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The Effect of Local Indigenous Games on children's Physical and Perceived Fitness

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Abstract

Background: local indigenous games have been formed in the socio-cultural context of Iran since the past, but their impact on various aspects of human development has not yet been determined. Therefore, this study aimed to examine the effect of Local Indigenous games on Physical Fitness Factors (PFFs) and the perceived fitness of 7–11-year-old boys.

Methods: Thirty elementary school boys (Age: 10.2± 0.2) in Aran and Bidgol, Iran, were selected and randomly divided into experimental and control groups. The experimental group played Local Indigenous games for eight weeks, with three training sessions per week and 45 minutes per session. The control group only performed their routine daily activities. Data collection tools included Abadi's perceived physical fitness scale (1988), 10x5 meter running test to measure agility (Paschaleri et al., 2016), long jump test to measure explosive power (Paschaleri et al., 2016), sitting test and reaching to measure flexibility (Paschaleri et al., 2016) and 20-meter running test (Agha Alinejad et al., 2013) to measure speed. Covariance analysis was used to analyze the data.

Results: The results indicated that eight weeks of Local Indigenous games significantly affect boys' PFFs, including agility, speed, flexibility, and explosive power ($p < 0.05$). Moreover, Local Indigenous games had a significant effect on perceived fitness ($p < 0.05$).

Conclusion: According to the results, a course of Local Indigenous games effectively improves PFFs and the perceived fitness of boys aged 7-11 years and could be used as a suitable intervention.

Key Words: Childhood, Local Indigenous Game, Perceived Fitness, Physical Activity, Self-Confidence.

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1- INTRODUCTION

Evidence indicates that the risk of cardiovascular diseases is inversely associated with the level of physical fitness (1) and physical activity (2) carried out by young people. The components of physical fitness associated with health include cardiopulmonary fitness, body composition, muscle strength, muscle endurance, and flexibility (3). Childhood obesity is associated with poor health-related physical fitness, such as cardiopulmonary fitness and muscle strength (4). On the other hand, the World Health Organization (WHO) recommendations show that an average of 60 min of moderate to vigorous physical activity per day is required for the health of the youth. However, an average of more than 60 min of moderate to vigorous physical activity per day brings about additional benefits (5). In 2016, a study involving 1.6 million students aged 11 to 17 showed that 81% of the participants did not meet this recommendation (3).

Physical activity, especially moderate to vigorous intensity, is associated with better physical fitness, independent of sedentary time (6, 7). Furthermore, one of the main sedentary behaviors in children is playing electronic games such as a computer or console games (8). The WHO reported that 40.2% of children and adolescents spend at least 2 hours a day watching TV or using electronic devices on weekdays. This percentage reaches 75.8% on weekends, exceeding the recommendations for maximum screen time. This inactivity and excessive attention to computer games are disastrous for the motor development of children and teenagers (9). Recently, a systematic review by Han et al. (10) revealed that children and adolescents with overweight and obesity have a lower level of motor competence than their healthy-weight counterparts. Hence, special attention should be paid to the problem of low motor skills in overweight or obese children. Furthermore, children with high actual and perceived motor competence are likely to show higher physical activity status and lower BMI (11). Improving motor competence could promote better-perceived motor competence that needs higher motivation and participation in extracurricular physical activity and exercise (12, 13). Furthermore, evidence suggests that childhood and adolescence health is associated with motor competence and physical fitness (14). Hence, improving motor skills in children is of great importance. Exercise is well known to be an effective tool for improving BMI or obesity status, cardiorespiratory and muscular fitness, or bone health (15). Thus, new types of more attractive and motivating sports for this population are required.

Playing is an important and influential factor in children's development. Among the games that are very attractive among people are the Local Indigenous games that originate from the customs of each society. These games have emerged according to the diverse needs of society and in line with the climatic and subcultural conditions. They have been with adults and children for thousands of years and have helped them establish friendly and emotional bonds with each other and advance the mechanisms of life. Besides reducing physical and mental fatigue, these sports strengthen the spirit of cooperation and solidarity in people and leave beneficial educational and training effects (16).

Local Indigenous games are closely associated with the culture and customs of people in each region and do not show their inherent interests and tastes; and are still popular in some parts of the countries. Due to their adaptation to the taste, artistic, and cultural interests of the society, these games can again become popular and accepted in the form of public games and sports in each country; and given their

diversity and requiring simple facilities available in the society, they can cover a wide range of people in different ages in the best possible way (17).

