THE EFFECT OF ARM MUSCLE POWER, WAIST FLEXIBILITY, AND SELF-CONFIDENCE ON FRONT HANDSPRING SKILLS IN ARTISTICS GYMNASTICS

HafizYazid Lubis[1], Yasep Setiakarnawijaya[2], Mansur Jauhari[3]

[1] *Pendidikan Jasmani Kesehatan dan Rekreasi, Sekolah Tinggi Olahraga dan Kesehatan Bina Guna, Medan*
[2,3] *Pendidikan Jasmani, Pascasarjana Universitas Negeri Jakarta, Komplek Universitas Negeri Jakarta*

Correspondiing author. Email **:** *yazid.fiz@gmail.com*

Abstract This study aims to determine the effect of arm muscle power, waist flexibility and self-confidence on front handspring skills in Sport Coaching Education of State University of Medan Students. The research method used in this study is a survey method with path analysis techniques. The population in the study was first semester students totaling 84 students, with sample selection using total sampling method. The analysis technique uses a path analysis approach at a significance level of 0.05. the conclusion of each research finding shows (1) There is a direct influence between each independent variable {Arm Muscle Power (X_1), Waist Flexibility (X_2), and Self-Confidence (X_3), (2) There is a direct effect of each independent variable {Arm Muscle Power (X_1), Waist Flexibility (X_2), and Self-Confidence (X_3) have a direct influence on Front Handspring Skill (Y)}, (3) There is an indirect effect of arm muscle power (X_1) on front handspring skills (Y) through self-confidence (X_3). There is an indirect effect of waist flexibility (X_2) on front handspring skills (Y) through self-confidence (X_3). Thus, Front Handspring Skills can be improved through increased Arm Muscle Power, Waist Flexibility and Self-Confidence.

Keywords: front handspring, arm muscle power, waist flexibility, self-confidence.

INTRODUCTION

The handspring skill is one type of movement that is trained in the floor gymnastics branch (Karisma Sari, 2018). This skill requires the gymnast to be able to maximize all her muscles, especially the hands (Alvarenga et al., 2013). In handspring, the gymnast must continue forward linear motion which is converted into vertical motion by refusing the hand (Sembiring et al., 2018). This skill includes a difficult and complex element because it involves the entire body, and it is not uncommon to cause injuries due to accidents (Mack et al., 2020). Some of the factors that correlate with handspring skills are arm muscle strength. In his study (n=30) (Yuliyanto, 2018) found that there was a significant correlation (rcount=0.534 > rtable=0.361) between arm muscle power and handspring ability in artistic gymnastics for students of the Department of Sports Coaching Education, Universitas Tunas Pembangunan Surakarta. Although the study only revealed the relationship between arm muscle power and students' handspring ability.

On the other hand, self-confidence also has a significant contribution to handspring skills taught in college. In his report (Gumilar, 2019) stated that students who have high self-confidence have better handspring learning outcomes with reciprocal teaching styles compared to practice teaching styles. However, this research report did not explain the relationship between arm muscle power and waist flexibility with handspring skills. This is considered important considering that these two aspects are considered to play an important role when a gymnast does handspring (Fernandes et al., 2016).

Studies on the flexibility of the waist on the handspring seem not done too much. Based on online searches, there is only Handayani's research (Handayani, 2018) which reveals that physical components such as explosive power, strength, speed and waist flexibility determine the level of handspring skills performed. Therefore, he found that 15% of PT Semen Padang's gymnastics athletes had front handspring technique skills in the good category, 80% in the sufficient category and 5% in the poor category. In summary, waist flexibility is assumed to have a relationship with the athlete's level of confidence and handspring performance

As stated above, self-confidence is considered important for an athlete

and/or student. This is evident from several studies in the field of gymnastics, self-confidence has always been a factor studied in many places such as (Aspin et al., 2019; Shaman et al., 2022; Yudho, 2017) . Of all these studies, none was conducted at a university that was accredited with excellence (A). This of course can be one of the differentiating factors with previous research (Ridwan et al., 2017). Another thing that makes self-confidence important to study is because of the assumption that students at superior accredited tertiary institutions have had brilliant achievements both at local and national levels so they are considered to have high self-confidence (Egi Aldi Reza, Muhammad Mury Syafei, 2021; Hankin, 2005).

