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## Analysing the Effects of Indigenous Activity Intervention on the Aggressive Behaviour and Anxiety of School Children

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### Keywords

*Activity Intervention, Aggressive Behaviour, Indigenous Activity*

### ABSTRACT

This study investigates the impact of indigenous activity (IA) programs on aggressive tendencies among adolescents aged 12-14 in the Cooch Behar district, West Bengal, India. The study involved 120 participants, equally distributed between the experimental and control groups, with 60 subjects in each group. The experimental group underwent a 10-week IA training program, whereas the control group received no intervention. Aggression levels were assessed using the Aggression Questionnaire and Anxiety levels were assessed using the Manifest Anxiety Scale, and Anxiety levels were assessed using the Manifest Anxiety Scale before and after the intervention. The analysis revealed significant differences between the two groups across all aggression subcategories: Anger, physical aggression, hostility, and verbal aggression ( $p < 0.05$ ). Participants in the experimental group demonstrated more substantial reductions in aggressive behavior than those in the control group. The observed effect sizes ranged from small to moderate across different subcategories. The study also evaluates the effectiveness of a novel cognitive-behavioral intervention program designed to address both aggressive and anxious behaviors simultaneously. Findings suggest that integrated approaches targeting both aggression and anxiety may be more effective than single-focus interventions. This research contributes to the understanding of the complex interplay between aggression and anxiety in children and offers insights for developing targeted interventions to promote emotional well-being and positive behavioral outcomes in educational settings.

### INTRODUCTION

The global escalation of aggressive behavior among children is a multifaceted issue influenced by various factors, including home environment, exposure to violent content, media impact, and societal stresses (Loeber & Hay, 1997). Aggression frequently manifests as a symptom of mental health conditions, such as ADHD, ODD, and CD, with problems exacerbated by limited mental health resources in developing countries (Frick & White, 2008; Kieling *et al.*, 2011). The advent of social media has introduced novel forms of aggressive conduct, such as cyberbullying, in which online anonymity can facilitate harmful behaviors (Kowalski *et al.*, 2014; Slonje & Smith, 2008). In India, aggressive behavior in children is further complicated by sociocultural factors, including traditional family expectations and academic stress (Saxena *et al.*, 2018). The proliferation of smartphones and internet connectivity has exposed children to potentially deleterious content, increasing the risk of aggressive conduct (Chaudhary *et al.*, 2020). There is an urgent need for effective interventions that focus on enhancing parental support and mental health services (Kuppuswamy & Singh, 2021; Kuppuswamy & Kumar, 2019). Traditional Indian games such as Kabaddi and Kho-Kho, emphasizing teamwork and self-control, offer a culturally relevant approach to addressing aggression. These activities could potentially constructively channel children's energy and enhance emotional well-being

in educational settings (Ghosh, 2019). This study investigates the potential of interventions based on Indigenous activities to mitigate aggressive behavior and anxiety in school-age children, aiming to elucidate how cultural practices can contribute to emotional and behavioral development.

### MATERIALS AND METHODS

#### Procedure

A fitness assessment was conducted on 212 male students, aged 12–13, from two prominent educational institutions in the Cooch Behar district of West Bengal, India. The study selected 120 participants who achieved scores within levels 3 and 4 of the fitness benchmarks established by the Ministry of Youth Affairs and Sports's Expert Committee, ensuring their capacity to engage in the training program. These subjects were subsequently allocated in equal numbers to the Control and Experimental Groups (60 per group), adhering to a Pre-Post Random Group Design. The investigation comprised two phases: pretest and posttest. Initial Aggression data was obtained using a translated version of "The Aggression Questionnaire" and Manifest Anxiety Scale, which participants completed within their classroom settings. In the interim period between assessments, only the Experimental Group participated in a Training Protocol of Indigenous Activities, encompassing six widely recognized traditional practices.

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This protocol was formulated through an extensive pilot study involving subjects of comparable age (Roy *et al.*, 2024) and was further refined based on pilot outcomes and expert guidance from esteemed Physical Education professionals. The investigation utilized The Aggression Questionnaire (Buss & Perry, 1992) was used to evaluate aggressive behavior. This 29-item instrument assesses four dimensions of aggression: physical, verbal, angry, and hostile. Participants responded on a five-point Likert scale ranging from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me). The questionnaire allowed for computation of both the overall aggression score and individual subscale scores. Previous research has validated the reliability of this instrument for adolescent populations (Santisteban & Ma Alvarado, 2009). The internal consistency coefficients (Cronbach's alpha) were reported as 0.88 for physical aggression, 0.89 for verbal Aggression, 0.82 for anger, and 0.84 for hostility were.

