



Research Study in Special Training of Rhythmic Gymnasts During Covid-19 Pandemic

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Abstract. The coronavirus (Covid-19) pandemic presents us with a new challenge. During the strict lockdown, coaches continued to train junior athletes online. To determine the results of online training, the training of 13 junior rhythmic gymnasts was analyzed in this study. The mean age of the participants was 13 ± 2 . The movement tests used in the study were based on 23 indicators with 15 movement tests to determine the specific physical training of rhythmic gymnasts approved by the Mongolian Standardization and Metrology Agency and were analyzed. The results showed that the average score of the athletes in the study was the highest score 25%, the medium score was 19%, and the lowest score was 56%. This shows that online training has not been very effective.

Keywords: Online training · Youth athletes · Test · Standard

1 Introduction

During the worldwide Covid-19 lockdown, coaches faced problems in the training and coaching activities of continuing the training of junior athletes. Coaches have overcome this difficulty with online training, and this situation is likely to be repeated in the future. The training of rhythmic gymnasts continues for many years with phases and results of success. Among other sports, the training begins from an early age. Depending on the situation of widespread of “Covid-19” in the countries and the period of the strict lockdowns, the physical training of the youth athletes was affected to varying degrees. For example, a U.S. study of 13,000 athletes on “Health, Exercise, and Quality of Life for Adolescent Athletes in the United States” found that during Covid-19-related school closures, sports events delay has caused different levels of performance depending on the USA’s adolescent’s health, social level, type of sports participation, level of poverty. The study concludes that health professionals need to consider these findings in the future when developing and implementing adolescent health policies in the United States [1, 2]. According to a survey of 302 coaches on the topic “Rhythmic gymnastics training during the pandemic”, most coaches continued to train gymnasts during the pandemic,

but 76.5% of coaches confirmed that they lost some gymnasts. In terms of performance control, challenges, physical and technical tests prevailed. Determinants of lockdown training vary according to the level of gymnasts, the highest level of Internet access, the lowest level of distance, and social distancing. In the future, it was said that e-learning content, performance evaluation, requirements, and tools should be reviewed [3].

In 2016, Mongolia's Standards and Metrology Agency discussed the training time of Mongolian rhythmic gymnasts, based on the results of research by academics, and confirmed the "Requirements for Rhythmic Gymnastics Environment and Training Requirements" [1]. In this standard, we set junior athletes' total annual training duration at 768 h. Accordingly, our coaches used to train an average of 768 h a year in normal conditions, in 2020, training duration of 800 h were 577 h online, and 223 h in the gym, in 2021, 144 h were online, and about 650 h were in the gym. During 2020 and 2021, due to the lockdown and quarantine of Covid-19, the training time in the gym was reduced by 721 h. This is almost equal to the total time of gym training for the year.

A follow-up study noted that the Covid-19 pandemic has halted sports around the world and continues to affect sports since their resumption, with high school athletes among those affected by the pandemic. It is important to understand how the pandemic duration and the ongoing challenges have affected the population both mentally and physically. This will help meet their needs and protect their health. During the lockdown, they should be provided with online training adapted to their home environment to help them stay fit and improve their technical performance [4].

Currently, Greek researchers' study on "The effects of reduced training during Covid-19" in the 100-m and 400-m freestyle at the Greek Swimming Championships results that junior athletes between the ages of 13 and 18's swimming training have been decreased by 4 months in 2012–2020 and 2 months in 2020–2021 respectively. This outcome caused athletes and coaches to worry about the success of the competition. 41 coaches were interviewed about the training process (satisfaction, training duration). According to the coaches, the duration of the training season and the daily swimming distance in 2019–2020 and 2020–2021 were lower than in the previous five seasons ($p < 0.001$). During Covid-19, the number of athletes and swimmers who qualified for the national championship was the same as in previous years. Between 2015 and 2021, the men's 100-m freestyle and 400-m freestyle success rates decreased in the 400-m freestyle 2021 [5]. This shows that the overall success of junior athletes has declined due to the strict quarantines of countries imposed during Covid-19. Therefore, it is necessary to conduct this study to plan the gym training and improve the indicators of the skills that are lacking, taking into account the results of the online training of rhythmic gymnastics youth athletes.

