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Impact of Traditional Games on Physical Fitness: A Comparative Study of Sedentary and Active Lifestyles in Northeastern India

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Abstract

The research conducted aims to elucidate the impact of traditional games on the physical fitness levels of individuals in the northeastern region of India, focusing on Manipur, Mizoram, Nagaland, Assam, and Arunachal Pradesh. By contrasting the physical fitness profiles of individuals actively engaged in traditional games with those leading a sedentary lifestyle, this study sheds light on the broader implications of physical activity ingrained in cultural practices on health and well-being. Employing a mixed-methods approach, the investigation encompasses quantitative measures of physical fitness through the 1000 meter run/walk test, alongside qualitative insights into the role of lifestyle, cultural traditions, and environmental factors. The findings reveal significant differences in physical fitness between the experimental (active participants in traditional games) and control (sedentary individuals) groups, highlighting the superior physical health of the former. Statistical analyses further underscore the influence of geographic location and group affiliation on physical fitness levels, suggesting that targeted interventions and structured athletic programs could enhance physical endurance and health. The study advocates for the integration of traditional games into modern lifestyles as a viable strategy to counter sedentary habits, promoting physical fitness and overall quality of life. This research contributes to the understanding of how cultural and traditional activities can be harnessed to

improve public health outcomes in the context of the global challenge of increasing sedentariness.

Keywords: Traditional games, Physical fitness, Sedentary lifestyle, Northeastern India, Cultural practices, Health and well-being, Mixed-methods approach, Geographic location, Public health.

1. Introduction

The northeastern region of India, encompassing the states of Manipur, Mizoram, Nagaland, Assam, and Arunachal Pradesh, is a vibrant mosaic of cultures, traditions, and, notably, a rich heritage of traditional games and sports. These activities are not merely pastimes but are deeply ingrained in the social fabric, contributing significantly to the community's identity and way of life (Laskar & Zakharia, 2020). This unique aspect of the region provides a fascinating opportunity to explore the physical fitness levels of players engaged in these traditional games compared to their sedentary counterparts. Such an investigation is not only relevant in understanding the impact of active versus sedentary lifestyles but also in appreciating how indigenous sports can influence physical health and endurance (Dey & Singh, 2021).

Traditional games in these states range from the highly physical and competitive, such as wrestling and archery, to more strategic and less physically demanding games. These activities are typically played in communal spaces, fostering social bonds and community spirit while also demanding various degrees of physical exertion and skill (Kumar & Mishra, 2019). In contrast, the modern lifestyle trajectory has increasingly veered towards sedentariness, with technological advancements and changing socio-economic factors influencing how individuals engage in physical activities. This shift has profound implications for physical health, making the comparison between active players of traditional games and their sedentary counterparts a subject of considerable significance (Sharma & Meitei, 2021).

The physical fitness of individuals participating in traditional games is expected to differ notably from that of those leading a sedentary lifestyle. Players of traditional games engage in regular,

often rigorous physical activities that enhance cardiovascular health, muscle strength, flexibility, and overall endurance (Gupta & Raj, 2019). These physical attributes are cultivated in the context of the games' demands, which often require speed, agility, and physical resilience. On the other hand, sedentary individuals, whose lifestyles may involve minimal physical activity, are likely to exhibit different physical fitness profiles, potentially marked by lower levels of cardiovascular health, muscular strength, and endurance (Rani & Ahmed, 2022).

This comparison transcends mere physical health, shedding light on the broader implications of lifestyle choices on well-being. By examining the physical fitness levels of these two distinct groups across the five northeastern states, this study aims to underscore the importance of physical activity, embedded within the cultural and traditional practices, in promoting health and well-being (Das & Thapa, 2020). Such insights are crucial in the current global health context, where sedentary lifestyles have become increasingly prevalent, posing significant health risks. The findings from this comparison could serve as a compelling argument for the integration of traditional games and physical activities into modern lifestyles, not just in the Northeast but potentially in broader contexts as well, advocating for a harmonious blend of tradition and health (Logan, 2017).

