International Journal of Computer Information Systems and Industrial Management Applications
ISSN 2150-7988 Volume 18 (2026) pp. 1-10

https://doi.org/10.70917/ijcisim-2026-0126
Article

Research on the Influence Mechanism of Naadam Culture on the Physical and Mental Health Development of Adolescents in the Ethnic Areas of the Northern Frontier

Wurigenmuren [1,2], Shaoying Liu [3,*], Baigalmaa Chultem [4] and Battsetseg Gonchoo [5]

[1] Department of Physical Education, Hohhot Minzu College, Hohhot, Inner Mongolia, 010051, China
[2] Department of Education Studies, Mongolian National University of Education, 210648 Ulan Bator, Mongolian
[3] College of Physical Education, Zhangjiajie University, Zhangjiajie, Hunan, 427000, China
[4] Department of Education Studies, Mongolian National University of Education, Ulan Bator, 210648, Mongolian
[5] Head of Curriculum office School of Physical Education, Mongolian National University of Education 210648 Ulan Bator Mongolian
* Correspondence author: muren6869045@163.com

Abstract: Nadam culture is an important component of the overall cultural system of the ethnic regions in Northern Xinjiang, boasting a rich traditional heritage and profound cultural significance. This study focuses on the impact of Nadam culture on the physical and mental health development of adolescents, employing research methods such as experimental design, questionnaire surveys, and mathematical statistics to conduct educational experiments on students at a certain school. Before and after the experiment, the physical health indicators and psychological health factors of the two groups of students were measured and analyzed. The results showed that the experimental group exhibited significant differences in all physical health indicators ($p < 0.05$), with the most notable improvements observed in the three indicators of pull-ups, sit-and-reach, and sit-ups, with growth rates of 45.24%, 42.34%, and 22.64%, respectively. The total mental health score of the experimental group decreased by 4.49%, which was higher than the 1.03% decrease in the control group. All factors showed significant differences at the 5% level, and the reduction rate was 1.94% to 5.74% higher than that of the control group. Nadam culture had the most significant improvement on other factors, hostility, and interpersonal relationships among adolescents. The above results indicate that Nadam culture has a positive effect on the physical and mental health development of adolescents.

Keywords: experimental method; mathematical statistics method; Nadam culture; mental and physical health of adolescents

1. Introduction

Health is an eternal theme for humanity and a source of happiness and security for the general public [1]. Adolescents are an important foundation of the nation and determine the future direction of a country's development. For a long time, the health issues of Chinese adolescents have been widely discussed [2-3]. The sudden outbreak of the pandemic in 2020 caused severe losses across all industries. School physical education courses were forced to pause due to the pandemic, which was extremely detrimental to the physical and mental development of adolescents[4]. In 2021, the eighth national survey on student physical health found that compared to 2014, the rate of adolescents aged 13 to 22 meeting or exceeding physical health standards had increased to varying degrees, and their physical fitness had also improved. However, there remains significant imbalance in the physical health status of students across different age groups, and the issue of adolescent physical health remains severe[5].

With economic development and improved living standards, sports have become our preferred form

of leisure and entertainment [6]. As people's material needs are met, their spiritual needs have gradually increased, leading to growing academic attention on spiritual well-being. The influence of traditional ethnic sports culture on adolescents' physical and mental health has emerged as a new trend [7-9]. Adolescents are the future of the nation; enhancing their physical fitness and promoting their healthy development are matters of great importance to the future of the country and the nation [10]. The physical and mental health of adolescents is a hallmark of societal progress. Their physical fitness not only affects their personal growth and quality of life but also the overall health of the nation and the quality of talent cultivation in China. Research into the physical and mental health of adolescents is therefore imperative [11-12].

The Naadam culture in the northern ethnic regions is a traditional Mongolian sports competition activity. On June 5, 2009, it was included in the second batch of provincial-level intangible cultural heritage lists in Jilin Province. The activity centers on three traditional sports: horse racing, wrestling, and archery, and is categorized under acrobatics and competitions [13-15]. Currently, research on the impact of traditional Naadam sports culture on the physical and mental health of adolescents from this perspective remains unexplored, but the conditions for such research are now ripe. The findings of many scholars have laid the groundwork for this research. For example, Becheva et al. found that sports activities have a positive impact on the physical and mental health of adolescents and are an important factor in maintaining and promoting health. Traditional sports culture aims to ensure harmonious coexistence among people, and promote adolescents' growth and physical development [16]. Min and Yao explored the impact of sports activities on adolescents' mental health, finding that such activities effectively reduce anxiety and enhance psychological capital [17]. Nasrulloh et al. confirmed through a systematic review that traditional sports activities can improve adolescents' physical and mental health by enhancing physical fitness, reducing stress, increasing well-being, and strengthening social relationships [18]. Congsheng et al. found that physical activity significantly predicts mental health among college students, explaining 35.8% of the variance, and recommended promoting such activities to improve adolescents' mental health [19]. Akbar et al. explored the impact of traditional physical activities on the physical and mental health of adolescents in North America and Oceania, emphasizing their benefits in emotional, psychological, and spiritual aspects, and stressing the importance of incorporating these activities into training programs [20]. Sun et al. found that traditional martial arts physical activities can alleviate various pressures faced by adolescents, including academic stress, emotional stress, economic stress, and employment stress. These activities not only enhance college students' physical fitness but also promote their overall physical and mental health development [21]. From the above scholars' research, it is evident that the promotional effects of traditional physical activities on adolescents' physical and mental health have been widely recognized by scholars, and these research findings lay the foundation for studies in this perspective.