2 Research Methodology

The special physical training of rhythmic gymnasts was used as a documentary method, and the study of foreign athletes of the "Covid-19" period was read from a source published in "google. Scholar". The purpose of online Touring Covid-19 was to keep athletes fit. To analyze the performance of online training, we took movement tests to determine the specific physical training of rhythmic gymnasts approved by the Mongolian Standardization and Metrology Agency and the results have been processed. The movement

tests used have three ratings: high, medium, and low. Athletes' performance can be assessed directly. We used this movement test to study the 2010 Mongolian Gymnastics Federation (MGF) national team's special training, and compared the starting average of these athletes to the online fitness training average. Due to training unit sizes and sizes of special physical training's movements tests, high-scoring-3, medium-scoring-2, and low-scoring-1 scores were given and analyzed by Spearman's rank order correlation in the SPSS program.

3 Research Results

When coaches conducted gymnasts' training online, it was no longer possible to practice the competition routines. Therefore, the purpose of online training during Covid-19 was to maintain the physical training of the athletes. Training.

The online training was led by coaches in Zoom, and each training session lasted an average of 2.5–3 h. In 2020–2021, when there was a strict quarantine due to Covid-19, 13 junior gymnasts participated in a total of 721 h of online training (Table 1). Many disadvantages have been observed during online training, such as boredom of athletes, interrupting siblings, insufficient space availability, running out of internet data, phone camera not working, or reluctance to show herself to coaches and others, which affects the training performance.

To calculate the results of online training, we used movement tests to determine the special physical training of rhythmic gymnasts approved by the Mongolian Standardization and Metrology Agency. It includes:

1. 5 parameters of 3 tests of flexibility

- 1.1. Stand with feet shoulder-width apart and hold static back hyperextension with hands for 3 s (Flexibility 1.1)
- 1.2. Stand with the right/left leg wide and a backward walkover for 3 s. Measure the distance between the tip of the hand and the heel of the foot. (Flexibility 1.2 right, Flexibility 1.2 left)
- 1.3. Splits sit straight, right, left, put right/left foot on the chair. Measure from the pelvis to the floor. (Flexibility 1.3 right, Flexibility 1.3 left, Flexibility 1.3 front right, Flexibility 1.3 front left)

2. Indicators of the 3 tests of the agility

- 2.1 Balance 1 foot on the sole, lift the other leg back and raise the hands to the sides. The time to change the pose and move from the position is measured in seconds (Agility 2.1 right, Agility 2.1 left).
- 2.2 Stand with your feet apart and hold the rings vertically on your palms. Measure the time the ring is placed constantly. (Agility 2.2).
- 2.3 Throw a tennis ball up to land 5m. It is counted by how many times it hits after throwing 5 times (Agility 2.3).

3. 5 indicators of 4 strength tests

Table 1. Online training variants

| Nº. | Training sessions | Exercises | Setting |
|-----|--|--|---|
| 1 | Warm-up (30 min) | Shin exercise | 10 kinds of exercise each 50 times |
| | | Running in place exercises | 8 kinds of running exercises 10 |
| | | Rope jumping | Double jumps Forward 300 times Backward 150 times Each leg 30 times |
| 2 | Strength exercise (40 min) | Leg push exercises on a chair | One leg exercises 16 times 2 legs exercise 2 times |
| | | Arm strength exercises on a chair | 2 types of push-ups each 20*3 times |
| | | Exercises for the inner muscles of the legs with a chair | Up, sideways, and down looking at 3 kinds of exercise 50*2 times |
| | | Core and back exercises on a chair | 50*3 times |
| 3 | Stretching exercises (60 min) | Stretch between 2 chairs on 3 sides | Between 2 chairs 3 min Only forward leg on the chair 3 min Only back leg on the chair 3 min |
| | | Swing with the band | Straight swing 100*2 times Swing while standing 30 times 6 sides |
| | | Leg posture and swings with equipment | 10 types of posture each leg 8 counts 6 sides |
| | | Back exercises | 3 min exercise 3 times |
| 4 | Techniques for the element of physical difficulty (20 min) | Balanced weight exercises with a chair | Try to stand for 30 s |
| | | Rotation exercises | Rotation exercises each 15 times |
| 5 | Equipment mastering technique (30 min) | The technique of mastering ball, clubs, rope, ribbon | Try out interesting new elements |

