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# EFFECT OF TACTICAL GAME MODELS ON FORMATION OF BASIC TECHNIQUES IN HANDBALL PLAYERS: MIXED METHOD

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**Abstract**

**Study purpose.** This study aimed to evaluate the effect of a tactical game model program on improving formation of basic techniques in male handball players.

**Materials and methods.** This study adopted a mixed method (quantitative and qualitative). 20 students from Indonesian education universities were willing to be the subjects of this study. The experimental group (n=10) received treatment, namely the tactical game model program, and the control group (n=10) carried out daily training activities or did not receive any program. The tactical game model program was held 16 times with once a week meetings. After the tactical game model program was completed, 10 athletes were interviewed. The quantitative instrument in this study used a test for shooting, passing and dribbling. Meanwhile, the instrument for qualitative research used in-depth interviews about the experiences, strengths and weaknesses of the tactical game model program. Analysis of quantitative data was carried out using IBM SPSS, and analysis of qualitative data was carried out using thematic analysis.

**Results.** The results of this quantitative study showed that there was a significant effect of tactical game models on improving the formation of basic techniques in male handball players ($p<0.05$), but the control group showed no significant effect ($p>0.05$). Meanwhile, the results of qualitative research showed that the subjects provided positive and diverse perceptions about the tactical game model program.

**Conclusions.** This study confirms that the tactical game models program has proven to be an alternative teaching method for lecturers at the university level to improve the formation of basic techniques in male handball players.

**Keywords:** tactical game models, formation of basic techniques, handball, mixed method.

## Introduction

In the current crisis of the COVID-19 pandemic, all sports activities are hampered, and temporarily banned (Grix, Brannagana, Grimesa & Neville 2021; Skinner & Smith, 2021; Fallatah, 2021). Even the Tokyo Olympics events that were supposed to take place in 2020 were canceled and rescheduled for 2021 (Wong et al., 2020). In addition, the national and international sports competitions must be carried out without spectators and require strict COVID-19 protocol standards (Parnell, Widdop, Bond & Wilson, 2022).

Handball is one of the sports that has been affected by COVID-19 (Hermassi, Hayes, Sanal-Hayes & Schwesig 2021). Data reports that during the COVID-19 pandemic, training activities could not be carried out in a long duration, due to social distancing, isolation, and lockdown regulations (da Silva Musa et al., 2021), thus causing many negative impacts on athletes. The formation of basic techniques possessed by beginner handball athletes are currently the focus of attention, because they have limited opportunity to exercise in the COVID-19 era (Mon-López, Riaza, Galán & Roman 2020), resulting in a gradual decline of basic techniques. Formation of basic techniques, including: passing, dribbling, shooting are important aspects for beginner athletes to support performance when competing (Manchado, García-Ruiz, Cortell-Tormo & Tortosa-Martínez, 2017; Debanne, 2018; Font et al., 2021; de la Rubia et al., 2021), and become a parameter of success for achieving high achievements (Wagner et al., Finkenzeller, Würth & van Duvillard, 2014; Gouveia et al., 2019). Therefore, in this new normal

era requires proper training to improve the basic techniques of beginner handball athletes. One teaching model that is claimed to have an effect on improving the basic techniques of a sport is tactical game models.

Tactical game models provide a teaching concept that focuses on developing athlete skills through modified game situations (Smith et al., 2015; Gouveia et al., 2019). According to a previous study, tactical game models are a development of teaching games for understanding (Calábria-Lopes, Greco & Pérez-Morales, 2019; Harvey et al., 2020; Robles, Collado-Mateo, Fernández-Espínola, Viera & Fuentes-Guerra 2020; Nopembri et al., 2022), which have the similar framework, but more simplified, namely using modified games, with varying degrees of tactical complexity (Sgro, Coppola, Schembri & Lipoma 2020). Teaching through tactical game models must include small-side games to implement modified gameplay, in order to develop a more optimal athlete training experience (Hodges, Wicke & Flores-Marti, 2018). The modified game allows adaptation the original version of sport, in terms of the dimensions of playing area, number of players and rules (Nathan, 2016). Several previous studies have reported the benefits of using tactical game models (Gouveia et al., 2019; Sucipto, Yudiana, Hambali, Komariyah & Gumilar, 2021).