**Manifest Anxiety Scale**

Dr. Tasneem Naquvi developed a manifest anxiety scale to evaluate anxiety levels in children. This instrument comprises 40 statements pertaining to the subjects, each accompanied by 'YES' and 'NO' options. Participants were required to carefully read and respond to each statement by selecting either 'es or no. A score of one is assigned for each 'Yes' response, while 'No' responses receive zero points. The total score ranged from a minimum of 0 to a maximum of 40. The scale was translated into Bengali with the assistance of two experienced English and Bengali instructors at Jenkins School in Coochbehar. To ensure that the translated version maintained the intended meaning of the original questionnaire, its content validity was verified (r=0.84).

**Ten Weeks Indigenous Activity Training Intervention**

Total no. of Indigenous activities= Six.

**Table 1:** Ten Weeks Indigenous Activity Training Intervention

	Days	Activity	Division
1 <sup>st</sup> and 2 <sup>nd</sup> Week	1 <sup>st</sup> day	Kit-kit, Golla-Chhut.	5 min. warm up, 40 min. indigenous activity, 5 min cooling down.
	2 <sup>nd</sup> day	Chhi-Buri, Pakki.	5 min. warm up, 40 min. indigenous activity, 5 min cooling down.
	3 <sup>rd</sup> Day	Kit-kit, Chhi-Buri,	5 min. warm up, 40 min. indigenous activity, 5 min cooling down.
	4 <sup>th</sup> Day	Golla-Chhut, Pakki.	5 min. warm up, 40 min. indigenous activity, 5 min cooling down.
3 <sup>rd</sup> and 4 <sup>th</sup> Week	1 <sup>st</sup> day	Kit-kit, Golla-Chhut	5 min. warm up, 50 min. indigenous activity, 5 min cooling down.
	2 <sup>nd</sup> day	Chhi-Buri, Pakki.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down
	3 <sup>rd</sup> Day	Kit-kit, Chhi-Buri,	5 min. warm up, 50 min. indigenous activity, 5 min cooling down
	4 <sup>th</sup> Day	Golla-Chhut, Pakki.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down
5 <sup>th</sup> and 6 <sup>th</sup> week	1 <sup>st</sup> day	Kit-kit, Golla-Chhut, Pakki.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down
	2 <sup>nd</sup> day	Chhi-Buri, Pakki, Kit- kit.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down
	3 <sup>rd</sup> Day	Kit-kit, Golla-chhut Pakki,	5 min. warm up, 50 min. indigenous activity, 5 min cooling down
	4 <sup>th</sup> Day	Golla-Chhut, Pakki, Chhi-Buri.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down
7 <sup>th</sup> & 8 <sup>th</sup> week	1 <sup>st</sup> day	Kit-kit, Golla-Chhut, Pakki, Rumal Churi.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down
	2 <sup>nd</sup> day	Chhi-Buri, Pakki, Rumal Churi, Golla-Chhut.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down.
	3 <sup>rd</sup> Day	Kit-kit, Golla-chhut Pakki, Rumal Churi.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down.
	4 <sup>th</sup> Day	Golla-Chhut, Pakki, Chhi-Buri, Kit-Kit.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down.
9 <sup>th</sup> & 10 <sup>th</sup> Week	1 <sup>st</sup> day	Kit-kit, Golla-Chhut, Pakki, Edur-Biral, Rumal Churi.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down
	2 <sup>nd</sup> day	Chhi-Buri, Pakki, Kit- kit, Edur-Biral, Rumal Churi.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down.
	3 <sup>rd</sup> Day	Golla-chhut Pakki, Chhi-Buri, Edur-Biral, Rumal Churi.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down.
	4 <sup>th</sup> Day	Golla-Chhut, Kit-Kit, Chhi-Buri, Edur-Biral, Rumal Churi.	5 min. warm up, 50 min. indigenous activity, 5 min cooling down.

Name of the activities : Kit-kit, Golla-Chhut, Chhi-Buri, Pakki, Edur-Biral, Rumal Churi.