- 3.1. Holding onto the gymnastic wall, raise the right leg and jump on the left leg. Get the number of times it has been completed (Power 3.1 right, Power 3.1 left).

- 3.2 Hang from the gymnastic wall and keep your legs at a wide angle. Performance is obtained in seconds (Power 3.2).
- 3.3. Lie face down and bring the chest back to a wide horizontal position. A correct performance performed in 10–20 s is counted (Power 3.3).
- 3.4. Push-ups ups. Correct ones will be counted (Power 3.4).

4. 4 indicators of 3-speed tests

- 4.1 Holding the gymnastic wall with the left/right hand, bend the right/left/ leg, and stand up 10 times. Performance is obtained in seconds (Speed 4.1 right, Speed 4.1 left).
- 4.2 Double jump in 10 s. Count the number of jumps (Speed 4.2).
- 4.3 Double jumps in 30 s. Count the number of jumps (Speed 4.3).

5. 2 indicators of 2 speed-power tests

- 5.1 Push off from the right leg and jump on the left leg. /measure from the sole to the heel of the landing foot/ (Speed-Power 5.1).
- 5.2 Jump splits 3 times from the place / measure the distance / (Speed-Power 5.2).
A total of 15 movement tests, some tests on the right and left sides of the body, with a total of 23 indicators.

The obtained indicators can be directly evaluated at 3 levels: high, medium, and low. The indicators were calculated for each ability, for each athlete, for example, the high, medium, and low values of the 7 indicators of the 3 tests of flexibility (Fig. 1–5).

In addition, the average values of the high, medium, and low scores for each of the 13 athletes' abilities were determined and compared with the average values of the 2010 Mongolian Rhythmic Gymnastics national team at the beginning of the experiment to improve the special training of athletes.

When determining the relationship between home distance and field, and special physical training performed by athletes online, the units and dimensions of the physical training movement test are different, so high score-3, medium score-2, and low score-1 were measured by Spearman's correlation analysis and analyzed.

4 Result

According to the results of the movement test with 5 physical abilities and 23 indicators to determine the special training of artistic gymnasts, out of 7 indicators of the test on the right and left legs of the total 3 flexibility abilities, athlete T4 scored higher than 13 athletes in five indicators, while athletes T1, T6, T9, T11, T13 has a low score on indicators 5–6 (Fig. 1).

However, out of the 4 parameters of the 3 tests of agility, athletes T1, T6, T9, T10, and T11 scored high on only one test, while a total of 12 athletes scored low on 3–4 indicators, as shown in Fig. 2. However, in a total of 4 agility tests, athletes T2, T6, T9, T10 and T11 got high scores on only one test, athletes T1, T3, T4, T7, T8, T12, and T13 got low scores on all 4 tests are shown below in Fig. 2.