This paper explores the cultural value of the Naadam Festival in the ethnic regions of Northern Xinjiang, focusing on its fitness and recreational functions, and investigates its impact on the physical and mental health of adolescents. A total of 100 second-year middle school students from a certain school were selected as experimental subjects, divided into an experimental group and a control group, and subjected to a 16-week experiment. Nine indicators, including sit-ups, lung capacity, and pull-ups, were selected as measures of adolescents' physical fitness, while the SCL-90 Symptom Self-Rating Scale was used as a tool for assessing adolescents' mental health. Data were collected through questionnaire surveys. Before and after the experiment, independent samples t-tests were conducted on the physical fitness and mental health indicator data of both groups. The mathematical statistical results of each indicator were analyzed, and the increases and decreases were compared to test the impact of the Naadam culture on adolescents' physical fitness and mental health. Finally, based on the experimental analysis, the promotional mechanisms of the Naadam culture on the physical and mental health development of adolescents were discussed and summarized.

2. The Naadam Festival in the Northern Frontier Ethnic Region and Its Cultural Value

Naadam, which means “games,” “entertainment,” and “amusement” in Mongolian, is a major traditional festival in the northern ethnic regions. The Naadam activities in the northern ethnic regions feature a rich array of celebratory rituals, competitive events, sacrificial prayers, cultural performances and appreciation, material exchanges, emotional communication, and festive gatherings. The most enduring and significant activities are the “Three Manly Arts” competitions of wrestling, archery, and horse racing, as well as song and dance performances.

2.1. Promoting ethnic cultural identity

The Naadam culture, in its formative process, has absorbed various elements from the nomadic culture of the northern frontier ethnic groups, including their geographical environment, lifestyle, values, ethnic beliefs, moral ethics, traditional customs, and ethnic traditions. The annual Naadam festival serves as a reaffirmation and validation of the nomadic culture of the grasslands. Currently, the Naadam festival has gradually become a crucial component of the daily lives of the northern frontier ethnic groups, serving as the primary ideological reliance for nomadic people and a natural bond ensuring harmonious coexistence within tribal communities. In a certain sense, the environment of ethnic life is closely intertwined with the cultural groups and characteristics of ethnic cultures. The formation of cultural phenomena is fundamentally tied to the lifestyle patterns and survival atmosphere of ethnic groups. The unique material foundation of the Naadam culture is a key factor in the formation of Mongolian culture, representing the overall manifestation of nomadic culture at a specific stage of its development.

2.2. Preserving the Living Art of the Mongolian People

The activities of the Naadam Festival encompass a wide range of traditional events, including Mongolian chess, horseback archery, sand wrestling, horse racing, camel racing, archery, horse racing, and wrestling. These time-honored, time-tested traditional events possess strong artistic qualities, fully showcasing the artistic value of the Mongolian Naadam Festival, which serves as a fusion of traditional sports and traditional art. This illustrates the characteristic of living cultural heritage in Nadam culture. It not only enriches the cultural life of the northern frontier ethnic groups but also provides a cultural knowledge system for the growth and development of more people in the northern frontier regions.

2.3. Meeting the psychological needs of farmers and herders

The Naadam Festival is not merely an experiential activity but also a spectator event, effectively addressing the distinct needs of both tourists and herders. Mongolians are warm-hearted, open-minded, and often join tourists in participating in the Naadam Festival. Some visitors may also enter the arena out of enthusiasm to compete with wrestlers, earning applause from the audience and creating a lively atmosphere. The Mongolian Naadam Festival has endured to this day precisely because it embodies the open-mindedness of a nomadic people.

