

## The Effect of Hatha Yoga and Namaskar Surya Yoga on Flexibility and Balance in Women

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### Abstract

*The purpose of this study was to analyze the effect of Hatha yoga and Surya Namaskar yoga on flexibility and balance in women. The research method used in this research is quantitative with quasi-experimental method, with research design using pretest and posttest, group I Hatha Yoga, group II Yoga Surya Namaskar and group III control group, with data analysis using ANOVA. The data collection process was carried out by testing the flexibility and balance of the FIT FUN PLACE exercise group. Then the data were analyzed using the SPSS series, the target of this research was members of the FIT FUN PLACE gymnastics with 30 members, divided into 3 groups of 10 people each, this study was conducted for 16 meetings. There is a significant effect on increasing flexibility in the group that does Hatha Yoga with an average increase in flexibility of 2.9 or an increase of 9%. A significant effect on improving balance in the group that did Hatha with an average increase in balance of 2.77 or 13%. Increased flexibility in the group who did Surya Nakasmara Yoga with an average increase in flexibility of 2.35 or an increase of 7%. Improved balance in the group that did Surya Nakasmara Yoga with an average increase in balance of 4.56 or an increase of 19%.*

### Keywords

hatha yoga; surya  
namaskar yoga;  
flexibility; balance;  
women



## I. Introduction

In the current era of advanced technological developments, there are many activities that can be done using only smartphones and the internet, such as playing games, listening to music, watching movies, shopping online, searching for information, transactions via m-banking. Even in carrying out daily activities, many are facilitated such as the use of cars, motorbikes, elevators, escalators, making a person rarely even lazy to do motion activities, especially to carry out heavy activities or even sports activities. Many of the benefits obtained by moving include improving blood circulation, strengthening the heart muscle, strengthening the lungs, strengthening muscles, bones and connective tissues, besides moving can make the body healthier and fitter. If humans are less mobile, it can cause various diseases, including hypokinetic.

According to WHO (2018), physical activity is defined as body movements produced by skeletal muscles that require energy expenditure. Physical activity is a movement that is carried out in a planned manner as a form of muscle training and energy burning (Samsudin, 2021). Physical activity is an inseparable part of the life of living things, ranging from simple to very complex activities (Sulaiman in Arif, 2021). Physical activity is complex and multi-dimensional behavior. Many different modes of activity contribute to total physical activity, these include work, household physical activity (e.g.

babysitting, household cleaning), transportation (e.g. walking, cycling to work) and leisure time physical activity (e.g. dancing, swimming). Sport is a subcategory of leisure physical activity and is defined as physical activity in which planned, structured and repetitive bodily movements are performed to improve or maintain one or more components of physical fitness. Muscles are said to be active tools of movement because they have the ability to contract and relax. With this ability the body can perform various kinds of movements. These abilities include flexibility, balance, and strength.

Flexibility is the body's ability to perform exercises with a large or wide amplitude of movement. According to Bompaa (2000) (in Mekayanti et al., 2015: 40) that flexibility is the ability of the wrist or joint to be able to make movements in all directions with a large and wide range of motion in accordance with the function of the joints being moved. Another term for flexibility that is often found is flexibility and flexibility. Balance is the condition of a person being able to maintain a certain position without falling. According to Mekayanti et al (2015: 45) Balance is the ability to maintain body balance when placed in various positions. To maintain stability, flexibility and balance, you can use a variety of exercises, one of which is yoga. Yoga gymnastics movements combine physical to improve posture, breathing techniques, meditation and relaxation so that they are effective and safe to apply because there have been many modifications, Vitalistyawati (2019: 27).

Today's women have roles in many key areas of the household. A lot of housework often takes up free time, so women tend to ignore health problems. Entering the age of 30 years, the activities carried out by women begin to decrease and the physiological process of aging begins to appear, thus requiring types of exercise that can be done efficiently, such as yoga.

## II. Research Methods

In this kind of research is using research methods kuantita tif, clicking use the approach of quasi-experiment (quasi exsperimen) with r Definition of research using " Tow group pretest-posttest desaign".

**Table 1.** Research Design

$T1_1$	$X_1$	$T2_1$
$T1_2$	$X_2$	$T2_2$

Source: Maksum (2018 )

Information:

- T1 1 : Pretest hatha yoga group
- X1 : Hatha yoga group treatment
- T1 2 : Posttest hatha yoga group
- T2 1 : Pretest of Surya namaskar yoga group
- X2 : Surya namaskar yoga group treatment
- T2 2 : Posttest of Surya namaskar yoga group

Meanwhile, the population in this study amounted to the population is the entire research subject whose characteristics have been determined by the researcher (Sriundy, 2015: 240). The population in this study are:

30 Members of the Fit Fun Place aerobics group with an age range of 20-30 years. Sampling in this study using saturated sampling, namely the sampling technique used is less than 30 people (Riduwan 2013: 21).