From the author's observations and discussions with gymnastics lecturers at Medan State University, it was found that there are still many students who have difficulty taking floor gymnastics courses, especially front handspring. Some of these problems are (1) students tend to have difficulty and are less active in learning which may be due to low self-confidence, (2) students find it difficult to apply the front handspring in real movements and (3) students find it difficult to master the

correct movement techniques (Donovan & Spencer, 2019). This is also supported by the average score of students in gymnastic technique skills, the majority of which scored C and even E (failed). This is of course contrary to the acquisition of accreditation status for study programs and institutions, both of which are included in the category A rank (National Accreditation Board for Higher Education, 2016)

Furthermore, superior accredited universities tend to also have teaching staff who have also made many achievements both at the national and international levels. Based on the foregoing, the researchers considered it necessary to conduct research on the effect of arm muscle power, waist flexibility and self-confidence on front handspring skills in gymnastics at the State University of Medan.

METHOD

This study will examine a case to find out whether there is an influence between four variables, the first variable is the endogenous variable or the dependent variable, namely the front handspring skill in students of Sports Coaching Education, Faculty of Sports Science, State University of Medan (Y).

and the next variable is the intervening variable in this study is the level of self-confidence (X_3). Then the exogenous or independent variables are arm muscle power (X_1) and hip flexibility (X_2). The purpose of this method is to test the validity of a theory about causal relationships between three or more variables that have been studied using a correlational research design by testing the relationship between variables (Gall et al., 2007; Sugiyono, 2012).

This study uses descriptive statistical analysis which aims to describe the relationship between variables investigated systematically (Atmojo, 2010; Widiastuti, 2019). Then proceed with path analysis to determine the effect of one variable on the other variables according to the path that has been applied. There is no control, training or manipulation with a significant level of = 0.05 in this study because this study was non-experimental. The research design needed in planning and implementing this research can be seen in the image below:
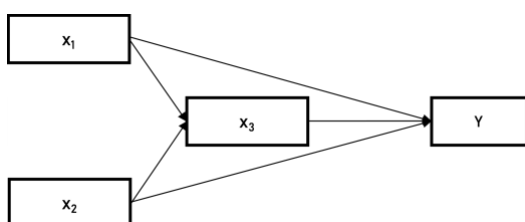

Figure 1: Research Design

RESULT AND DISCUSSION
Result

There are four variables in this study, consisting of three exogenous variables or independent variables and one endogenous variable or dependent variable. These variables are: arm muscle power (X1), waist flexibility (X2), self-confidence (X3) and front handspring skills (Y). Collecting data from the four variables, the researchers used a test technique using a validated instrument to measure arm muscle power, waist flexibility, self-confidence and front handspring skills. The values presented from raw data are processed using descriptive statistical methods with the SPSS program.

Data description

The following are the results of descriptive analysis calculations on the Front Handspring Skills variable (Y):

Table: 1

Front Handspring Skills

	N	Minimum	Maximum	Mean	Std. Deviation
Front Hansdpring	84	5.20	9.10	6.6607	.78802
Valid N (listwise)	84				

Based on the results of these calculations, the lowest score for the student's Front Handspring Skill was 5.20 and the highest score was 9.10. The average value of Front Handspring Skills from 84 students was 6.66 with a standard deviation of 0.78.

The following are the results of descriptive analysis calculations on the Arm Muscle Power variable (X_1):

Table: 2

Arm Muscle Power

	N	Minimum	Maximum	Mean	Std. Deviation
Arm Muscle Power	84	4.50	7.10	5.5404	.51947
Valid N (listwise)	84				

Based on the results of these calculations, the lowest value of the student's arm muscle power was 4.50 and the highest value was 7.10. The average value of arm muscle power from 84 students was 5.54 with a standard deviation of 0.52.