Although research on tactical game models has been extensively researched internationally (Sgro, Coppola, Schembri & Lipoma, 2020), however there have been no previous studies reporting the effects of tactical game models on improving basic handball techniques in male players during the COVID-19 crisis. In addition, this study offers different aspect from previous studies, namely assess the effects of tactical game models through a mixed method, which would provide a more accurate study about the effects of tactical game models as the analysis used quantitative and qualitative methods. This research has implications for the development of basic techniques in playing handball among male athletes at beginner level throughout the country and providing insightful knowledge for teachers, lecturers and other practitioners regarding the importance of using tactical game models during the current pandemic. Thus, this study aims to evaluate the effect of tactical game models on improving the formation of basic techniques for male handball players.

## Materials and Methods

### *Participants*

This study used a mixed method, which is a type of research that combines quantitative (experimental) and qualitative (in-depth interviews) method. Based on data from previous studies, the mixed method was effective for uncovering and overcoming a problem (Gani et al., 2022).

A total of 20 athletes in entry-level from the Indonesian Education University were involved in this study as subject research. The inclusion criteria of subject include: male gender, age 20-23 years, height 150-169 cm, weight 45-66. These subjects were selected by researchers via whatsapp messages contained about the information of this study to 25 athletes in beginner level and only 20 people were willing to participate in this study. These 20 subjects were later allocated to the experimental group (n = 10), which received treatment of tactical game models and the control group (n = 10), which carried out daily learning or did not follow any program for 7 week.

### *Instruments*

*Quantitative Instruments.* This battery test aims to measure the skills of athletes in performing basic handball techniques. There were 3 item test, namely:

*Shooting Test.* This first test item aims to measure the ability of athletes when shooting skills in handball games. Subjects performed flying shoot, dive shoot or fall shoot. The subject shoots at the goal with a distance of 9 meters aimed at the top left corner (zone 1), top right corner (zone 2), bottom left corner (zone 3) and bottom right corner (zone 4). If the ball enters zones 1 and 2, 2 points are awarded, while if the ball enters zones 3 and 4, it is awarded a value of 3. The subject is given 12 opportunities (Metan & Küçük, 2021).

*Passing Test.* This second test item aims to measure the ability of athletes when performing passing skills in a handball game. The subject stood behind the boundary line with a distance of 1 meter and held the ball in front of the chest, then the subject threw the ball at the wall and then caught it again (Saavedra, Halldórsson, Þorgeirsson, Einarsson & Guðmundsdóttir, 2020). The activity was carried out for 30 seconds. Each subject has 2 opportunities. Scoring was calculated from the total score of passing for 30 seconds.

*Dribbling Test.* This third test item aims to measure the athlete's ability when performing dribbling skills in handball games. The subject dribbles the ball through the cones. Scoring was calculated by counting the number of cones that have been successfully passed for 30 seconds (Saavedra, Halldórsson, Þorgeirsson, Einarsson & Guðmundsdóttir, 2020).

*Qualitative Instruments.* This qualitative research used in-depth interviews with all subjects about the experiences, advantages and disadvantages of the tactical game models program. In-depth interviews were conducted through the Whatsapps platform for 20-30 minutes and interviews were conducted in Indonesian (Gani et al., 2022).

### *Study organization*

Before starting this research, all participants were asked to write a statement letter about their willingness to participate in all activities in this study. This study was approved by the Indonesian Education University (No: 1021/01/2022) and in accordance with the World Medical Association Code of Ethics (Helsinki Declaration for humans).

