15 (2) (2026) 677-683

Journal of Physical Education, Sport, Health and Recreations

http://journal.unnes.ac.id/journals/peshr

Contribution of Sit-Up Exercises on Candle Attitude Ability in Gesaid Gymnastics Club

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Keywords

Sit up; Candle Attitude; Gymnastics

Abstract

Floor gymnastics is a sport that requires very complex coordination of movements, high precision, and perfect mastery of technique by combining muscle strength, flexibility, and motor coordination. In this study, it was determined to determine the contribution of sit-up exercises to candle attitudes in gymnastics gesaid club athletes. This study uses a correlational approach with one data collection. The population and sample in this study used 10 athletes with a total sampling technique. The instruments used in this study were sit-ups for 1 minute and candle attitude ability test by assessing the initial attitude, implementation, final attitude and being able to maintain a candle attitude for 2 seconds. The data analysis in this study used a correlation test and a determination coefficient test. The results of the study showed that the contribution of sit-ups to the attitude of candles in gymnastics gesaid club athletes with an R square value of 0.448. It shows that the higher the strength of the abdominal muscles with the sit up exercise, the more stable it is to perform the skill by contributing 44.8% to the candle attitude of the athletes of the Gesaid Gymnastics Club. In conclusion, sit-up training is a supporting variable that directly affects the mastery of technique, position endurance, and the beauty of candlestick movements for athletes.

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p-ISSN 2460-724X
e-ISSN 2252-6773

INTRODUCTION

The development of quality human resources is inseparable from the aspect of physical health, where sport is the main medium in improving the degree and physical fitness by maintaining muscle, bone, and balance functions, to increase the effectiveness and quality of human movement (Izquierdo et al., 2021). Exercise is not just a physical activity but a means to develop the body's functional potential optimally (Nathasya, 2024), furthermore, exercise also has positive implications for a person's mental state (Hidayat et al., 2025). With this, good physical abilities are proven to be able to support body composition and fitness to improve the quality of human movement (Baj-Korpak et al., 2022).

Good physical condition is able to improve movement ability and motor competence to increase achievement, without excellent physical condition, an athlete will not be able to follow the coach's instructions or master complex techniques (Burton et al., 2023). Physical condition components (strength, VO_2max, speed, power, agility, flexibility, and balance) have a strong relationship with gymnastics' achievement rankings (Wijaya, Nurkholis, et al., 2024). Even in other journals, consistent physical activity is able to consistently lower visceral fat in the body (Darmawan et al., 2023). Physical condition is a whole unit that cannot be separated in the effort to achieve sports achievements, where strength (*strength*) became the most dominant biomotor element and became the main foundation to support the success of difficult movement techniques in gymnastics (Gaspari et al., 2024).

Floor gymnastics is a sport that demands very complex coordination of movements, high precision, and perfect mastery of technique by combining muscle strength, flexibility, and motor coordination(Brtva et al., 2023). Where structured muscle strength exercises such as *Sit Up*, push ups and wall sits are proven to be able to improve the quality of floor gymnastics techniques (Pandeleke et al., 2026). In addition, core stability exercises have been proven to improve strength, balance, and torso stability which are important for floor gymnastics movements (Esteban-García et al., 2021), then long-term core stabilization exercises were able to increase abdominal muscle strength and significantly improve balance performance compared to control, demonstrating a functional relationship between core strengthening and the ability to maintain balance in basic gymnastics tasks (Wijaya, Kartiko, et al., 2024). Therefore without adequate abdominal muscle strength, athletes will not be able to withstand the load of the legs in an upright position against gravity (Bojairami & Driscoll, 2021) .

In floor gymnastics, the candle posture is a form of movement in which the body is lifted straight up by resting on the back, while the hips and legs are straightened upwards by being supported by both hands on the back or waist (Fatmawati, 2013). The success of this candle attitude movement is based on the ability of the body's core muscles to maintain balance and straightness where the abdominal muscles become a driving machine as well as a balancing force in static and dynamic positions (Zemková & Zapletalová, 2022), the support of qualified support facilities also has an influence on the success of movement and training(Hanif & Darmawan, 2024). Even in other research findings, anxiety and core muscle strength have positive implications for floor gymnastics movement skills (Harahap et al., 2025). In addition, the abdominal muscles are also able to contribute significantly to floor gymnastics movements by holding the pelvic and spine positions to keep them straight and prevent the body from arching (Rizal, 2026a).

The phenomenon that occurred in the Gesaid Gymnastics club showed that there were technical obstacles in performing candle attitude movements, where there was a diversity of the results of candle attitude movements of gymnasts athletes who were able to perform movements stably but there were still athletes who had difficulty maintaining the candle stance stance stance stance. This problem is thought to be caused by the contribution of the abdominal muscles. There are indications that the exercises so far have only focused on the type of repetitive exercises without paying attention to the strengthening of the abdominal muscles specifically as the main support of floor gymnastics movements.