**Analysis of Data**

After the completion of ten weeks of training program

various levels of sub categories aggression (Table 2) both the groups was again measured and the collected data were analysed by using the IBM SPSS version 20. A one way analysis of covariance (ANCOVA) was conducted to compare the effects of IA on Post-test result of the Experimental and control Groups of various categories of Aggression and Anxiety while controlling the Pre-test data as covariate. Shapiro-Wilk test and Levene's test were conducted to meet the assumptions.

**RESULTS AND DISCUSSION**

The study revealed that there were significant differences between Control and Experimental groups in Sub Categories of Aggression i.e. Anger (A), Physical Aggression (PA), Hostility (H) and Verbal Aggression (VA) as F value respectively  $F(1,117) = 7.809, 4.648, 5.967,$  and  $p < 0.05$  (Table 2). The Post hoc tests showed

there were significant differences between the scores of the three groups. The partial Eta Squared values (Table 2) indicate the effect size and should be compared with the Cohen's guideline (0.2 = Small effect, 0.5 = Moderate effect, 0.8 = Large effect). According to that for both groups the effect size was small (PA & VA) to moderate (H & A). The Partial Eta Squared value showed the 63%, 38%, 69% and 49% of variance in A, PA, H and VA score respectively of both groups when controlling the Pre-test Scores.

The results of the Levene's Test (Table 2) were insignificant ( $p > 0.05$ ), indicated that the group variances did not exist. Hence, the assumption of homogeneity of variances was not violated.

The normality of the data was tested by the Kolmogorov-Smirnov formal test. Table 2 shows the insignificant ( $p > 0.05$ ), indicating the data were normally distributed.

**Table 2:** Computation of ANCOVA of Experimental and Control Groups on Aggressive Sub Category

Aggression sub Category	Groups	Mean & SD (Pre Test)	Mean & SD (Post Test)	Test results of normality (p=0.05)	Test results of Homogeneity (p=0.05)	F Value	Sig (p=0.05)	Eta square
Anger (A)	Control	19.67 ±6.81	19.68 ±6.26	Pre= 0.163 (p= >0.05) Post= 0.198 (p= >0.05)	0.498 >0.05	7.809	<0.05	0.063
	Experimental	20.15 ±6.51	19.18 ±5.87					
Physical Aggression (PA)	Control	23.93 ±8.13	23.98 ±7.97	Pre= 0.197 (p= >0.05) Post= 0.187 (p= >0.05)	0.706 >0.05	4.648	<0.05	0.038
	Experimental	23.90 ±7.90	23.32 ±7.83					
Hostility (H)	Control	21.20 ±6.89	21.03 ±6.31	Pre= 0.186 (p= >0.05) Post= 0.187 (p= >0.05)	0.638 >0.05	8.176	<0.05	0.069
	Experimental	21.37 ±6.95	20.55 ±6.27					
Verbal Aggression (VA)	Control	14.90 ±4.89	15.12 ±4.96	Pre= 0.190 (p= >0.05) Post= 0.187 (p= >0.05)	0.501 >0.05	5.967	<0.05	0.49
	Experimental	15.23 ±4.78	14.67 ±4.65					

**Table 3:** The mean and standard deviation of Anxiety Scores

Groups	Pre-Test		Post-Test	
	Mean	SD*	Mean	SD
Control Group (N=60)	24.93	±4.88	23.27	±3.30
Experimental Group (N=60)	25.35	±5.04	16.80	±3.01

The mean and standard deviation of Anxiety in both groups are presented in Table 3. There was a significant difference between Control and Experimental group [ $F(1,117) = 133.798, p < .05$ ] (Table 4). A Post hoc test showed there was a significant difference in between anxiety score of both groups. The partial Eta Squared value indicates the effect size

and should be compared with the Cohen's guideline (0.2 = Small effect, 0.5 = Moderate effect, 0.8 = Large effect). According to that for both groups the effect size is moderate. The Partial Eta Squared value showed the 53.3% of variance in Anxiety scores of both groups when controlling the Pre-test Anxiety Scores.

**Table 4:** The difference between the Control and Experimental Groups

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	1276.878	1	1276.878	133.798	.000	.533
Error	1116.572	117	9.543			

**Table 5:** Levene's Test result

F	df1	df2	Sig.
.120	1	118	.730

Table 5 shows the results of the Levene's Test is insignificant ( $p = >0.05$ ), indicating that the group variances did not exist. Hence, the assumption of homogeneity of variances was not violated.