2.4. Showcasing traditional nomadic folk culture

The Naadam Festival in the northern ethnic regions of China seamlessly integrates grassland agricultural and pastoral culture with sports events, serving as a highly valuable “living fossil” within Mongolian sports culture. The Mongolian ethnic group originated on the northern grasslands of China, with a long and legendary history. Over the course of its development, it has cultivated a distinctive nomadic folk culture. The Naadam Festival encompasses multiple aspects of nomadic culture, including nomadic economy, transportation culture, music and dance art, culinary culture, architectural culture, clothing culture, sports culture, and ethnic religious beliefs. It embodies the unique ethnic psychology and lifestyle characteristics of Mongolian nomadic culture.

2.5. Realizing fitness and entertainment functions

Every event at the Naadam Festival is closely tied to the daily lives of herders, embodying a leisurely and entertaining spirit that has earned it the favor of grassland herders. From a physical fitness perspective, the primary functions of the Naadam Festival include enhancing physical resilience and coordination, improving flexibility in the hips, knees, and ankles, and strengthening the core and limbs. From the perspective of sports science, the Naadam Festival offers significant benefits for both physical and mental well-being. From a student perspective, events like archery and wrestling serve as a valuable supplement to physical education curricula, not only improving students' physical fitness but also enriching their understanding of traditional ethnic knowledge. Higher education institutions in the autonomous region place great importance on the traditional festival of Naadam. They utilize these competitive and performance activities to engage more people, thereby enriching their spiritual lives. In large-scale performance events, Mongolian-style projects are always prepared, and wrestling is spiritually performed to the accompaniment of Mongolian songs, enabling people to experience harmony and unity while appreciating the performers' exceptional skills.

3. Research subjects and methods

3.1. Research Approach

This study conducted a 16-week, 36-hour Naadam cultural intervention experiment and used paired sample t-tests and independent sample t-tests to explore the impact of Naadam culture on the physical and mental health of adolescents. The aim was to improve the physical fitness of adolescents, help them relieve academic stress, enrich their leisure activities, explore the introduction of Naadam culture into schools, and contribute to the inheritance of Naadam culture.

3.2. Research subjects

Experimental group:

Changes in indicators such as 800m run, 1000m run, lung capacity, and sit-and-reach test results, as well as changes in factors of the SCL-90 symptom self-assessment questionnaire, were measured before and after Nadam cultural learning among 50 adolescents aged 13–15 years old in the second year of junior high school at a certain school. Nadam cultural learning primarily included cultural knowledge as well as learning wrestling, archery, and horse racing.

Control Group:

Changes in indicators such as 800m run, 1000m run, lung capacity, and sit-and-reach test results, as well as changes in factors of the SCL-90 Symptom Self-Rating Scale, were measured before and after normal physical activities among 50 adolescents aged 13–15 years in the second year of junior high school at a certain school.

3.3. Research Methods

3.3.1. Mathematical Statistics Method

After collecting the experimental data, SPSS 25.0 and Excel 2014 were used to process, statistically analyze, and interpret the data. This study will perform independent samples t-tests and paired samples t-tests on the average changes in physical fitness and psychological assessment scores before and after the experiment. The experimental data results will be expressed in the form of mean ± standard deviation ($X \pm SD$), t-values, and p-values for intuitive analysis and discussion (with $p < 0.05$ as the reference value; $p < 0.05$ indicates a significant difference, and $p > 0.05$ indicates no significant difference).

3.3.2. Questionnaire Survey Method

By distributing and collecting the SCL-90 symptom assessment scale to the experimental group and control group on-site, processing the data, and then analyzing it using SPSS, the changes before and after the test were obtained, serving as the basis for the mental health assessment. The self-assessment questionnaires for the pre- and post-experiment psychological tests were distributed on-site, filled out by the students, and collected immediately afterward. A total of 200 questionnaires were distributed, with 200 returned, resulting in a 100% response rate.

3.3.3. Experimental Method

The study employed a stratified random sampling method to select two groups of students for the experiment. Through physical fitness measurement indicators and mental health assessment indicators, the impact of the Naadam culture on the physical and mental health development of adolescents was analyzed.

The physical health measurement indicators included a 50-meter dash, 4×10 shuttle run, standing long jump, sit-and-reach, 1-minute sit-ups, lung capacity, pull-ups, 1000-meter run, and 800-meter run. The mental health assessment indicators were based on the SCL-90 Symptom Self-Rating Scale, which includes 10 symptom factors: somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobia, paranoia, psychosis, and other factors. If the score for a particular factor is high after the test, it indicates a severe mental health issue in that area; conversely, a lower score indicates a milder issue. The SCL-90 total symptom index is the average score of the 10 factors, reflecting the overall level of mental health. A higher total symptom index score indicates a lower overall level of mental health, while a lower score indicates a higher overall level of mental health.