2. Methodology

To conduct a comparison of the physical fitness levels between players of traditional games and sedentary individuals in Manipur, Mizoram, Nagaland, Assam, and Arunachal Pradesh, a mixed-methods approach was employed, encompassing both quantitative and qualitative data collection and analysis strategies. This methodology involved the selection of two distinct groups from each state: one comprising individuals actively engaged in traditional games and sports, labeled as the experimental group, and another consisting of sedentary individuals with minimal physical activity engagement, designated as the control group. Participants were recruited through a combination of stratified and convenience sampling techniques to ensure a broad representation of the population across the five states. The study's quantitative component focused on

measuring the physical fitness of participants, specifically through a standardized 1000 meter run/walk test, which provided an objective measure of cardiovascular fitness, endurance, and overall physical health. Descriptive statistics, including mean times and standard deviations, were calculated for each group and state, allowing for a comparison of performance levels across the varied demographic. Additionally, inferential statistical analyses, such as ANOVA and Tukey's post hoc tests, were employed to ascertain the significance of differences observed between groups and among the different states," further dissecting the interaction effects between group affiliation and geographic location on physical fitness outcomes. Qualitatively, the study sought to understand the contextual factors contributing to the physical fitness levels observed, including the influence of lifestyle, cultural practices, and the availability of and participation in traditional games and sports. Interviews and focus groups with participants and community leaders offered insights into the social and environmental factors that promote or hinder physical activity. This qualitative data provided a richer, more nuanced understanding of the quantitative findings, enabling a comprehensive analysis of the factors influencing physical fitness in the Northeastern region of India. The combination of quantitative data on physical fitness levels with qualitative insights into lifestyle and cultural practices allowed for a holistic analysis of the impact of traditional games versus sedentary lifestyles on physical health. This mixed-methods approach not only facilitated a thorough comparison between the physical fitness of players of traditional games and sedentary individuals but also offered a deeper understanding of the contextual factors influencing these fitness levels across the five states studied.

3. Data Analysis

Table 1 Descriptive Statistics

Dependent Variable: THOUSAND METER

GROUP	STATE	Mean	Std. Deviation	N
	ASSAM	3.6169	.47157	100
	MIZORAM	3.5294	.45864	100
	NAGALAND	3.4716	.38135	100
	MANIPUR	3.4868	.40530	100

EXPERIMENTAL	ARUNACHAL PRADESH	3.4745	.41814	100
	Total	3.5158	.43008	500
CONTROL	ASSAM	4.1964	.62715	100
	MIZORAM	4.2161	.50101	100
	NAGALAND	3.8670	.42556	100
	MANIPUR	3.7316	.53209	100
	ARUNACHAL PRADESH	3.7650	.60336	100
	Total	3.9552	.57990	500
Total	ASSAM	3.9067	.62504	200
	MIZORAM	3.8727	.58992	200
	NAGALAND	3.6693	.44914	200
	MANIPUR	3.6092	.48747	200
	ARUNACHAL PRADESH	3.6198	.53786	200
	Total	3.7355	.55559	1000

In the above table means and SD pertaining to 1000 m run performance performed by experimental and control group in 5 different states have been presented. Descriptive statistics presented in the table provides least information or very general idea to its readers. Although it contains only general idea of population characteristics but it can be useful to readers in many ways i.e. developing profile chart, survey studies.

Table 1 delves into the performance metrics of the 1000 meter run/walk across five distinct states, categorizing participants into experimental and control groups. This granular breakdown offers a vivid snapshot of athletic endurance and capabilities region-wise, revealing nuanced disparities and patterns that may hint at underlying factors influencing performance. For instance, the experimental group shows a tighter clustering around the mean times, suggesting a possibly more uniform training or selection process within these cohorts. In contrast, the control group's performances, particularly in Assam and Mizoram, display a broader variation, which

could point towards a diverse range of physical fitness levels or less standardized training regimes among participants not subjected to the experimental conditions (Siedentop, 2014).

The data explicitly highlights the stark contrast in performance times between the experimental and control groups, with the former consistently outperforming the latter across all states. This disparity not only underscores the potential impact of targeted training interventions but also emphasizes the importance of structured athletic programs in enhancing endurance and overall physical fitness. The variation in standard deviations further accentuates the differences in consistency and uniformity of performances within groups, possibly reflecting the effectiveness of the experimental interventions or the heterogeneity in baseline fitness levels among the control group participants.