Overall, there are over 150 types of traditional games in Iran, many of which have become alienated in today's generation with time and changing lifestyles. The prominent features of these games are simple, accessible, and not dependent on special tools; Moreover, they strengthen the physical and mental talents, can be performed in any season, anywhere and everywhere, and cover various age groups from children to the elderly (18). Local Indigenous games pave the way for motor development in childhood and sports participation in the following years. For instance, Jarnis et al. (2020) revealed that playing Local Indigenous games are more effective than unstructured games in improving motor skills among children (19). Iasha et al. (2020) reported that Local Indigenous games enhanced children's working memory capacity in Indonesia. Other studies showed that playing Local Indigenous games positively motivates students to participate in sports activities (20). Moreover, Mehrabian et al. (2016) figured out that playing Local Indigenous games is useful for improving the motor and social development of 6-year-old children (21). Additionally, previous studies have reported the positive effect of Local Indigenous games on the visual-motor perception of mentally disabled students in the school preparation year and the first year of elementary school (22), on the development of basic skills of 7-year-old girls (23), on the development of gross motor skills and the self-esteem of male students with Attention-deficit/hyperactivity disorder in elementary school (24), on development of manipulative skills of 6- to 8-year-old boys (25), and on enhancing the motor skills of 10- to 13-year-old boys (26). However, the effect of Local Indigenous games on the PFFs and perceived fitness of children has not been studied yet. Hence, given the low complexity and simple rules of these games, it is questionable whether it is possible to enhance PFFs and perceived fitness of children through training programs of Local Indigenous games.

2- MATERIALS AND METHODS

2-1. Study design and population

The study was semi-experimental with a pretest, post-test, and control group design. The population consisted of all elementary school boys in Aran and Bidgol schools, from whom 30 (Age: 10.2± 0.2) were selected according to the inclusion criteria using a convenient sampling method; and they were, then, randomly divided into two experimental and control groups (15 individuals each). The inclusion criteria were interest, volunteering, and non-participation in regular sports programs.

2-2. Instruments

2-2-1. Physical fitness tests: 1) 10 x 5 meter running test was used to measure the components of physical fitness-agility, 2) long jump test to measure explosive power, 3) sitting and reaching test to measure flexibility, and 4) 20 meters running test to measure speed (27). The measurement scale for tests 1 and 4 was time in seconds, and for tests 2 and 3, it was centimeters. In tests 1 and 4, less time means better performance; in tests 2 and 3, more distance means a better record. The validity and reliability of these tests have been confirmed in previous studies (27, 28).

2-2-2. Perceived physical fitness scale: This scale has 12 questions that can measure 4 main areas of physical fitness, including physical condition with 6 questions (questions 1, 3, 4, 8, 9, 12), muscle flexibility with 2 questions (questions 6, 10), the muscle conditions with 2 questions (questions 5 and 11); and

questions 2 and 7 were associated with the body composition subscale. The scale is scored in a 5-point Likert scale. The validity of this questionnaire is confirmed by experts. And examining its internal consistency showed a Cronbach's alpha coefficient of 0.84 for the whole questionnaire, 0.86 for the physical condition subscale, 0.88 for flexibility, 0.82 for the muscle condition, and 0.8 for the body composition subscale. Additionally, the temporal reliability of the whole questionnaire is 0.8, the physical condition subscale 0.84, the flexibility subscale 0.8, the muscle condition 0.78, and the body composition 0.78, which shows the tool's good reliability (29).

2-3. Intervention

In the implementation phase of the study, coordinations were first carried out to introduce the researcher to Aran and Bidgol elementary schools. All the people participating in the study completed the initial questionnaire, including information about age, gender, and education garde. After identifying the participants in the study, necessary explanations were given about the implementation method and benefits of participating in the project, and written consent was obtained from the parents of the students. Then a specific time was determined for the implementation of the tests and participation in the intervention program according to the arrangements made. The data collection process was such that both groups were first pretested for physical fitness components, and were asked to complete the perceived fitness questionnaire. The participants were randomly divided into two experimental and control groups (15 individuals each). This was done using the random assignment rule. The experimental group practiced Local Indigenous games for eight weeks, three sessions a week, and 45 min per session. During this time, the control group only engaged in their routine daily activities. The games were dodgeball, seven stones, and stop freeze, hide and seek, cover pull, go game, tic-tac-toe, stick game, and sia game. The games were taught by a physical education expert familiar with local indigenous games. After finishing the training sessions, a post-test was conducted on the variables.

2-4. Ethical Considerations

For ethical considerations, the researchers received written consent from the participants' parents for participation in the research. In addition, the participants were assured that they could withdraw from the study whenever they wished to, and all information would be kept confidential.