This mixed research was conducted from January to February 2022 in Indonesian Education University (Indonesia). There are several meetings to be held for quantitative research. The first meeting was held on January 1, 2022, involving 40 participants in the initial test of the basic techniques of playing handball. The second meeting on January 3, 2022, the treatment group carried out the tactical game models program until the 17th meeting (February 7, 2022). At the 18th meeting (10 February 2022), all subjects carried out a final test activity, namely a skill test of the basic techniques of playing handball. The tactical game models program was held in the morning at the stadium located at the Indonesian Education University. This study applied the

COVID-19 health protocol strictly, for example, all subjects and the research team were checked for body temperature, vaccines and used hand sanitizers before training. While the qualitative research was conducted on 12 and 13 February 2022, the treatment group was interviewed for 20-30 minutes each and the interviews were conducted using Bahasa language. The tactical game models program is presented in Table 1.

**Table 1.** Unit plans for the tactical game models instructional

| Lesson | Tactical game models |
|---|---|
| 1-3 | Moving to the goal and shooting in situations of offensive advantage in 1 vs. 1 modification. |
| 4-6 | Decision making to shoot or passing in 1 vs. 1 modification. |
| 7-9 | Decision making to dribbling or shoot in 1 vs. 1 modification. |
| 10-12 | Decision making to passing, dribbling or shooting in 1 vs. 1 modification. |
| 13-14 | Team play 2 vs.2. |
| 15-16 | Team play 3 vs. 3. |

### *Statistical analysis*

*Quantitative analysis*

Data in quantitative research was analyzed using IBM SPSS version 25.0. The first step is to test the normality of the data using Shapiro-Wilk analysis. While the descriptive statistics (M±SD) and the difference in the pre-test and post-test basic handball techniques (shooting, passing, dribbling) scores of the tactical game models and control groups were tested using Paired Sample t-test analysis. The level applied in this study was $p<0.05$, which means it is accepted as significant. The size of effect was calculated as follows: small d: <0.5, medium d: 0.5-0.79 and large d: >0.85 (Gani et al., 2022).

*Qualitative analysis*

The qualitative analysis in this study was thematic, the results of in-depth interviews were coded and categorized into three themes (Ekström, Ostenberg, Björklund & Alricsson 2017), namely: theme 1: Tactical game models experience, theme 2: benefits of tactical game models and theme 3: disadvantages of tactical game models (Gani et al., 2022).

## Results

The normality test showed data were normally distributed ($p = 0.169 > 0.05$). While the statistical descriptive results of each group are presented in Table 2. Table 3 shows that the experimental group (tactical game models) had a significant effect on improving the basic handball technique ($p < 0.05$) which was shown by the large effect size on shooting ($d = 0.82$), and medium in passing ($d = 0.76$) and dribbling ($d = 0.71$). While the control group showed no improvement in the basic handball technique ($p > 0.05$), it was indicated by a small effect size (Table 3).

**Table 2.** Descriptive Statistics

| Dependent Variable | EG (n = 10) | | CG (n = 10) | |
|---|---|---|---|---|
| | Pre-Test | Post-Test | Pre-Test | Post-Test |
| | M(SD) | M(SD) | M(SD) | M(SD) |
| Shooting | 14.85 (2.72) | 17.75 (2.63) | 12.95 (2.28) | 12.35 (2.11) |
| Passing | 9.30 (1.41) | 14.60 (1.95) | 9.40 (1.23) | 9.70 (1.30) |
| Dribbling | 5.60 (0.503) | 7.20 (1.05) | 4.90 (0.553) | 4.80 (0.696) |

Note. M; Mean, SD: Standard Deviation, EG: Experimental Group, CG: Control Group

Meanwhile, the results of qualitative research indicate that the subject provides various perceptions regarding the tactical game models program, for example:

*Theme 1: Tactical game models experience*

The first aspect that needs to be considered is the experiences of subjects when carrying out the tactical game models program. In this method, researchers obtained a lot of information regarding subjects' perception on tactical game models, whether their perception leads to positive or negative assumption. The subject revealed that:

> "We have conducted the tactical game models program for 18 meetings and it was really fun and gave us a lot of movement experience, because during the program we learned some basic handball techniques in fun situations (S1, S4)."