4. Research Results and Analysis

4.1. Analysis of Physical Health Before and After the Experiment

4.1.1. Physical Fitness Scores of the Experimental Group

The Nadam cultural education program for the experimental group class focused on Nadam cultural

knowledge, wrestling, archery, and horse racing. After 16 weeks of training, two physical tests were conducted on the students before and after the experiment, and the data was statistically summarized. The comparison of the test results before and after the experiment for the experimental group is shown in Table 1.

The difference in lung capacity between the pre- and post-experiment measurements was 154.2 milliliters, representing an increase of 4.37%. The p-value for lung capacity was p=0.027 < 0.05, indicating a significant difference. For sit-and-reach, 10-meter shuttle run, and pull-ups, $p \leq 0.01$, indicating that training related to the Naadam culture significantly improved sit-and-reach, 10-meter shuttle run, and pull-ups. For the other indicators—50-meter run, sit-ups, and standing long jump—P values ranged from 0.01 to 0.05, indicating significant improvements between pre- and post-experiment. However, for the 1000-meter and 800-meter indicators, p values were greater than 0.05, indicating no significant effects. This suggests that training related to the Nadam culture does not have a significant impact on improving endurance fitness.

The fastest-growing test indicator was pull-ups, with a growth rate of 45.24%, followed by sit-and-reach with a growth rate of 42.34%, and sit-ups with a growth rate of 22.64%. This indicates that after undergoing training related to the Naadam culture, students showed the greatest improvement in strength and flexibility.

Table 1. Comparative analysis of the results of the experimental group.

Test index	Before		After		Growth rate	T value	p value
	Mean	SD	Mean	SD			
Lung capacity	3530.17	1028.54	3684.37	1081.85	4.37%	1.954	0.027
50m run	8.61	1.59	8.53	1.07	0.93%	4.741	0.042
Preflexion	10.32	10.07	14.69	8.37	42.34%	15.193	0.008
Sit-ups	27.12	8.35	33.26	6.05	22.64%	4.223	0.024
Ten meters back	11.39	1.23	10.88	1.18	4.48%	1.625	0.008
Lead up	4.73	2.31	6.87	2.57	45.24%	2.827	0.001
1000m	274.09	30.95	272.41	29.38	0.61%	3.819	0.247
800m	252.85	20.86	252.15	18.78	0.28%	3.552	0.136
Fixed jump	198.98	31.13	202.82	30.68	1.93%	-2.014	0.015

4.1.2. Physical Fitness Scores of the Control Group

The comparative analysis of the test scores before and after the experiment for the control group is shown in Table 2. In the 50-meter dash, the difference between the pre- and post-experiment scores was 0.09 seconds, representing an improvement of 1.08%. However, the p-value was 0.293 > 0.05, indicating no significant difference. The sit-and-reach test showed an increase of 0.33 cm after the experiment, representing a 3.15% increase, with p = 0.071 > 0.05, indicating no significant difference. The sit-ups test showed an increase of 0.72 repetitions after the experiment, representing a 2.88% increase, with P = 0.344 > 0.05, indicating no significant improvement in the sit-ups test between the pre- and post-experiment periods in the control group. In the 10-meter shuttle run, the difference between pre- and post-experiment was 0.49 seconds, an increase of 4.24%, p = 0.041<0.05, indicating a significant improvement. Upper limb strength (pull-ups) and lower limb strength (standing long jump) increased by 0.16 and 1.54 cm, respectively, before and after the experiment, with p > 0.05, indicating no significant difference. The 1000-meter run for males and the 800-meter run for females improved by 2.46 seconds and 0.24 seconds, respectively, after the experiment, representing increases of 0.90% and 0.10%, respectively. However, the P-values for males and females in the 1000-meter and 800-meter runs before and after the experiment were both >0.05, indicating no significant differences.

After 16 weeks of regular physical education classes, the control group showed clear improvements in all physical fitness test indicators, though the extent of improvement varied, with some indicators showing higher increases and others lower. Among these, the lung capacity and 10-meter shuttle run indicators showed the largest increases, at 6.11% and 4.24%, respectively.

Table 2. Comparative analysis of the results of the control group.