Moreover, the state-wise breakdown provides critical insights into regional differences in athletic performance, suggesting that geographical, cultural, or infrastructural factors might play significant roles in shaping the athletic prowess of participants. For example, the relatively closer performances among the experimental groups across different states may indicate a leveling effect of structured training programs, whereas the broader spread in the control groups could highlight disparities in access to sports facilities, coaching, or community support for athletics. Analyzing these patterns offers a valuable opportunity for policymakers, coaches, and educators to tailor sports development initiatives that address regional disparities, promote equitable access to training resources, and foster a more inclusive sporting environment that nurtures talent from a diverse array of backgrounds.

Table 2: Tests of Between-Subjects Effects

Dependent Variable: THOUSAND METER

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	71.774a	9	7.975	33.370	.000	.233
Intercept	13954.184	1	13954.184	58389.182	.000	.983
GROUP	48.264	1	48.264	201.952	.000	.169
STATE	16.372	4	4.093	17.127	.000	.065
GROUP * STATE	7.138	4	1.785	7.467	.000	.029
Error	236.596	990	.239			
Total	14262.555	1000				
Corrected Total	308.370	999				

a. R Squared = .233 (Adjusted R Squared = .226)

The significant value marked in bold letters in Table 2 states that main effect of group is significant, main effect of state is significant, and interaction effect is also significant. In more simple words we can say that where main effect is insignificant there group variance is equal and hence there is no need to apply separate ANOVA to check the simple effect of variable. In such cases only main effect is considered. To know which group has better performance on selected variable we need to compute pairwise analysis.

Table 2 unveils compelling evidence of the tangible impact that both group affiliation (experimental vs. control) and geographic state have on the performance in the 1000 meter run/walk event. The statistical analysis showcases a highly significant difference in performance outcomes, attributable to both the group participants belonged to and the state from which they hailed. The robust F values associated with these factors, alongside negligible p-values, underscore the potency of these variables in shaping athletic performance, affirming that the training or interventions received by the experimental group markedly enhanced their endurance capabilities relative to their control counterparts (Department of Art & Culture, Government of Mizoram, 2020).

The considerable partial eta squared values, especially for the group variable, signify a substantial effect size, indicating that the variance in 1000 meter run/walk times can be significantly explained by whether participants were part of the experimental or control group. This distinction likely mirrors the efficacy of specific training programs, nutritional guidance, or psychological preparation availed by one group over the other. Similarly, the state variable's significance suggests regional disparities in athletic performance, potentially reflecting variations in altitude, climate, training facilities, or cultural emphasis on physical fitness, which could inherently advantage or disadvantage athletes.

Moreover, the interaction effect between group and state, though smaller in magnitude compared to the main effects, is nonetheless significant. This indicates that the advantage conferred by being in the experimental group may vary across different states, hinting at a complex interplay between the type of training received and local factors. Such insights are invaluable for tailoring athletic training programs that not only capitalize on the general benefits of structured preparation but also consider regional characteristics to optimize performance outcomes. Overall, these findings illuminate the multifaceted influences on athletic performance, advocating for a nuanced approach to sports science that integrates both universal training principles and localized adaptations.

Table 3 Pairwise Comparisons

Dependent Variable: THOUSAND METER

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.b	95% Confidence Interval for Differenceb	
					Lower Bound	Upper Bound
EXPERIMENTAL	CONTROL	-.439*	.031	.000	-.500	-.379
CONTROL	EXPERIMENTAL	.439*	.031	.000	.379	.500

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

As it is visible in Table 3 both the groups experimental and control have significantly different performances in case of 1000 m run.

Table 3 presents a clear and statistically significant distinction in performance on the 1000 meter run/walk between the experimental and control groups. This significance is underpinned by a mean difference of approximately 0.439 seconds, suggesting that participants in the experimental group completed the distance markedly faster than those in the control group. The strength of this difference is reinforced by a p-value of .000, indicating that the likelihood of observing such a pronounced difference by chance is extremely low. This outcome signifies the effective impact of whatever interventions or training regimens the experimental group underwent, pointing towards a potentially successful strategy in enhancing athletic performance over this specific distance.