Abdominal muscle strength training is a strong foundation for the success of gymnastics movements because it is considered to be able to increase muscle strength and endurance (Kumar & Zemková, 2022), even this exercise is also able to improve gymnastic movements competitively (Dongaz et al., 2023) Because this core training exercise helps reduce energy leakage

so that movement becomes more stable and efficient (Luo et al., 2021). The sit-up movement exercise is one of the effective movements because it is able to represent and train the strength of the core muscles by being able to provide stability in limb movement(Prabowo & Syahlaa, 2023), in addition, sit-up movement exercises are able to improve postural stability which is important for improving body control, especially in complex gymnastic movements (Zemková & Zapletalová, 2022).

In this study, there is a novelty of research by focusing on abdominal muscle strength with exercise *Sit Up* as a single variable to measure its contribution to the ability of candle attitude in gymnastics athletes. This is based on the fact that the strength of the abdominal muscles has a big role in stabilizing the movement of the candle attitude by helping to lift and hold the position, keeping the body line straight so that there is no body misalignment or *poor aligment* as well as stabilizing the pelvis and spine against the movement of floor gymnastics, candle attitude (Karshiyevich, 2025).

This study aims to obtain data and information regarding the contribution of abdominal muscle strength to the ability of posture movements. In addition, this study also aims to emphasize the importance of paying attention to abdominal muscle strength training in an effort to obtain optimal wax posture movement results so that it can provide tested solutions that are of significant benefit to coaches and athletes in improving the results of wax posture floor gymnastics movements.

METHODS

This study uses a quantitative method, namely using data in the form of values and statistical analysis in testing the relationship between variables (Yusuf et al., 2023). This type of research is a correlational study to see if there is a relationship between the variables being studied, and a relationship that can occur in a unidirectional or opposite direction. The purpose of this study is also to find out the relationship between variables and how strong the relationship is from the variables being studied (El Hasbi et al., 2023).

This study involved athletes from the Gesaid Gimnastik floor gymnastics club, in Pati, Central Java, with a total sampling technique involving as many as 10 Gesaid Gimnastik athletes as research subjects. To obtain analytical data, a data collection research instrument is needed, namely a test of abdominal muscle strength by conducting a test *Sit-up* according to Fenanlampir & Faruq, 2015 (Intan Munira, Dedi Saputra, 2025) for one minute which was then obtained from the abdominal muscle strength of the research subjects. The second test is the ability to stance candles according to Yuarsa et al., 2023 (Intan Munira, Dedi Saputra, 2025) By taking data, the technique ability of the candle attitude can be judged from the initial attitude of the implementation and the final attitude and is able to hold for 2 seconds. The candle attitude test is carried out after the sit up test with a 5-minute interval

The data analysis technique of this study uses a validity test by testing the normality and linearity of the tested data. Then the correlational test and the determination coefficient test were also used to see if there was a relationship or contribution between variables and how strong the relationship was between the variables. In this study, the independent variable (X) is the sit up and the variable (Y) is the candlestick attitude.

RESULTS AND DISCUSSION

The data of this study was conducted to test the relationship between the contraction or the relationship between abdominal muscle strength and the ability of candle attitude movements. The researcher conducted research data in the form of abdominal muscle strength and wax attitude skills on Wednesday, May 6, 2026 at the Gesaid Gimnastik floor gymnastics club, so that descriptive data was obtained that provided an overview of abdominal muscle ability with *sit-up* tests and wax attitude skills. Below is a table of statistics that have been taken:

Table 1. Descriptive Statistics

Variabel	N	Min	Max	Mean	Hours Deviation
Sit-up	10	18	61	36.50	12.537
Candle Attitude	10	65	95	83.00	10.328

The table above shows that there are 10 research samples with an average *sit-up* score of 36.50 with a standard deviation of 12,537 which has the highest score of 61 and the lowest score of 18. Then the average candlestick attitude skill score was 83.00 with a standard deviation of 10,328 with the highest score of 95 and the lowest score of 65.

Table 2. Normality Test

Variabel	Sig.(p)	Description
Sit-up	0.685	Signifikan
Candle Attitude	0.191	Signifikan

The results of the normality test with the Shapiro test above show a sig value on the *sit-up* variable of 0.685, this shows that the distribution of data on *the sit-up variable* is normally distributed because of the sig.(p) > 0.05. Then the candle attitude variable also shows the same thing where the sig value in the normality test for the candle attitude variable shows a result of 0.191 > 0.05 which can be stated that the data is normally distributed.

Table 3. Linearity Test

Variabel	Sig. Dev From Linearity	Description
Sit-up * Candle Attitude	0.778	Signifikan

Based on the results of the linearity test in **table 3**. Showing the result of the sig. (p) deviation from linearity of 0.778 > 0.05, then the linearity assumption is not met. It can be concluded that the *variables of sit-up* and candlestick attitudes tested in this study are **linear**.