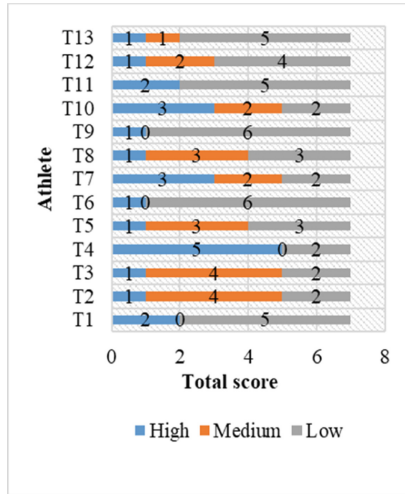


Fig. 1. High, medium, and low scores are on the the agility of junior athletes

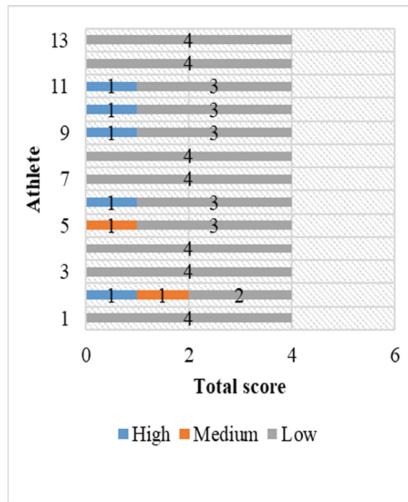


Fig. 2. High, medium, and low scores on the flexibility of junior athletes

In the total of 5 strength capability tests, assess T4, T9, and T10 got the high score in 4 tests and a total of 5 athletes got low scores in 1–2 movement tests. T3, T8, and T13 scored high scores in 2 of the 4 indicators of the speed capability test, while 6 athletes scored low scores in 3 indicators. All 13 athletes scored low in the 3 parameters of the speed-strength and 2 movement tests.

Each athlete was tested in total 5 physical capabilities with 23 indicators, athlete T4 got high scores on a total of 9 tests, and athletes T1, T6, T11, and T13 received low

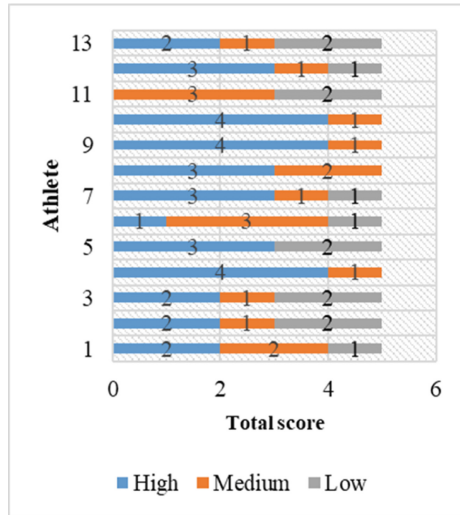


Fig. 3. High, medium, and low scores on the strength capability of junior athletes

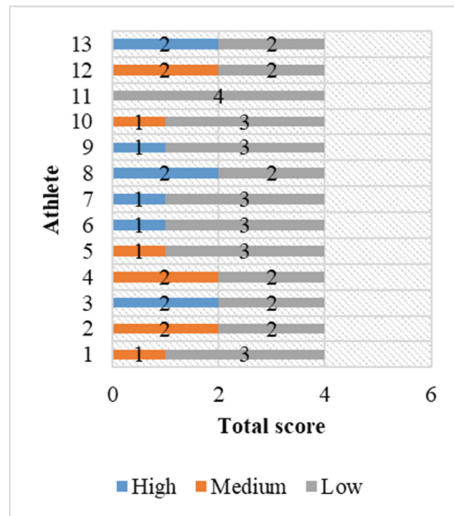


Fig. 4. High, medium, and low scores on the speed capability of junior athletes

scores on 16–17 tests (Fig. 5). 13 athletes got low scores in 179 tests out of total 299 tests and it resulted in 56% in total.

In a total of 4-speed capability tests, athlete T11 got the low scores on all tests, and athletes T1, T5, T6, T7, T9, and T10 got low scores on 3 tests, shown in Fig. 4. In the endurance capabilities’ 3 movement tests, all 13 athletes received the low score.

