxation could be an effective way to improve athlete performance. This psychological training not only serves to manage physical and mental stress reactions but also helps athletes maintain emotional control, focus, and consistent technique during competition. Therefore, the implementation of deep breathing relaxation training should be considered as an element of a comprehensive training program, so that athletes with disabilities can reach their full potential in competition and overcome psychological issues that have interfered with their performance. A limitation of this study lies in the sample of athletes with disabilities from the National Standard and Compound divisions registered with the National Paralympic Committee of Indonesia. The limited number of participants, only 20 athletes, may not be sufficient to represent the entire population of athletes with disabilities in each division. Therefore, the results should be viewed with caution and cannot be generalised to all divisions for athletes with disabilities in archery.

CONCLUSION

The conclusion of this study indicates that the implementation of deep breathing relaxation training is significantly effective in reducing anxiety levels in archery athletes with disabilities, particularly in the National Standard and Compound divisions. The results showed that after a two-month intervention period, athletes participating in this training experienced a significant reduction in anxiety levels, with average scores indicating improved concentration and emotional stability during competition. This breathing technique helps athletes regulate their physiological and psychological functions, enabling them to better cope with competitive pressure without experiencing excessive distraction. This anxiety reduction contributes to improved athlete performance, enabling them to achieve greater accuracy and higher mental resilience during competition.

The authors recommend that coaches and teams coaching archery athletes with disabilities regularly incorporate relaxation training through deep breathing relaxation into their training programs. This training should be conducted in a planned and consistent manner so that athletes can learn to manage their anxiety and improve their mental readiness before competition. Furthermore, providing ongoing psychological

support is crucial to maintain the overall mental health of athletes, especially those experiencing high levels of anxiety.

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