Test index	Before		After		Growth rate	T value	*p* value
	Mean	SD	Mean	SD			
Lung capacity	3740.69	1125.53	3969.22	824.06	6.11%	3.053	0.032
50m run	8.33	1.69	8.24	1.25	1.08%	2.051	0.293
Preflexion	10.48	6.27	10.81	6.01	3.15%	-1.235	0.071
Sit-ups	25.04	5.79	25.76	5.27	2.88%	-0.713	0.344
Ten meters back	11.57	1.47	11.08	1.75	4.24%	-3.759	0.041
Lead up	4.15	1.27	4.31	1.12	3.86%	-0.249	0.492
1000m	273.22	29.67	270.76	28.55	0.90%	3.856	0.308
800m	250.19	18.74	249.95	15.45	0.10%	2.508	0.357
Fixed jump	197.62	29.51	196.08	28.74	0.78%	-0.844	0.221

4.1.3. Comparison of Growth Rates for Each Indicator

The growth rates of various indicators between the two groups before and after the experiment are compared as shown in Figure 1. The growth rates of the two groups differed across various physical indicators, with the experimental group generally exhibiting higher growth rates than the corresponding growth rates of the control group. This was particularly evident in tests such as pull-ups, sit-and-reach, and sit-ups, where the growth rates were 41.38%, 39.19%, and 19.76%, respectively. This also indirectly indicates that the experimental group achieved significant improvements in upper body strength, abdominal strength, and flexibility. The control group showed smaller growth rates, but outperformed the experimental group in lung capacity, 50-meter dash, and 800-meter run.

In summary, training related to the Naadam culture is beneficial for promoting the functional development of adolescents' internal organs and various systems, enhancing their adaptability to environmental changes and rapid response to emergencies, and strengthening their joint attack capabilities and overall resistance to impact.

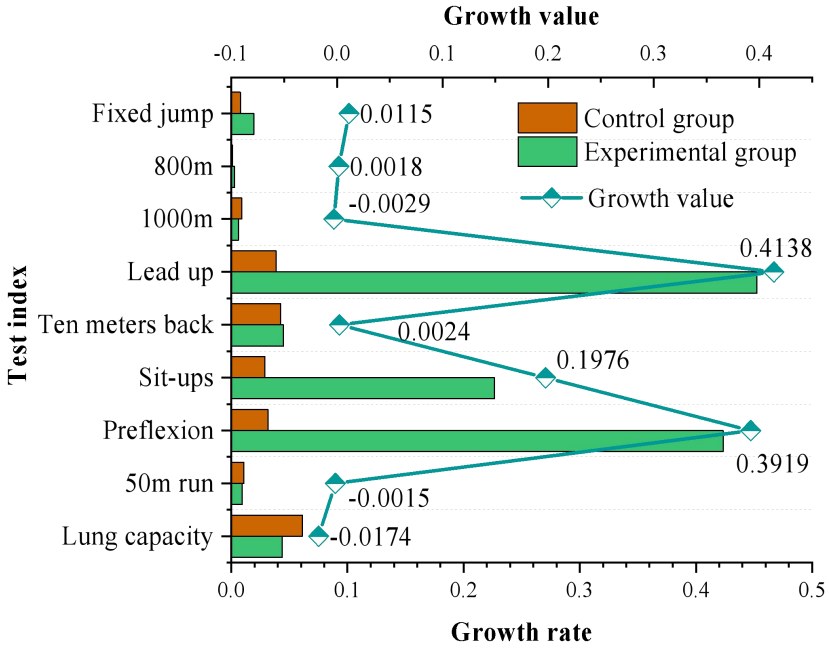

Figure 1. Comparison of the growth rate of the two groups before and after the experiment.

4.2. Analysis of Mental Health Before and After the Experiment

A paired samples t-test was conducted on the mental health test results of the experimental group and the control group before and after the experiment in order to analyze the differences between the two groups before and after the experiment.

4.2.1. Mental Health Analysis of the Experimental Group

The psychological health analysis of the 50 adolescents in the experimental group before and after the experiment is shown in Table 3. After 16 weeks of training related to Nadam culture, there was a significant difference in the overall psychological health level of the adolescents in the experimental group ($p < 0.05$), with a 4.49% decrease in the overall psychological health score. All factor indicators decreased, with a 4.84% decrease in the somatization factor, a 3.77% decrease in the obsessive-compulsive factor, the depression factor decreased by 4.58%, the hostility factor decreased by 5.76%, the interpersonal relationships factor decreased by 5.03%, the paranoia factor decreased by 3.82%, the anxiety factor decreased by 2.70%, the phobia factor decreased by 4.51%, the psychosis factor decreased by 3.85%, and the other factors decreased by 6.61%. The training related to the Naadam culture showed significant differences in all 10 psychological test indicators ($p < 0.05$), with the other factor, hostility, and interpersonal relationships showing the most significant decreases. This indicates that Naadam culture can effectively improve adolescents' mental health levels and promote their mental well-being, particularly in addressing psychological issues related to hostility and interpersonal relationships.

Table 3. Psychological health analysis before and after experiment of the experimental group.