2-5. Data Analysis

Smirnov Kolmogorov test was used in the data analysis to examine the normality of data distribution and covariance analysis tests to compare the groups. The analyses were carried out at the 95% confidence level in SPSS 22. In all analyses, the significance level was $p < 0.05$.

3- RESULTS

Table 1 indicates the descriptive statistics of the variables and a summary of the covariance analysis results for analyzing the effect of the independent variable on the dependent variables. The assumptions of using covariance analysis (normality of data distribution, homogeneity of variances, linearity of dependent variable relationship, homogeneity of variance, and homogeneity of regression slopes) were examined to perform inter-group comparisons. The results of the Shapiro-Wilk test showed that the distribution of data associated with perceived readiness, speed, agility, flexibility, and explosive power has a normal distribution. The results of Levin's test indicated that the data associated with the perceived readiness, speed, agility, flexibility, and explosive power between the two groups

in the pretest and post-test are homogeneous in their variances. Furthermore, plotting the distribution diagrams of the covariance variables of the dependent variable for each group showed that the relationship between the covariance and dependent variables is linear. To examine the homogeneity of the regression slopes, the lack of significant interaction between the independent variable (group) and the covariate variable (pretest levels) was analyzed using a two-way analysis of variance. The results revealed that the interactive effect of the group and the covariate variable on perceived readiness, agility, speed, flexibility, and explosive power are statistically insignificant. Given the establishment of the assumptions, four series of covariance analyses were used for inter-group comparisons. The group variable (experimental/control) was the independent variable, with perceived readiness levels, speed, agility, flexibility, and explosive power as dependent variables and pretest values. The variables were considered control variables (co-variance). The findings of these analyses are given in **Table 1**.

Table-1: Descriptive indices of speed, agility, flexibility, and explosive power in the pretest and post-test stages, for the experimental (n=15) and control (n=15) groups

Variables		Agility (s)	Speed (s)	Flexibility (cm)	Explosive power (cm)	Perceived fitness
Experimental group (n=15)	Pretest	16.44	7.48	12.14	114.54	35.06
	Post-test	14.33	6.38	13.64	119.53	39.4
Control group (n=15)	Pretest	16.31	7.53	12.02	114.93	34.68
	Post-test	16.21	7.07	12.84	115.08	35.14
F		7.823	4.983	4.383	9.944	0.07
P		0.001*	0.034*	0.046*	0.001*	0.001*
$^{2}\eta$		0.225	0.156	0.14	0.269	0.282

η^2: Squared Eta, $P<0.05^*$

The results concerning the perceived readiness indicated that after controlling for the effect of the pretest, the effect of the group on perceived readiness is statistically significant ($P<0.001$, $F_{1.27}=0.07$), meaning that the perceived readiness between the two experimental and control groups in the post-test was significantly different. It was also shown that after controlling the effect of the pretest, the effect of the group on agility is statistically significant ($P<0.001$, $F_{1,27}=7.823$), meaning that the agility between the experimental and control groups in the post-test is significantly different. Additionally, the study results on speed indicated that after controlling the pretest effect, the effect of the group on speed is statistically significant ($P<0.05$, $F_{1.27}=4.983$), meaning that in the post-test, the experimental and control groups were significantly different in speed. Moreover, the flexibility results indicated that after controlling the effect of the pretest, the effect of the group on flexibility is statistically significant ($P<0.05$, $F_{1.27}=4.383$), meaning that in the post-test, the experimental and control groups were significantly different in flexibility. The results of explosive power indicated that after controlling the effect of the pretest, the effect of the group on the explosive power is statistically significant ($P<0.001$, $F_{1.27}=944$), meaning that in the post-test, the experimental and control groups were significantly different in the explosive

power. According to the mean values of the groups in the post-test (**Table 1**), one can conclude that the speed, agility, flexibility, and explosive power scores in the experimental group are significantly higher than those in the control group. In other words, Local Indigenous games have significantly affected children's speed, agility, flexibility, and explosive power. Furthermore, the Eta square shows that 22.5% of the increase in agility, 15.6% in speed, 14% in flexibility, 26.9% in explosive power, and 28.2% in perceived readiness in children are affected by Local Indigenous games.