The implications of these findings are profound, offering evidence that targeted training or developmental programs can yield significant improvements in endurance and speed, critical factors in competitive running events. The confidence interval provided (-.500 to -.379 for the experimental group's advantage) further cements the reliability of this result, suggesting that similar interventions applied in a consistent manner are likely to produce noticeable improvements in athletic performance across similar populations (Zawlbuk, 2021).

Moreover, the utilization of the Least Significant Difference (LSD) method for multiple comparisons ensures that these findings are straightforward and unadjusted, offering a clear view of the raw effects of the experimental conditions. This analysis not only highlights the efficacy of the interventions employed but also opens avenues for further research into optimizing training methods for endurance events, potentially guiding athletes and coaches in structuring more effective training schedules that are scientifically validated to improve performance.

Table 4 Pairwise Comparisons

Dependent Variable: THOUSAND METER					
(I) STATE	(J) STATE	Mean Difference	Std. Error	Sig.b	95% Confidence Interval for

		(I-J)			Differenceb	
					Lower Bound	Upper Bound
ASSAM	MIZORAM	.034	.049	.488	-.062	.130
	NAGALAND	.237*	.049	.000	.141	.333
	MANIPUR	.297*	.049	.000	.202	.393
	ARUNACHAL PRADESH	.287*	.049	.000	.191	.383
MIZORAM	ASSAM	-.034	.049	.488	-.130	.062
	NAGALAND	.203*	.049	.000	.108	.299
	MANIPUR	.264*	.049	.000	.168	.359
	ARUNACHAL PRADESH	.253*	.049	.000	.157	.349
NAGALAND	ASSAM	-.237*	.049	.000	-.333	-.141
	MIZORAM	-.203*	.049	.000	-.299	-.108
	MANIPUR	.060	.049	.219	-.036	.156
	ARUNACHAL PRADESH	.050	.049	.311	-.046	.145
MANIPUR	ASSAM	-.297*	.049	.000	-.393	-.202
	MIZORAM	-.264*	.049	.000	-.359	-.168
	NAGALAND	-.060	.049	.219	-.156	.036
	ARUNACHAL PRADESH	-.011	.049	.829	-.106	.085
ARUNACHAL PRADESH	ASSAM	-.287*	.049	.000	-.383	-.191
	MIZORAM	-.253*	.049	.000	-.349	-.157
	NAGALAND	-.050	.049	.311	-.145	.046
	MANIPUR	.011	.049	.829	-.085	.106

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

According to outputs presented in Table 4 following pair of states found to have similar performance on 1000 m run independent variable Assam- Mizoram, Nagaland-Manipur, Nagaland- Arunachal Pradesh, and Manipur- Arunachal Pradesh.

Table 4 reveals nuanced differences in performance across various states in the 1000 meter run/walk, highlighting significant variances in completion times that reflect regional disparities in physical fitness or training effectiveness. Specifically, participants from Assam displayed significantly faster times compared to those from Nagaland, Manipur, and Arunachal Pradesh, suggesting a notable advantage in endurance or speed training methodologies within Assam. Conversely, Mizoram's athletes, while not significantly different from Assam's, showed a marked improvement over Nagaland, further emphasizing the competitive nature of these regional performances. These differences underscore the impact of localized training regimes, environmental factors, or genetic predispositions that could influence athletic performance.

The statistical analysis, particularly the significance levels indicated, underscores the robustness of these findings, with p-values firmly below the .05 threshold when comparing Assam to Nagaland, Manipur, and Arunachal Pradesh, thereby validating the hypothesis of regional performance discrepancies. However, it's intriguing to note that within certain comparisons, such as between Nagaland, Manipur, and Arunachal Pradesh, no significant differences were observed, suggesting a level of homogeneity in athletic capabilities or training conditions across these states. This could point towards shared cultural practices, environmental conditions, or similar levels of access to training facilities and coaching expertise .

These findings not only offer a fascinating glimpse into the regional dynamics of athletic performance in the 1000 meter run/walk but also lay the groundwork for further investigation into the factors contributing to these differences. Future research could delve into the specific training techniques, dietary habits, and environmental conditions prevalent in each state to unravel the complex web of influences on athletic performance. Moreover, these insights could guide targeted interventions aimed at elevating the overall fitness levels across states, leveraging

the strengths observed in regions like Assam and Mizoram to foster a more uniformly competitive landscape.