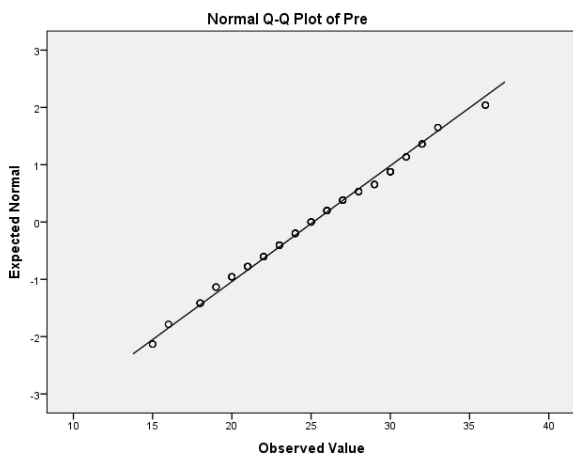
The normality of the data was tested by the Shapiro-wilk

formal test. Table 6 shows the insignificant ( $p = >0.05$ ), indicating the data were normally distributed. Also both Q-Q plot shows the same result.

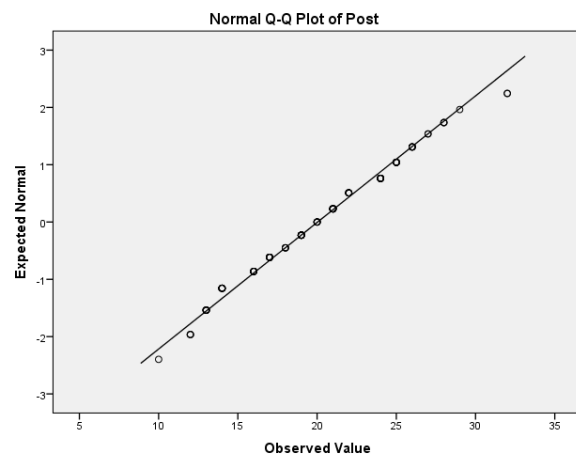
**Tests of Normality**

**Table 6:** Result of normality testing

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Pre	.070	120	.200*	.984	120	.157



**Figure 1:** Q-Q Plot of Pre-test score

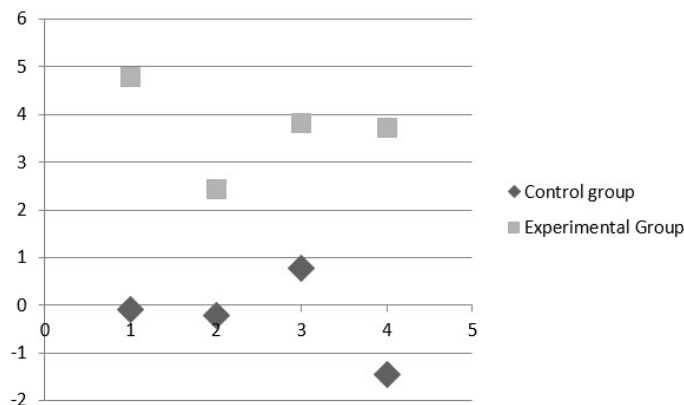


**Figure 2:** Q-Q Plot of Post-test score

**Discussion**

The present study focused on aggressive behavior in high school students and aimed to demonstrate the efficacy of an IA intervention in reducing such behavior. The findings

indicated that adolescents in the experimental group, following 10 weeks of IA interventions administered four times per week, exhibited significantly greater reductions in aggression and anxiety than adolescents in the control group



**Figure 3:** The difference (%) between Pre and post test results of groups. In X-axis 1= Anger, 2 = Physical Aggression, 3 = Hostility, 4 = Verbal Aggression