Test index	Before		After		Reduction rate	T value	*p* value
	Mean	SD	Mean	SD			
Somatization	1.24	0.22	1.18	0.17	-4.84%	7.384	0.005
Compulsion	1.59	0.17	1.53	0.15	-3.77%	3.948	0.006
Depression	1.53	0.23	1.46	0.18	-4.58%	6.022	0.003
Antagonism	1.39	0.15	1.31	0.11	-5.76%	5.046	0.002
Interpersonal relation	1.59	0.21	1.51	0.18	-5.03%	8.427	0.004
Paranoia	1.57	0.20	1.51	0.17	-3.82%	9.195	0.007
Anxiety	1.48	0.09	1.44	0.07	-2.70%	7.892	0.001
Horror	1.33	0.22	1.27	0.15	-4.51%	5.129	0.003
Psychosis	1.56	0.19	1.50	0.14	-3.85%	3.368	0.005
Other factors	1.21	0.21	1.13	0.16	-6.61%	4.241	0.003
Total score	1.45	0.17	1.38	0.14	-4.49%	9.982	0.001

4.2.2. Mental Health Analysis of the Control Group

The analysis of mental health before and after the experiment for the 50 adolescents in the control group is shown in Table 4. There was a significant difference in the overall level of mental health among the adolescents in the control group after 16 weeks of physical education classes ($p < 0.05$). After the intervention, the somatization factor decreased by 0.81% ($T = 3.055$, $p < 0.05$), the obsessive-compulsive factor decreased by 0.62% ($T = 1.312$, $p > 0.05$), and the depression factor decreased by 1.31% ($T = 2.039$, $p < 0.05$). hostility decreased by 0.72% ($T = 3.511$, $p > 0.05$), interpersonal relationships decreased by 1.18% ($T = 3.532$, $p > 0.05$), paranoia decreased by 1.88% ($T = 1.271$, $p > 0.05$), anxiety factor decreased by 0.68% ($T = 2.017$, $p > 0.05$), terror factor decreased by 1.50% ($T = 2.932$, $p < 0.05$), psychosis factor decreased by 0.63% ($T = 1.075$, $p > 0.05$), and the other factor decreased by 0.87% ($T = -0.867$, $p > 0.05$). Physical education exercises had a significant effect on the somatization, depression, and phobia factors among adolescents, but no significant effect on the other seven factors ($p > 0.05$). This indicates that physical education exercises have a significant impact on improving adolescents' mental health, but only in terms of somatization, depression, and phobia-related aspects of mental and physical health.

Table 4. Psychological health analysis before and after experiment of the control group.

Test index	Before		After		Reduction rate	T value	P value
	Mean	SD	Mean	SD			
Somatization	1.23	0.22	1.22	0.20	-0.81%	3.055	0.039
Compulsion	1.62	0.19	1.61	0.14	-0.62%	1.312	0.101
Depression	1.53	0.17	1.51	0.13	-1.31%	2.039	0.022
Antagonism	1.39	0.17	1.38	0.15	-0.72%	3.511	0.463
Interpersonal relation	1.69	0.16	1.67	0.13	-1.18%	3.532	0.152
Paranoia	1.60	0.18	1.57	0.15	-1.88%	1.271	0.238

Anxiety	1.46	0.12	1.45	0.11	-0.68%	2.017	0.079
Horror	1.33	0.19	1.31	0.16	-1.50%	2.932	0.021
Psychosis	1.58	0.17	1.57	0.14	-0.63%	1.075	0.424
Other factors	1.15	0.22	1.14	0.21	-0.87%	-0.867	0.347
Total score	1.46	0.19	1.44	0.16	-1.03%	1.528	0.032

4.2.3. Comparison of Reduction Rates for Each Indicator

The reduction rates in mental health indicators for the two groups of students are compared as shown in Figure 2. The reduction rates for all mental health indicators were higher in the experimental group than in the control group, with a difference of 1.94% to 5.74%. This difference was particularly pronounced in the factors of other factors, hostility, and somatization, with reduction rate differences of 5.74%, 5.04%, and 4.03%, respectively. This indicates that the Naadam culture has a promotional effect on the mental health development of adolescents, with the most significant improvements observed in hostility and somatization.