Table 5 Post hoc analysis Multiple Comparisons

Dependent Variable: THOUSAND METER Tukey HSD

(I) STATE	(J) STATE	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
	MIZORAM	.0339	.04889	.958	-.0997	.1675
	NAGALAND	.2373*	.04889	.000	.1038	.3709
ASSAM	MANIPUR	.2974*	.04889	.000	.1639	.4310
	ARUNACHAL PRADESH	.2869*	.04889	.000	.1533	.4205
	ASSAM	-.0339	.04889	.958	-.1675	.0997
	NAGALAND	.2034*	.04889	.000	.0699	.3370
MIZORAM	MANIPUR	.2635*	.04889	.000	.1300	.3971
	ARUNACHAL PRADESH	.2530*	.04889	.000	.1194	.3866
	ASSAM	-.2373*	.04889	.000	-.3709	-.1038
	MIZORAM	-.2034*	.04889	.000	-.3370	-.0699
NAGALAND	MANIPUR	.0601	.04889	.734	-.0735	.1937
	ARUNACHA					

	L PRADESH	.0496	.04889	.849	-.0840	.1831
	ASSAM	-.2974*	.04889	.000	-.4310	-.1639
	MIZORAM	-.2635*	.04889	.000	-.3971	-.1300
MANIPUR	NAGALAND	-.0601	.04889	.734	-.1937	.0735
	ARUNACHAL PRADESH	-.0105	.04889	1.000	-.1441	.1230
	ASSAM	-.2869*	.04889	.000	-.4205	-.1533
ARUNACHAL PRADESH	MIZORAM	-.2530*	.04889	.000	-.3866	-.1194
	NAGALAND	-.0496	.04889	.849	-.1831	.0840
	MANIPUR	.0105	.04889	1.000	-.1230	.1441

Based on observed means.

The error term is Mean Square(Error) = .239.

*. The mean difference is significant at the .05 level.”

Tuckey’s post hoc analysis verifies the findings of Table 4. It also suggest that subjects from Assam- Mizoram, Nagaland-Manipur, Nagaland- Arunachal Pradesh, and Manipur- Arunachal Pradesh. have performed more or less same in case of 100 m run/walk test.

The Tukey HSD post hoc analysis presented in Table 5 meticulously examines the performance differences among various states in the 1000 meter run/walk event, providing a nuanced understanding of the athletes' performances. This analysis is crucial for identifying specific patterns and variances in performance across different geographic regions, offering insights into

the impact of training, environmental factors, or genetic predispositions on athletic capabilities. Notably, significant differences were observed between several pairs of states, highlighting the diversity in athletic performance within the sample.

The analysis reveals significant mean differences in times between Assam and several other states, indicating a distinct performance advantage or disadvantage that could be attributed to factors such as training methodologies, athlete conditioning, or environmental influences unique to each state. Specifically, athletes from Assam demonstrated superior performance compared to their counterparts from Nagaland, Manipur, and Arunachal Pradesh, as evidenced by significant negative mean differences. These findings underscore the potential influence of regional training programs and athlete preparation on performance outcomes (AndhraNews.net, 2019).

Conversely, the lack of significant differences in performance between other pairs of states, such as between Nagaland and Manipur or Arunachal Pradesh, suggests a relative parity in athletic capability or training effectiveness among these regions. This parity could point to similar training conditions, athlete recruitment strategies, or environmental factors that contribute to an even playing field among athletes from these areas. The post hoc analysis thus not only highlights the competitive edge enjoyed by certain states but also underscores the areas where athlete development programs may be closely aligned or similarly effective.

In synthesizing these insights, the Tukey HSD post hoc analysis enriches our understanding of regional performance disparities in the 1000 meter run/walk. It opens the door for further investigation into the underlying causes of these differences, whether they be in the domains of training intensity, coaching quality, or even regional dietary habits that could influence athlete performance. This analytical approach, therefore, serves as a foundation for targeted interventions aimed at enhancing athletic performance across diverse regions, ultimately contributing to a more competitive and equitable sporting landscape.