Some subjects mentioned that: "We are very lucky to be able to participate in the tactical game models program, because through this training we can learn how to do

**Table 3.** Differences values in pre-test and post-test in the EG and CG groups

| Dependent Variable | EG (n = 10) | | | | CG (n = 10) | | | |
|---|---|---|---|---|---|---|---|---|
| | Pretest-Posttest M(SD) | t | p | ES (d) | Pretest-Posttest M(SD) | t | p | ES (d) |
| Shooting | 2.900 (1.51) | 8.542 | 0.000 | 0.82 | 0.600 (1.50) | 1.788 | 0.090 | 0.007 |
| Passing | 5.300 (2.15) | 11.001 | 0.000 | 0.76 | 0.300 (1.17) | 1.143 | 0.267 | 0.004 |
| Dribbling | 1.600 (1.14) | 6.263 | 0.000 | 0.71 | 0.100 (0.912) | 0.490 | 0.629 | 0.000 |

Note. M; Mean, SD: Standard Deviation, EG: Experimental Group, CG: Control Group, p: Significance; ES (d): Effect Size (Cohen's d)

shooting, dribbling and passing techniques in the right way (S7, S10)."

"At the beginning of the tactical game models program, we were still confused about this training, but slowly we began to understand the concept of this training. We interested this training and we will continue to use it, even after this research has been completed (S5 and S2)."

"We got a lot of valuable experience after joining this program, for example (a) how to make a hard and targeted shooting movements, (b) Fast dribbling which difficult for opponents to stop it, and (c) directed passing (S3, S6)."

"We think that the valuable experience of the tactical game models program is it can add our knowledge about techniques and tactics in handball games (S8, S9)."

*Theme 2: Advantages of tactical game models program*

The second aspect that needs to be analyzed is the superiority of the tactical game model program. Excellence is an important point that must be known, so that it can provide information on the effectiveness of the tactical game models program. The subject revealed that:

"Tactical game models helped me the basic technique of playing handball better than before, because in the training process we played handball with modified rules, for example 2 vs 2. This model can help our basic technique gradually improve (S10, S1)."

"According to our opinion, the advantages of tactical game models were the application of game modifications, so that training was much more interesting than other training. This also keeps us motivated to join the tactical game models program (S4, S2)."

"The advantage is about tactics and techniques which applied in the training process, so that our abilities develop faster (S5, S9)."

"This game is interesting, not boring, encourage our motivation and rich in motion experience and modifiable games are the advantages of tactical game models (S3, S7)".

"The rules were able to modified, for example the game can be played with 2 vs 2 or 3 vs 2. The size of field that can be modified, for example playing handball with a smaller size of field than the actual size. This is the main advantage of tactical game models (S6, S8)".

*Theme 3: Weaknesses of tactical game models program*

This third theme is important to analyze based on the perceptions of the subjects, in order to minimize the weaknesses in the tactical game models program. Regarding this third theme, the subject argued that:

"We think that the weakness lies in the knowledge and how to use this model. If the teacher do not understand the stages of teaching, the material will not be delivered optimally (S2, S4, S7, S8, S10)."

"The application of tactical game models will be less effective, if the sports equipment at a university is inadequate (S1, S3, S5, S6, S9)".

## Discussion

Our study aimed to evaluate the effect of the tactical game models program on the improvement formation of basic techniques for male handball players from mixed analyzes. The results of quantitative study show that the tactical game model program had a significant effect on improving the basic techniques of male handball athletes at beginner level. The increase occurred because the tactical game model provides training for athletes, they can be more active in moving, and they are required to play using basic technical skills (Sgro et al., 2020). In addition, the use of games such as 2 vs 2 or 3 vs 3 involving small groups is much more effective and they can play more actively, so that basic techniques can be learned optimally (Menezes, Ramos, Marques & Nunomura, 2018).