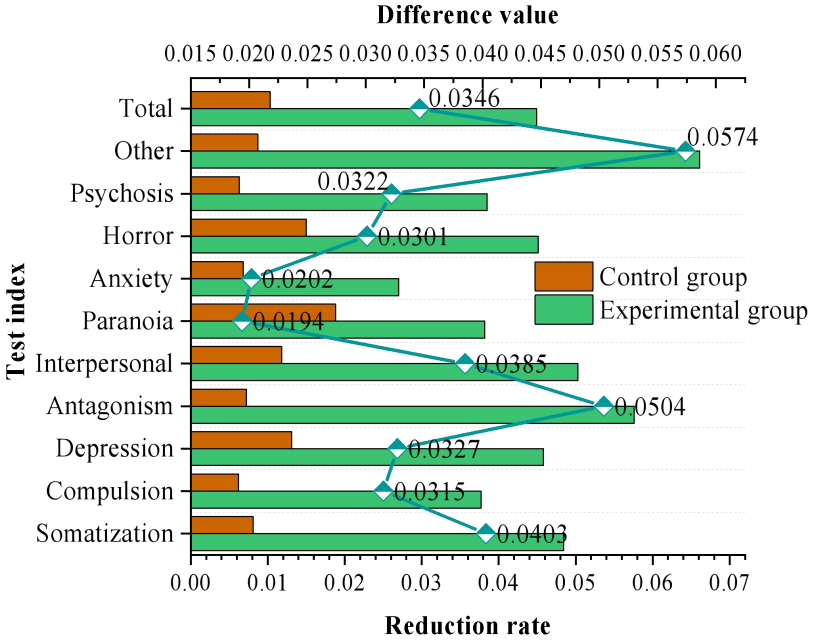

Figure 2. The comparison between the two groups of students' mental health index decreased.

4.3. The Mechanism of Nadam Culture in Promoting Physical and Mental Health

From the analysis of the physical and mental health of adolescents before and after the experiments, it can be concluded that the Naadam culture can promote the healthy development of adolescents' physical and mental well-being. The reasons are as follows:

In terms of physical health: (1) Physical exercises related to the Naadam culture have a positive effect on promoting bone and muscle growth, increasing bone density, and improving blood circulation. These exercises can enhance adolescents' physical adaptability and immune system by improving their cardiovascular function and metabolism. (2) Sports activities related to the Naadam culture help improve the human nervous system, enhance sensitivity and rapid response capabilities, and facilitate the conversion between excitation and inhibition in the cerebral cortex central nervous system. (3) After participating in sports activities related to the Naadam culture, adolescents have more stable physical adaptability, improved cardiopulmonary function, enhanced immunity, and disease prevention.

In terms of mental health: (1) Alleviate psychological stress and enhance self-confidence. Cultivates good willpower and a positive, proactive attitude toward life. (2) Promotes teamwork and fosters a spirit of perseverance. Through Nadam culture-related sports, adolescents can develop a sense of teamwork, a spirit of perseverance, and a sense of national identity. (3) Enhances self-discipline, self-reliance, and perseverance. Nadam sports training requires constant motivation and encouragement, teaching adolescents how to set goals, make plans, and stick to them.

5. Conclusion

The Naadam Festival in the northern ethnic regions has a long history, rich content, and strong ethnic characteristics, and it also holds cultural value in terms of physical fitness and entertainment. This study took students from a certain school as the research subjects, set up a teaching experiment, and compared the results of physical fitness tests and mental health tests to explore the impact of Naadam culture on the physical and mental health development of adolescents.

Before and after the experiment, all indicators of physical fitness tests in the experimental group showed significant changes at the 5% level, particularly in the three items of pull-ups, sit-and-reach, and sit-ups, with growth rates of 45.24%, 42.34%, and 22.64%, respectively. The growth rates of the experimental group in these three items were 41.38%, 39.19%, and 19.76% higher than those of the control group. While the control group's physical fitness indicators showed some improvement, most did not exhibit significant differences, and the growth rates were generally lower than those of the experimental group. This indicates the promotional effect of the Naadam culture on adolescents' strength and flexibility.

The total scores for mental health indicators in the experimental and control groups decreased by 4.49% and 1.03%, respectively, before and after the experiment. Additionally, there were significant differences ($p < 0.05$) in all mental health factors between the experimental and control groups before and after the experiment, with reduction rates ranging from 2.70% to 6.61%. Among these, the experimental group showed the largest decreases in other factors, hostility, and interpersonal relationships, with decrease rates in all factors being 1.94% to 5.74% higher than those of the control group. This indicates that Nadam culture has a positive effect on adolescents' mental health levels.

In summary, Nadam culture can effectively promote the physical and mental health development of adolescents. The educational and cultural heritage functions of Nadam culture should be fully utilized by introducing it into schools, employing various educational channels to transmit Nadam culture, cultivating students' ethnic emotions, awakening their ethnic identity awareness, and enhancing their aesthetic abilities. This approach not only helps build adolescents' ethnic self-confidence but also improves their overall comprehensive qualities.