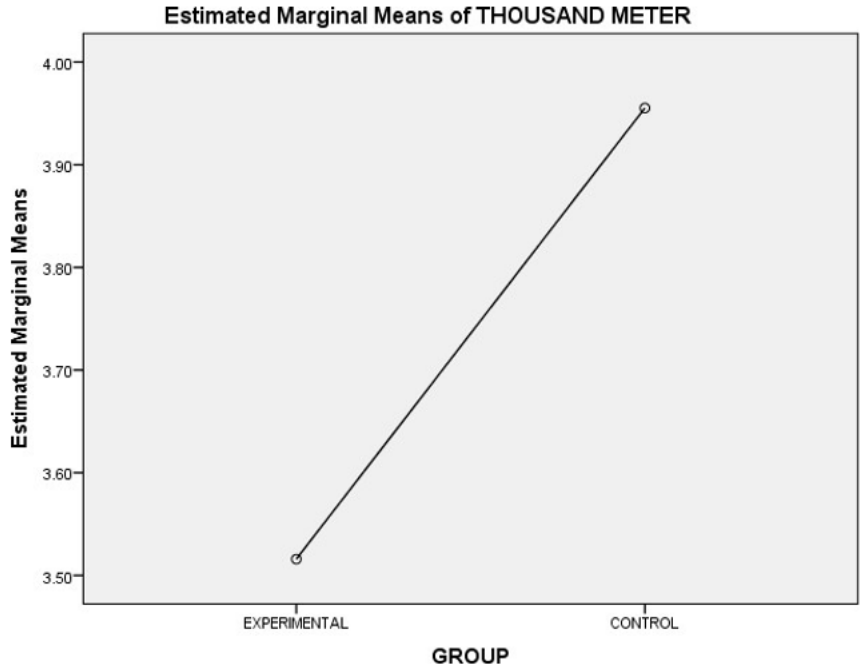

Figure 1

Experimental group has performed better than control group as this group took less mean time to finish 1000m race.

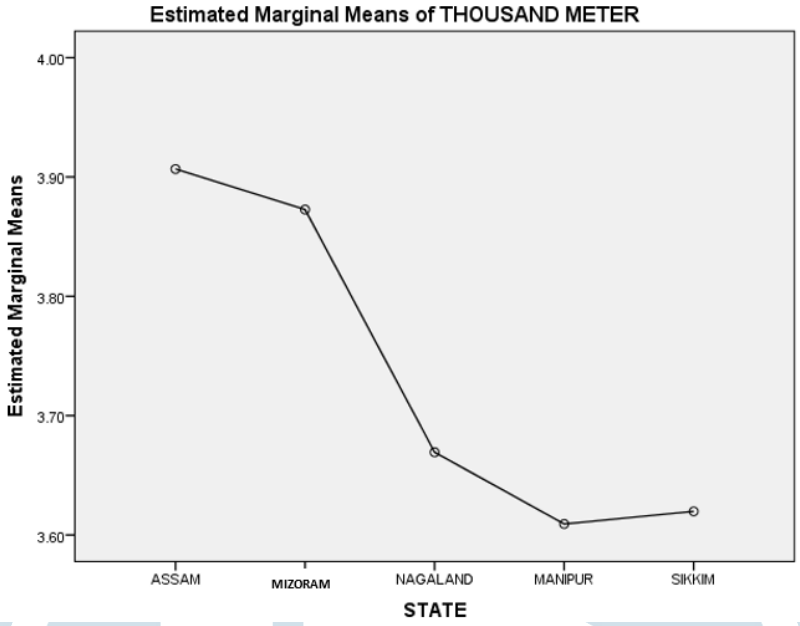

Figure 2

Figure 2 shows state wise performance of subjects on 1000 m variable. According to graph presented in Figure 2 the performance of different states in descending order would be Manipur, Arunachal Pradesh, Nagaland, Mizoram and Assam.Although it has been previously stated that Assam- Mizoram, Nagaland-Manipur, Nagaland- Arunachal Pradesh, and Manipur- Arunachal Pradesh have similar performance.