Studies have shown that engaging in extracurricular physical activity is instrumental in reducing aggressive behavior among teenagers (Eccles *et al.*, 2003; Park *et al.*, 2017). However, few studies have specifically investigated the effects of team sports interventions on youth mental health (Hammami *et al.*, 2014; Shachar *et al.*, 2016; Hammami *et al.*, 2018; Trajković *et al.*, 2020a). Most of these studies have focused on various forms of recreational soccer, with only one study encompassing a wider array of sports (Shachar *et al.*, 2016). This investigation revealed that after-school sports programs, including basketball, soccer, volleyball, martial arts, and capoeira, were more efficacious than standard physical education (PE) classes in reducing anger, hostile thoughts, physical aggression, and negative emotions in children aged 8–12 years. Consistent with our findings for the overall sample, Trajković *et al.* (2020a) observed a significant decrease in physical aggression among high school students participating in an 8-month recreational soccer program. Our study not only demonstrated a reduction in physical aggression but also in verbal aggression and anger. These outcomes suggest that participation in team sports can promote cooperation, sharing, and improved relationships between peers and adults, thereby enhancing psychological well-being (Pedersen & Seidman, 2004). Furthermore, unlike contact sports, volleyball does not involve direct physical confrontation, thus potentially mitigating the risk of physical violence (Mutz, 2012). Our research indicates that adolescents can apply positive behaviors learned during sports to nonathletic situations. Several models have been proposed to address aggression or improve aggressive behavior management, with one effective approach being the enhancement of adolescents' self-control skills through indirect means (Ronen *et al.*, 2007). Research supports the role of self-control skills as mediators in reducing aggressive behavior (Shachar *et al.*, 2016). Park *et al.* (2017) emphasized that after-school sports activities offer numerous psychological benefits, including fostering self-effacement, mutual respect, and consideration. The present study found that participants in small-sided volleyball reported higher levels of

enjoyment than those in traditional PE classes (Chart 3), which may contribute to the observed decrease in aggressive behavior.

The substantial F-value [ $F(1,117) = 133.798, p < 0.05$ ] indicated a statistically significant relationship between the IA training program and participants' anxiety levels. The eta-squared value of .53 suggests that approximately 53% of the variance in anxiety scores can be attributed to the IA program. The study observed a 30% reduction in severe anxiety in the experimental group following the IA training (Table 4). Research has demonstrated that physical activity exerts a positive influence on stress and anxiety levels (Anderson, 2013; Robinson, 2019; Mayo, 2017; Akandere, 2008; Naderi, 2019). Aerobic exercise effectively alleviates depression in pediatric patients with cancer and diminishes anxiety symptoms (Naderi, 2019; Akandere, 2008; Akandere, 2011; Nejad, 2015; Carek, 2011). Regular physical activity decreases reactivity in the sympathetic nervous system and hypothalamic-pituitary-adrenal axis, modulates hormone release and enhances serotonin and endorphin levels (Crews, 1987; Åstrand, 2003; Jackson, 2006; Rimmel, 2007; Salmon, 2001; Droste, 2003; Dunn, 1991; Meeusen, 1995; Wilson, 1996; Chaouloff, 1997). Exercise influences neurotransmitters by increasing dopamine, serotonin, noradrenaline, and GABA levels, elevates endorphins, attenuates the impact of stress hormones on the hypothalamic-pituitary-adrenal axis, induces relaxation through increased body temperature, and redirects attention from anxiety through activities such as aerobic exercise and dance (Naderi, 2019; Anderson, 2013; Alikhani, 2015; Kolehmainen, 2014; Atkinson, 2009). Van Loon *et al.* (2023) examined school-based skills-training programs for adolescents with psychological needs. The current study revealed greater benefits from a ten-week IA training program, with an effect size (0.53) comparable to or exceeding that of psychotherapy and pharmacotherapy (SMDrange =  $-0.22$  to  $-0.37$ ) (Twomey, 2015; Cipriani, 2018). Regular IA, performed four times per week for 50-60 minutes over a minimum of ten weeks, influences physiological and psychological mechanisms, resulting in reduced anxiety levels.