References

1. Doré, I., Sylvester, B., Sabiston, C., Sylvestre, M. P., O'Loughlin, J., Brunet, J., & Bélanger, M. (2020). Mechanisms underpinning the association between physical activity and mental health in adolescence: a 6-year study. International Journal of Behavioral Nutrition and Physical Activity, 17, 1-9.
2. Gkintoni, E., Vantaraki, F., Skoulidi, C., Anastassopoulos, P., & Vantarakis, A. (2024). Promoting physical and mental health among children and adolescents via gamification—A conceptual systematic review. Behavioral Sciences, 14(2), 102.
3. Swetaa, A., Gayathri, R., & Priya, V. V. (2019). Awareness of mental health among teenagers. Drug Invention Today, 11(8).
4. Jester, N., & Kang, P. (2021). COVID-19 pandemic: Is teenagers' health in crisis? An investigation into the effects of COVID-19 on self-reported mental and physical health of teenagers in secondary education. Public Health in Practice, 2, 100099.
5. Shi, C., Yan, J., Wang, L., & Shen, H. (2022). Exploring the self-reported physical fitness and self-rated health, mental health disorders, and body satisfaction among Chinese adolescents: a cross-sectional study. Frontiers in psychology, 13, 1003231.
6. Guddal, M. H., Stensland, S. Ø., Småstuen, M. C., Johnsen, M. B., Zwart, J. A., & Storheim, K. (2019). Physical activity and sport participation among adolescents: associations with mental health in different age groups. Results from the Young-HUNT study: a cross-sectional survey. BMJ open, 9(9), e028555.
7. Downs, A., & Ashton, J. (2011). Vigorous physical activity, sports participation, and athletic identity: Implications for mental and physical health in college students. Journal of Sport Behavior, 34(3).
8. Malm, C., Jakobsson, J., & Isaksson, A. (2019). Physical activity and sports—real health benefits: a review with insight into the public health of Sweden. Sports, 7(5), 127.
9. Arsović, N., Đurović, R., & Rakočević, R. (2020). Influence of physical and sports activity on mental health. Facta Universitatis, Series: Physical Education and Sport, 559-568.
10. Liu, J., Ji, M., Clarke, C. V., Liu, R., Ma, X., & An, R. (2021). Physical activity and mental health among Chinese adolescents. American journal of health behavior, 45(2), 309-322.
11. Biddle, S. J., & Asare, M. (2011). Physical activity and mental health in children and adolescents: a review of reviews. British journal of sports medicine, 45(11), 886-895.
12. Lin, C., & Yang, H. (2020, September). Research on the Value of Physical Education in School to the Physical & Mental Health Development of Teenagers. In 2020 International Conference on Modern Education and Information Management (ICMEIM) (pp. 722-725). IEEE.
13. Zhang, T., Wen, H., & Li, X. (2018). A tourist-based model of authenticity of heritage sporting events: The case of Naadam. Sustainability, 11(1), 108.

14. Mongke, T., Budsuren, U., Tiemuqier, A., Bozlak, E., Wallner, B., Dulamsuren, S., ... & Han, H. (2024). Genomic conservation of Mongolian horses promoted by preservation of the intangible cultural heritage of Naadam in Mongolia. Conservation Letters, 17(3), e13019.
15. Liuhong, Z., & Gang, G. (2011, August). The comparative study of the development of of sports tourism project between Xinjiang and inner Mongolia Naadam festivals. In 2011 International Conference on Future Computer Science and Education (pp. 445-447). IEEE.
16. Becheva, M. S. V., Kirkova-Bogdanova, A. G., Kazalakova, K. M., & Ivanova, S. A. (2023). The benefits of sports for the physical and mental health of adolescents. Pharmacia, 70, 751-756.
17. Min, C., & Yao, J. (2022). Effect of positive rumination-based sports prescription on the mental health of teenagers. Psychiatria Danubina, 34(1), 64-70.
18. Nasrulloh, A., Hermawan, H. A., & Ihsan, F. (2024). Health benefits of traditional games: a systematic review. Retos: nuevas tendencias en educación física, deporte y recreación, (59), 843-856.
19. Congsheng, L., Kayani, S., & Khalid, A. (2022). An empirical study of physical activity and sports affecting mental health of university students. Frontiers in psychology, 13, 917503.
20. Akbar, L., Zuk, A. M., & Tsuji, L. J. (2020). Health and wellness impacts of traditional physical activity experiences on indigenous youth: A systematic review. International Journal of Environmental Research and Public Health, 17(21), 8275.
21. Sun, Y., Zhang, B., Ji, A., & Sun, W. (2022). A study on the impact of wushu sports health on college students' mental health. Journal of Environmental and Public Health, 2022(1), 5841017.