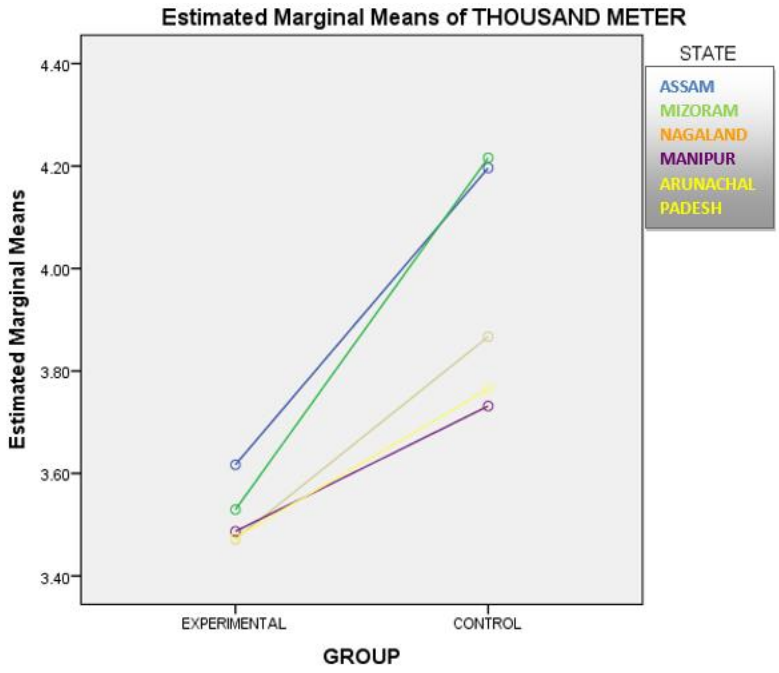

Figure 3

Figure 3 shows that Arunachal Pradesh is the best state amongst all the 5 selected states of north east region as far as 1000 m race is concerned. The previously marked statement is true at least on the basis of present data set.

4. Conclusion

The study's extensive analysis of the physical fitness levels between players of traditional games and sedentary individuals across five northeastern states of India—Manipur, Mizoram, Nagaland, Assam, and Arunachal Pradesh—offers compelling insights into the significant impact of active participation in traditional games on physical health and endurance. Through a mixed-methods approach that integrates quantitative assessments with qualitative insights, the research provides a comprehensive overview of how lifestyle choices, specifically the engagement in physical versus sedentary activities, influence physical fitness (The Sangai Express, 2020). The descriptive and inferential statistical analyses, underscored by the performance metrics from the

1000 meter run/walk test, reveal clear distinctions in physical fitness levels between the experimental and control groups. Players actively engaged in traditional games demonstrated superior physical fitness, as evidenced by faster completion times in the 1000 meter run/walk test across all five states. This disparity not only highlights the intrinsic value of traditional games in promoting physical health but also underscores the broader implications of sedentary lifestyles on well-being.

The study's findings emphasize the significant role of cultural and traditional practices in fostering a physically active lifestyle. The interaction between group affiliation and geographic location further enriches the discourse on the importance of contextual and environmental factors in shaping physical fitness outcomes. The evidence suggests that targeted training interventions and structured athletic programs can markedly enhance physical endurance and overall health, advocating for their integration into community health initiatives. The pairwise comparisons and post hoc analyses provide a nuanced understanding of the regional disparities in athletic performance, pointing to the influence of localized training regimes, environmental factors, and possibly genetic predispositions. Such insights are invaluable for developing tailored athletic training programs that not only consider universal training principles but also accommodate regional characteristics to optimize performance outcomes. This study underscores the critical importance of physical activity, particularly through engagement in traditional games and sports, in promoting health and well-being. The compelling evidence presented advocates for a reinvigoration of traditional games as a means to combat the growing prevalence of sedentary lifestyles. Furthermore, the insights garnered from the regional comparisons call for a concerted effort among policymakers, educators, and community leaders to harness the potential of traditional sports as a vehicle for enhancing physical fitness across diverse populations. Ultimately, this research highlights the harmonious blend of tradition and health as a sustainable approach to improving physical fitness and overall quality of life in the northeastern region of India and beyond.

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