Compared to the average of the gymnasts’ online special physical training, compared to the average of the 2010 Mongolian Rhythmic Gymnastics national team athletes’

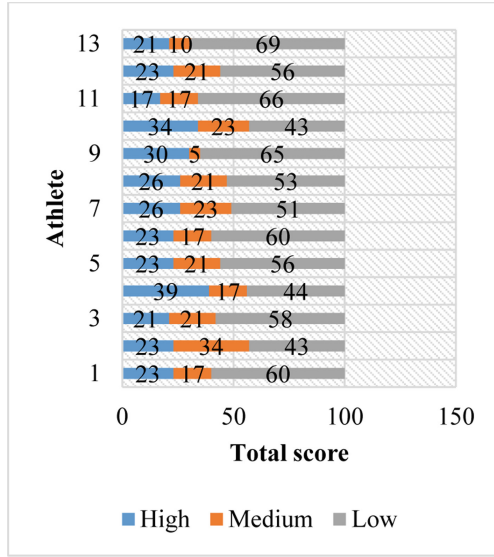


Fig. 5. Junior athlete's physical training high, medium, and low scores in percentage

Table 2. Correlation between parameters of specific physical training of junior gymnasts and field size during online training

| Spearman's rho | | Power 3.2 | Speed 4.2 | Flexibility 1.3frontleft |
|---------------------------|-------------------------|-----------|-----------|--------------------------|
| Area_size | Correlation Coefficient | -.609* | -.629* | |
| | Sig. (2-tailed) | .027 | .021 | |
| Flexibility 1.3frontrigth | Correlation Coefficient | | | .817** |
| | Sig. (2-tailed) | | | .001 |

starting training, the performance of the athletes who trained online is lower, with a difference of 6.9 points in flexibility, 1.3 in strength, and 1.2 in speed [6].

Spearman's correlation was used to determine whether the results of 23 indicators of special physical training of junior gymnasts depend on the size of the online training area.

In Table 2, the spearman's rank order correlation between junior athletes online training space size and special physical training coefficient in the power_3.2 test (hanging leg raises) are 0.609, in speed_4.2 test (double jumps roping) is 0.629, resulted in strong correlation, the correlation coefficients are $\rho(sig) = 0.001 < 0.06$, , statistically significant, flexibility_1.3frontrigth test (splitting stretch with chair) is 0.817 very strong

correlation and the correlation coefficient is $\rho(\text{sig}) = 0.001 < 0.08$, statistically significant. Hence, some of the physical strength training during online training depends on the training space size.

5 Discussion

Rhythmic gymnastics which performs complex compound movements beautifully is a sport that trains children from age 5 and sets the record for the average age of 18–22.

Developing flexibility is one of the most important aspects of rhythmic gymnastics. Complex.

elements that show flexibility are most commonly used in the exercise composition during competitions, which makes the exercises elegant [7].

The order of development of physical abilities of rhythmic gymnasts is determined as 1. Agility, 2. Flexibility, 3. Speed, 4. Explosion, 5. Space, 6. Balance, 7. Strength, 8. Endurance [8]. This shows the need for rhythmic gymnasts to maintain a high level of flexibility and coordination of movements. According to the research, when calculating the results of special physical training for junior gymnasts, the percentage of low scores is on average 56%, so it can be considered that the results of online training were not good enough. In particular, it was found that the parameters of jumping, which is a test of speed ability, and angle grip from the gymnastic wall, which is a test of strength ability, are dependent on the size of the field. This indicates that space is necessary for the development of certain physical abilities. The results will have a certain influence on the gymnasts' success, so coaches should take them into account in their training plans. The results of online training are 1.2–6.9 lower in flexibility, strength, and speed capacity tests compared to the results of special physical training at the beginning of the experimental research for gymnasts 12 years ago, which shows that online training is not suitable for junior athletes. Such quarantine situations are likely to recur, so attention should be paid to improving the results of online training.

6 Conclusion

During the high spread of Covid-19, the training of junior athletes who were under strict quarantine was conducted online, and the results of special physical training were obtained through movement tests, and the following conclusions were reached.

1. In any case, the experience of continues training and conducting trainings through online has gained.
2. Athletes were found to have low scores on agility, and endurance after the special online physical training.
3. The physical strength, which has a high percentage of low scores, needs to be improved in the short term by executing the additional training plan.

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