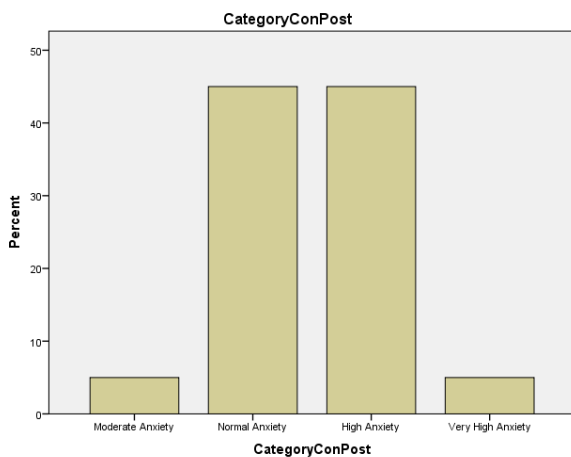


Figure 4: Pre score of Control Group

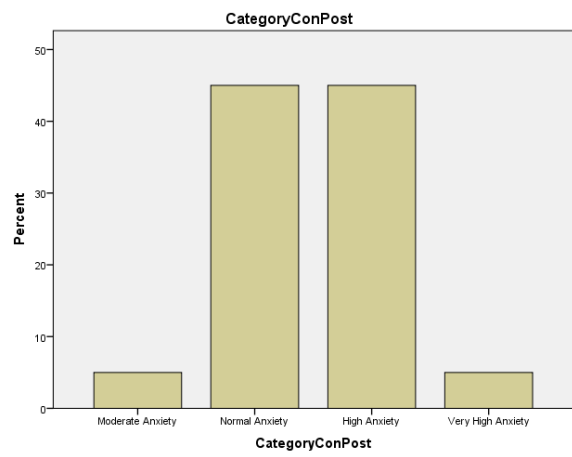


Figure 5: Post score of Control Group

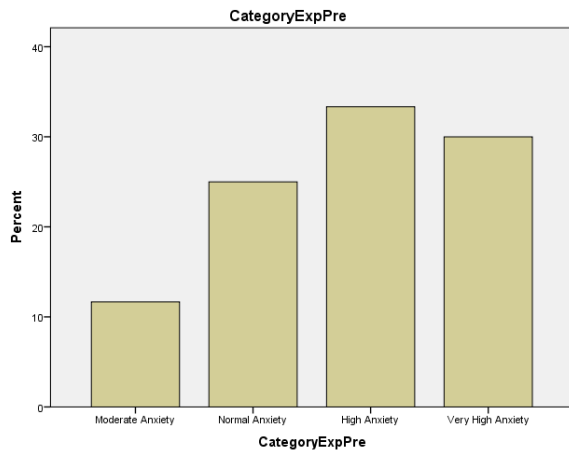


Figure 6: Pre score of Experimental Group

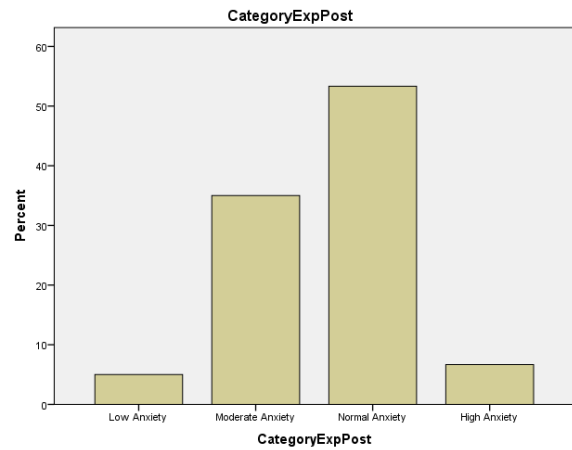


Figure 7: Post score of Experimental Group

Table 7:

Groups	Pre Test						Post Test					
	Very Low	Low	Moderate	Normal	High	Very High	Very Low	Low	Moderate	Normal	High	Very High
Control Group	0	0	6.67	31.67	38.33	23.33	0	0	8.33	41.67	41.67	8.33
Experimental Group	0	0	11	25	33.33	30	0	8.33	35	51.67	5	0

**Limitations**

**Sample Size Constraints**

The study’s participant pool of 120 individuals may not be sufficiently representative of a broader population.

**Restricted Age Range**

The focus on adolescents aged 12-14 limits the generalizability of the results to other age groups.

**Geographic Specificity**

The study’s confinement to the Cooch Behar district of West Bengal, India may restrict its applicability to other regions or cultural contexts.

**Gender Homogeneity**

The apparent inclusion of only male participants, as indicated in the methodology section, potentially limited the generalizability of the findings to female students.

**Brief Intervention Period**

The 10-week training program duration may be insufficient to assess the long-term effects of the intervention.

**Limited Scope of Indigenous Activities**

The study’s focus on six specific traditional activities may not encompass the full range of indigenous games and their potential impact.

**Absence of Follow-Up Assessments**

The study did not include follow-up evaluations to determine the persistence of observed effects over time.