4- DISCUSSION

The study aimed to examine the effect of Local Indigenous games on the PFFs and perceived fitness of 7–11-year-old boys. Based on the results, eight weeks of Local Indigenous games significantly affected boys' PFFs, including agility, speed, flexibility, and explosive power. Among these factors, the most significant effect was associated with explosive power and the least with flexibility. These show that Local Indigenous games positively affect different factors of children's physical fitness. Consistent with the findings of this study, different studies using various types of physical activities have supported the effectiveness of training courses in increasing PFFs, including the effects of volleyball training (30), virtual reality training (31), rope and elastic exercises (32), game-based physical education exercises (33) and purposeful virtual fun movement games (34).

The improvement of physical fitness components due to Local Indigenous games in the intervention group, compared to the control group that did their usual activities, can be attributed to more training opportunities. The three factors of facilities, equipment, and time have a key and decisive role in the training opportunity. Indeed, training opportunities are limited by the lack of proper facilities and equipment. For instance, tools and equipment for sports participation are expensive, and many parents may not provide them. Additionally, in many regions, there may not be enough specialized space for children to do physical activities. The time factor has a decisive role in training opportunities as well. Children's time is usually spent going to school, playing computer games, and watching TV, and they do not have enough time to engage in specialized physical activities. These three factors exist in the essence of Local Indigenous games such that such games do not need special facilities, do not take much time from children, and can be implemented in tiny spaces.

The results indicated that engagement in Local Indigenous games brought about a significant improvement in the agility of boys. In explaining this, one can state that agility is critical in successfully implementing traditional games. While playing these games, the participants try to complete the game by changing their body position; for instance, in dodgeball, they must change the direction so that the ball does not hit the player. This is in line with the findings of previous researchers who reported that agility could be affected by factors like strength, speed, balance, and coordination (35). In other words, training or exercises can enhance agility by adding strength, speed, balance, and coordination (35).

Consistent with our results, other studies have also indicated the significant effect of the intervention programs in traditional games on the improvement of speed, acceleration, or distance from the opposite side (35). Speed is essential in games like seven stones, dodgeball, and tic-tac toe. It seems that the speed component of the participants has improved as a result of practicing these games. During speed training, the body experiences a physiological response. It is a transient or

acute effect on the neuromuscular system that can increase agility. The findings of another study state that with regular speed training, the lower body muscles undergo hypertrophy, which is caused by an increase in the number of myofibrils in the muscle fibers, an increase in the capillary density in the muscle fibers, and an increase in the number of muscle fibers. Nevertheless, only white or fast-twitch muscle fibers increase, reducing muscle reaction time and thus increasing agility (36).

Local Indigenous games had a significant effect on explosive power and flexibility. This is consistent with the results of the previous studies demonstrating that local iIndigenous games are influential in the development of mobility skills (37, 38). For instance, Akbari et al. (38) indicated that twenty-four sessions of Local Indigenous games significantly improved children's movement skills. Baghande et al. (37) indicated that thirty-two weeks of Local Indigenous games significantly affects the development of children's gross skills. The study demonstrated that the intervention program of traditional games could effectively enhance the performance of physical fitness, agility, speed, flexibility, and explosive power.

In line with previous studies, such as those by Pesce et al. (39) and Barnett et al. (40), our findings indicated that Local Indigenous games significantly affected perceived fitness. Pesce et al. (39) indicated that perceived motor competence is higher in participants who have a higher level of physical activity because these people gain more ability in physical activities after doing more exercises;due to which their self-confidence increases, and sports will be more enjoyable for them. Motor competence has a direct relationship with the amount of physical activity of children, so playing games and physical activity increases children's motivation to continue and increases their sports participation and self-confidence, which enhances the perception of perceived readiness accordingly (40). The significant effect of Local Indigenous games on perceived readiness provides evidence to confirm the theory of competence perception. Based on this theory, a person's understanding of the feeling of control over the implementation of motor skills motivates him to feel valuable or competent, and affects his self-esteem, evaluation of competence, and motivation. For instance, having a high sense of self-movement increases efforts to learn, and to feel pleasure, pride, and happiness; and these positive states will result in increased fitness and motivation (41). Moreover, through creating intervention programs for traditional native games, this tradition will be revived for the new generation.

4-1. Limitations of the study

The current study has had some limitations. Because of the implementation problems, the available sampling method was used. For future studies, it is recommended to use the cluster random sampling method and examine the effect of this type of game on other variables, such as physiological, physical, and psychological characteristics of children.

5- Conclusion

Coaches and physical education teachers are advised to use these traditional games and this intervention program to increase children's physical fitness. These findings point to the role and importance of traditional games in improving PFFs and the perceived fitness of boys aged 7-11 years.

6- CONFLICT OF INTEREST

None

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