Table 4. Correlation Test

Variabel	Sig(p)	r	Description
Sit-up * Candle Attitude	0.034	0.669	Signifikan

The results of the correlational test in the table above between the *sit-up* variable and the candlestick attitude show the value of sig.(p) of 0.034 where this value is < 0.05, it can be concluded that there is a relationship between the two variables tested in this study. Then it can also be concluded that there is a strong relationship between *the sit-up variable* and the candlestick attitude because of the results of the correlational test in **table 4**. It shows a pearson correlation value of 0.669 > 0.610 which means that there is a strong relationship between these variables.

Table 5. Coefficient Determination Test

Variabel	R. Square	Description
Sit-up * Candle Attitude	0.448	Signifikan

Based on **table 5**. the determination coefficient test on the *sit-up* variable and the candle attitude showed an R Square value of 0.448 which shows how much influence *the sit-up* or abdominal muscle strength of floor gymnasts on the ability of candle attitude movement skills, based on the test results in **table 5**. The determination coefficient test can be drawn The

conclusion that the strength of the abdominal muscles contributes or contributes 44.8% to the ability to Candle Attitude Movement Skills.

The contribution of sit-up exercises to the ability to move candles

Sit up has a close relationship with the attitude of the candles. The results of the correlational test with the value of sig. (p) of 0.034 and the Pearson Correlation value of 0.669 > 0.610 which means that there is a strong relationship between these variables. In the coefficient test of determination on *the sit-up* variable and candle attitude, the R Square was 0.448 which shows how much influence *the sit-up* or abdominal muscle strength of floor gymnastics athletes is on the ability of candle attitude movement skills. It was stated that abdominal muscle strength with sit up exercises contributed 44.8% to the candlestick movement skills.

The role of sit ups is supported by several previous studies, namely sit up is one of the important roles to support the strength of the abdominal muscles so that they can perform a candle attitude. This research is in line with (Intan Munira, Dedi Saputra, 2025) By stating that there is a relationship between abdominal muscle strength and wax attitude of 0.480 with an effective contribution of 23.08% while the rest is determined by other factors or variables that are not studied in this study. In research (Aisyah et al., 2025) Simultaneously stating abdominal muscles is significantly related to the ability of candle posture with an R value of 0.425. Thus, the better the strength of the abdominal muscles, the better the athlete's ability to perform candle postures in floor gymnastics. And according to (Rizal, 2026b) showed that the strength of the abdominal muscles made a significant contribution with a value of 87.30% to the ability of the candle attitude. The candle attitude is a basic movement in floor gymnastics that requires good coordination between the abdominal and back muscles to maintain body balance in an upright position with the legs straight up.

Previous research can conclude that core body training has an effect on dynamic balance stability (Barrio et al., 2022). This shows that muscle strength is the main foundation in gymnastics. In the candle attitude movement, it requires the body's ability to maintain a static vertical position against gravity with a focus on the shoulders and neck. Sit-up exercises specifically target strengthening the abdominal muscles, which serve as the main driver as well as a balance when the athlete lifts the pelvis upwards (Christoph et al., 2020). Without adequate abdominal muscle strength, an athlete will have difficulty transitioning from a lying position to an upright position, as the pelvis is likely to fall or not be able to achieve a perfect straight line.

This contribution is not only seen at the initial time of lifting, but also in the aspect of isometric stability when the peak position is reached. In members of the Gesaid Gymnastics Club, programmed sit-up exercises create muscle strength that allows them to lock their pelvic position to stay parallel to their legs for a longer duration. When the abdominal muscles are strong, the pressure on the lower back muscles can be reduced, thus reducing the risk of injury and the aesthetics of movement which is a crucial aspect in gymnastics because it improves the balance component in athletes (Dong et al., 2023). Thus, the sit-up acts as a driving motor as well as a controlling brake that ensures that the movement of the candle attitude is carried out with high precision.

The effectiveness of this contribution also depends on the quality of the repetitions of sit-up exercises carried out in the club environment (Christoph et al., 2020). The physiological adaptation process resulting from regular sit-up exercises will improve intramuscular coordination, which is the ability of the nervous system to activate abdominal muscle fibers synchronously when performing candle posture movements. This is especially important for the gymnasts at the Gesaid Gymnastics Club, as the candle attitude demands subtle body control to maintain balance on a narrow pedestal. In conclusion, sit-up training is a supporting variable that directly affects the mastery of technique, position endurance, and the beauty of candlestick movements for athletes. A strong and comprehensive relationship can support the candle attitude by strengthening the strength of the athlete's abdominal muscles. Therefore, a trainer must be able to provide an exercise program to be able to support the candle attitude by using sit up exercises.

CONCLUSION

The conclusion of this study is that based on the results of the study, it can be concluded that there is a significant contribution between sit up exercises to candle attitudes in gymnastics gesaid clubs with a contribution of 44.8%. Abdominal muscle strength is produced from sit up exercises where the better the strength of the abdominal muscles can help maintain stability and body position so that it remains upright during candle posture movements. Thus, it will be easier for athletes who have strong abdominal muscles to be able to perform candle posture movements correctly. As well as for coaches, they can use sit-up exercises to support abdominal strength muscles as a menu of physical exercise programs to make it easier for athletes to perform candle movement correctly.

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