**Potential Self-Reporting Bias**

The reliance on self-reported questionnaires to assess aggression and anxiety may introduce response bias.

**Future Research Scope**

1. Conduct extended research to evaluate the long-term effects of traditional indigenous activities on children’s aggressive behavior and anxiety levels.

2. To examine the impact of programs incorporating indigenous activities on various aspects of mental health and well-being, including depression, self-esteem, and interpersonal skills.

3. Evaluate the efficacy of indigenous activities in reducing aggression and anxiety compared to other physical exercises or sports-based interventions.

4. Investigate the potential of traditional activities to address specific behavioral challenges, such as cyberbullying or academic-related stress, among students in India.

5. Analyze the influence of cultural elements on the effectiveness of indigenous activity interventions across India’s diverse regions.

6. Determine the optimal duration and frequency of indigenous activity programs to maximize behavioral benefits.

7. Explore the underlying mechanisms through which indigenous activities affect aggression and anxiety, such as alterations in neurotransmitter levels or stress hormone regulation.

8. Evaluate the capacity of indigenous activities to enhance academic performance and cognitive function in conjunction with behavioral outcomes.

9. Assess the feasibility of integrating indigenous activity programs into standard school curricula and measure their effects on overall student well-being.

10. Study the potential of indigenous activities to address aggression and anxiety in specific populations, such as children with ADHD or those on the autism spectrum.

### Social Implications

#### Decrease in Aggressive Conduct

The indigenous activity (IA) intervention program notably diminished various types of aggression (physical, verbal, anger, and hostility) in adolescents, possibly resulting in enhanced social interactions and less conflict in educational institutions and neighborhoods.

#### Lessening Anxiety

The IA program led to a 30% decrease in severe anxiety among participants, potentially contributing to improved mental well-being and social functioning in teenagers.

#### Cultural Significance

Utilizing traditional Indian games such as Kabaddi and Kho-Kho presents a culturally suitable method for tackling behavioral issues, possibly increasing acceptance and involvement in such interventions.

#### Substitution For Digital Media

The IA program offers a productive alternative to excessive digital media use, which has been associated with increased aggression in young people.

#### Enhanced Peer Relations

Engaging in team sports can foster cooperation, sharing, and improved relationships between peers and adults, thus strengthening their overall social abilities.

#### School-Centered Intervention

The research showcases the potential for implementing effective behavioral interventions within educational environments, which could lead to improved school atmosphere and student welfare.

#### Economic Approach

The IA program presents a potentially cost-effective method for addressing behavioral issues compared to more resource-intensive interventions, making it accessible in developing nations with limited mental health resources.

#### Encouragement of Physical Activity

This intervention promotes regular physical activity, which has broader health advantages beyond reducing aggression and anxiety.

#### Stress Control

The program's effects on decreasing anxiety suggest that it could be a valuable tool for assisting adolescents in managing academic and social pressure.

### Potential for Widespread Adoption

The positive outcomes of this study may encourage the implementation of similar programs in other schools and communities, potentially benefiting a larger adolescent population.

### CONCLUSION

This study demonstrates the effectiveness of a 10-week Indigenous Activity (IA) intervention program in reducing aggressive behavior and anxiety among adolescents aged 12-14 in Cooch Behar, West Bengal, India. The experimental group that participated in the IA program exhibited significant reductions in all aggression subcategories (anger, physical aggression, hostility, and verbal aggression) compared with the control group. The effect sizes ranged from small to moderate across different subcategories. Furthermore, the investigation revealed a substantial decrease in anxiety levels among participants in the IA program, with the intervention accounting for approximately 53% of the variance in the anxiety scores. These results suggest that structured, culturally relevant physical activities can significantly contribute to promoting positive behavioral changes and enhancing psychological well-being in adolescents. These findings align with previous research on the benefits of after-school sports programs and team-oriented activities in reducing aggression and improving mental health. The success of IA intervention highlights the potential of incorporating traditional games and activities into educational settings as a strategy for addressing behavioral issues and promoting emotional development in youth. This research contributes to the growing body of evidence supporting the use of culturally appropriate physical activity-based interventions in managing aggressive behavior and anxiety among adolescents. Future studies should explore the long-term effects of such interventions and their potential applications across diverse cultural contexts. The positive outcomes of this study may encourage broader implementation of similar programs in other schools and communities, potentially benefiting a larger adolescent population.

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