The following are the results of descriptive analysis calculations on the Waist Flexibility (X_2) variable:

Tabel: 3

Waist Flexibility

	N	Minimum	Maximum	Mean	Std. Deviation
Waist Flexibility	84	7.00	25.00	12.7976	5.23607
Valid N (listwise)	84				

Based on the results of these calculations, the lowest value of Waist Flexibility for students is 7.00 and the highest value is 25.00. The average value of waist flexibility of 84 students was 12.80 with a standard deviation of 5.24.

The following are the results of descriptive analysis calculations on the Self-Confident (X_3) variable:

Table: 4

Self-Confident

	N	Minimum	Maximum	Mean	Std. Deviation
Self-Confident	84	2.54	5.00	3.4792	.52199
Valid N (listwise)	84				

Based on the results of these calculations, the lowest value of student self-confidence was 2.54 and the highest score was 5.00. The average self-confidence value of the 84 students was 3.48 with a standard deviation of 0.52. By referring to table 4.6 the average value of 3.48 is included in the good/high criteria. So it can be concluded that in general students' self-confidence is in the high category.

Discussion

1. The direct effect of arm muscle power on self-confidence

The research findings explain that arm muscle power has an effect on self-confidence which is described by a path coefficient value of 0.171 and a significance at 0.031 <0.05, meaning that if there is an increase in arm muscle power, self-confidence will increase. This effect can be explained that arm muscle power is able to raise self-confidence to students. This finding also confirms that arm muscle power directly determines student self-confidence by 17.1%, and empirically proves that arm muscle power also affects students' self-confidence in performing movements in gymnastics courses, in other words, if arm muscle power weak, then the self-confidence is low, but on the contrary if the arm muscle power is good, the better the self-confidence will be. This is in line with research (Mulyono et al., 2019) that students' self-confidence is greater from internal factors, one of these internal factors is arm muscle power.

2. The direct effect of waist flexibility on self-confidence

The research findings explain that waist flexibility affects self-confidence which is described by a path coefficient value of 0.677 and a significance at 0.000 <0.05, meaning that if there is an increase in waist flexibility it will increase self-confidence. Waist flexibility is one of the important elements in gymnastics, in gymnastics movements a lot of flexibility is needed, one of which is waist flexibility. In a study written by Aji Mulyono, (Mulyono et al., 2019) that internal factors are greater than external factors in students' self-confidence levels. Waist flexibility is one of the internal factors that can affect self-confidence, so that if students have good waist flexibility, their confidence in doing movements in gymnastics will improve as well. This finding also confirms that waist flexibility directly determines self-confidence by 67.7%, this figure proves that waist flexibility is very important in determining student confidence, especially in doing gymnastics.

3. The direct effect of arm muscle power on front handspring skills

Arm muscle power is a factor in front handspring skills, this is in line with research (Yuliyanto, 2018) that there is a significant correlation between arm muscle power and front handspring ability. The findings of this study explain

that arm muscle power affects front handspring skills which is described by a path coefficient value of 0.157 and a significance at 0.011 <0.05, meaning that if there is an increase in arm muscle power, front handspring skills will increase. Arm muscle power plays a role in repulsing the mat when performing front handspring movements, as discussed in the previous chapter, that power is the product of strength and speed. When doing the front handspring movement, there are times when the body is in a handstand position, that is, placing the hands on the mat as a support, while the legs are straight up followed by the body and hands. But the difference is, handstand requires hand strength, while front handspring requires arm muscle power. The power of the arm muscles will help the body when doing the bending and landing when doing the front handspring. This finding also confirms that the arm muscle power directly determines the front handspring skill by 15.7%, that's why if the arm muscle power is getting better, the students will be better at doing front handspring movements.

4. The direct effect of waist flexibility on front handspring skills

Waist flexibility is one of the phases in doing front handspring, meaning that waist flexibility is one of the success factors in doing front handspring movements. The results of the analysis of research data showed that waist flexibility had a direct positive effect on front handspring skills, with a coefficient value of 0.199 and a significance at 0.017 <0.05, meaning that if there is an increase in waist flexibility, the front handspring skills will increase. This is in line with what was expressed by Candra Gamali Putra (Putra, 2015) in a previous study that flexibility has a contribution to front handspring ability. This finding also confirms that waist flexibility directly determines front handspring skills by 19.9%. Based on the results of the data analysis, it can be interpreted that students who have good waist flexibility will produce good front handspring skills as well.