The tactical games model can be a method to emphasize exercises through a game, encourage athletes to solve problems in game situations and help athletes become better players (Nathan, 2016; Ward, Piltz & lehwald, 2018; Harvey et al., 2020). According to González-Espinosa, García-Rubio, Feu & Ibáñez, (2021) tactical game models have a training approach by focusing on a game, athletes were required to solve tactical problems in a game to gradually improve basic technique. The results of this study are in line with previous research which explains that game-centered teaching is an effective approach to improve basic techniques in handball (Menezes, Marques & Nunomura, 2017). While subsequent findings showed that athletes in the control group did not experience a significant increase.

While the qualitative findings in this study showed that most athletes had a positive perception towards the tactical game model program. The main strength of this training model is a tactical approach and oriented towards promoting technique in an invasion sport (Harvey & Jarrett, 2014; Gouveia et al., 2019).

## Conclusions

Based on this study, it can be concluded that the tactical game model program is proven to have an effect on improving the formation of basic techniques for male handball players. The research has implications for providing information and scientific insight about the tactical game model for lecturers and this tactical game model can be applied to trigger the effectiveness of teaching techniques at the university level. Thus, the basic techniques (shooting, passing, dribbling) are possessed by male athletes. entry-level males can improve significantly. In terms of future works, it would be interesting to test the effect of tactical game models on the basic techniques of soccer, volleyball or other sports or can apply tactical game models to athletes at the professional level.

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## Conflict of interest

All authors declare that there is no potential conflict of interest associated with this research, or publication of this manuscript.

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# ВПЛИВ ТАКТИЧНИХ МОДЕЛЕЙ ГРИ НА ФОРМУВАННЯ ОСНОВНИХ ТЕХНІК У ГАНДБОЛІСТІВ: ЗМІШАНИЙ МЕТОД

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Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 6 с., 3 табл., 31 джерело.

**Мета дослідження.** Метою цього дослідження була оцінка впливу програми тактичних моделей гри на покращення формування основних технік у гандболістів чоловічої статі.

**Матеріали та методи.** У цьому дослідженні використовували змішаний метод (кількісний і якісний). Стати учасниками дослідження погодилися 20 студентів педагогічних університетів Індонезії. Експериментальна група (n = 10) виконувала спеціально призначену тренувальну діяльність, а саме – програму тактичних моделей гри, а контрольна група (n = 10) вела повсякденну тренувальну діяльність або не виконувала жодної програми. Програму тактичних моделей гри проводили 16 разів зі зборами раз на тиждень. Після завершення виконання програми тактичних моделей гри було проведено інтерв'ю з 10 спортсменами. Як засіб кількісного аналізу в цьому дослідженні використовували тест на кидок, передачу та ведення м'яча. При цьому як засіб якісного аналізу використовували докладні інтерв'ю з метою висвітлення вражень від програми моделей тактики гри та її переваг і недоліків. Аналіз кількісних даних проводили з використанням ПЗ IBM SPSS, а аналіз якісних даних проводили за допомогою тематичного аналізу.

**Результати.** Результати цього кількісного дослідження показали наявність значного впливу тактичних моделей гри на покращення формування основних технік у гандболістів чоловічої статі ($p < 0,05$), але контрольна група показала відсутність значного впливу ($p > 0,05$). При цьому результати якісного аналізу показали, що учасники дали програмі тактичних моделей гри позитивні та різноманітні суб'єктивні оцінки.

**Висновки.** Це дослідження підтверджує, що програма тактичних моделей гри зарекомендувала себе як альтернативний метод навчання для викладачів університетського рівня, спрямований на покращення формування основних технік у гандболістів чоловічої статі.

**Ключові слова:** тактичні моделі гри, формування основних технік, гандбол, змішаний метод.

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