5. The direct effect of self-confidence on front handspring skills

Self-confidence is the ability to believe in one's own abilities and feel positive about what can be done and not worry about what can't be done. The role of self-confidence is so important in everyday life, including in doing the

front handspring movement in gymnastics. Having good self-confidence will go a long way in producing good front handspring skills. This psychological aspect is very important in gymnastics, considering that gymnastics has extreme movements that are difficult to do, in this study it was proven that self-confidence has a direct positive effect on front handspring skills. Data analysis shows the effect of self-confidence on front handspring skills with a coefficient value of 0.651 and significant at 0.000 <0.05, in other words, if self-confidence increases, the resulting front handspring skills will also increase. This finding also confirms that self-confidence directly determines front handspring skills by 65.1%, this figure shows that self-confidence is one of the important factors in performing front handspring movements. This is in line with Firdaus Hendry's research (Yudho, 2017) that there is a positive relationship between self-confidence and front handspring skills.

6. **The direct effect of arm muscle power on front handspring skills through confidence**

    Based on the results of research data analysis that has been carried out by researchers, it is shown that arm muscle power has a positive indirect effect on front handspring skills through self-confidence. Data analysis shows the effect of arm muscle power on self-confidence resulting in a coefficient value of 0.171 with a significance value of 0.031 <0.05, meaning that when there is an increase in arm muscle power, self-confidence will increase. Based on the results of the data analysis, it can be interpreted that students who have good arm muscle power will have an effect on increasing their self-confidence, so that in carrying out the front handspring movement students are able to produce maximum movements and satisfactory front handspring results. This means that arm muscle power has an indirect effect on front handspring skills through self-confidence, so it can be concluded that self-confidence is able to mediate between arm muscle power and front handspring skills.

7. **The direct effect of waist flexibility on front handspring skills through confidence**

    As described in the previous chapter, flexibility is a person's ability to be able to move with the widest possible range of motion in his joints. In doing the front handspring movement, flexibility is needed, especially in the flexibility of the

waist. As in the research of (Yuliyanto, 2018) and (Putra, 2015) that flexibility has a close relationship with front handspring skills. This is in accordance with the results of data analysis in this study that the influence of waist flexibility on front handspring skills produces a coefficient value of 0.199 and a significance at 0.017 <0.05, meaning that when there is an increase in waist flexibility, self-confidence will increase. This means that waist flexibility has an indirect effect on front handspring skills through self-confidence, so it can be concluded that self-confidence is able to mediate between waist flexibility and front handspring skills.

CONCLUSION

Conclusions were drawn based on research findings with exogenous variables consisting of arm muscle power (X1), waist flexibility (X2) and self-confidence (X3). The endogenous variable is Front Handspring Skill (Y), as follows:

1. Arm muscle power (X_1) have a direct and significant effect on self-confidence (X_3) of Sport Coaching Education Students in State University of Medan.

2. Waist flexibility (X_2) has a direct and significant effect on self-confidence on self-confidence (X_3) of Sport Coaching Education Students in State University of Medan.

3. Arm muscle power (X_1) have a direct and significant effect on front handspring skills (Y) of Sport Coaching Education Students in State University of Medan.

4. Waist flexibility (X_2) has a direct and significant effect on front handspring skills (Y) of Sport Coaching Education Students in State University of Medan.

5. Self-confidence (X_3) has a direct and significant effect on front handspring skills (Y) of Sport Coaching Education Students in State University of Medan.

6. Arm muscle power (X_1) have an indirect and significant effect on front handspring skills (Y) through self-confidence (X_3) of Sport Coaching Education Students in State University of Medan.

7. Waist flexibility (X_2) has an indirect and significant effect on front handspring skills (Y) through self-confidence (X_3) of Sport Coaching Education Students in State University of Medan.

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