Data collection techniques are a very strategic step in a research because the research has the main goal of obtaining data. In (Maksum, 2012: 107) data collection is an important part of the research process. the quality of research is influenced by how far the data collection is carried out. Researchers may fail, as a result of collecting incorrect data. based on the research design to be used, data collection in this study consisted of three stages, namely: (1) pretest, (2) treatment, (3) posttest. The pretest will be held in one meeting which will get data on flexibility and balance from the sample, namely members of the Fit Fun Place aerobic group. Treatment will be held 16 times, within a period of six weeks (three times a week) referring to Bompa (in Bifarman, 2019: 165) by members of the Fit Fun Place aerobics group which is divided into two groups. The posttest was carried out in one meeting after the treatment to obtain data in the form of flexibility and balance levels for members of the Fit Fun Place aerobic group. For sampling, using the results of the pre-test ranked 1 to 20, then sampling is taken by jumping one number or zig-zag such as 1,3,5,7... and 2,4,6,8... and then draws again for get a fair share.

## **2.1 The Independent Variable**

*A practice of hatha yoga*

*B Surya Namaskar Yoga Practice*

## **2.2 The Dependent Variable in this Study is the Level of Flexibility and Balance**

To give meaning to the data in this study analyzed data processing , the type of data to be collected in this study is to test the level of flexibility and balance in mas ing each group. after the test results will be recorded and calculated based on the group and type of exercise applied, data analysis using descriptive statistical techniques , normality test, homogeneity test Lavene's test , different test using ANOVA statistical analysis and analyzed with the help of SPSS computer program (Statistical Program). For Social Sciences) .

A. Independent variable: daily physical activity.

B. Dependent variable: Physical fitness and academic achievement.

This research was conducted at SDN Pesanggrahan I for 2 months or 8 weeks, the test and measurement tools used were multistage fitness test (MFT) to measure physical fitness while academic achievement used cognitive tests in the form of multiple choice.

The data analysis used were descriptive statistics, normality test, homogeneity test, ANCOVA (analysis of covariance), and analysis with the help of a computer program SPSS (Statistical Program For Social Science) 23.0.

## **III. Discussion**

The results of this study were obtained through research that has been carried out and produced data. This study aims to compare Hatha yoga practice and Surya Namaskara yoga practice to the decrease or increase in Surya Namaskara yoga practice for members of the Fit Fun Place studio as many as 30 members.

Group 1 who do Hatha yoga exercises.

**Table 2.** In Practice: Hatha Yoga, Pretest and Posttest Data are Obtained as Follows:  
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
PRETEST	10	28	27.5	54.95	77.333
POSTTEST	10	30	36	33.10	1.868
PENINGKATAN	10	2	5	2.90	.810
Valid N (listwise)	10				

Based on the results of the data obtained in Table 2 discusses the results of flexibility in group 1, namely in the pretest the minimum value is 28, the maximum is 27.5, while the average is 54.95. In the post test, the lowest score is 30, the maximum value is 36, while the average is 33.10. from taking the pretest and posttest there was an average increase of 2.90.

**Table 3.** Descriptive Analysis of Flexibility Data Collection in Group 2

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
PRETETS	10	28.00	36.00	31.6000	2.22111
POSTTEST	10	32.00	37.50	34.1500	1.71675
PENINGKATAN	10	1.00	4.00	2.3500	.94428
Valid N (listwise)	10				

The minimum is 28, the maximum is 36 while the average is 31.6. In the post test, the lowest score was 32, the maximum value was 37.50, while the average was 34.15. from taking the pretest and posttest there was an average increase of 2.35.

**Table 4.** Descriptive Analysis of Flexibility Data Collection in Group 3

Descriptive Statistics					
	N	Mini mum	Maxi mum	Mean	Std. Deviation
PRETEST	10	26.00	29.5	56.75 00	83.73611
POSTEST	10	27.00	33.50	30.60 00	1.99722
PENINGF KTAN	10	.00	1.50	.4000	.51640
Valid N (listwise)	10				

The result of flexibility in group 3 is that in the pretest the minimum score is 26, the maximum is 29.5, while the average is 56.75. In the post test, the lowest score is 27, the maximum value is 33.50, while the average is 30.60. From taking the pretest and posttest there was an average increase of 0.40.

**Table 5.** Descriptive Data Retrieval Balance in Group 1  
**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
PRETEST	10	11.00	27.80	18.4800	5.40243
POSTEST	10	14.40	30.60	21.3100	4.94558
PENINGFKTAN	10	1.20	4.90	2.7700	1.07191
Valid N (listwise)	10				

The result of the balance in group 1 is that in the pretest the minimum score is 11, the maximum is 27.80, while the average is 18.48. In taking the post test, the lowest score is 14.40, the maximum value is 30.60, while the average is 21.31. from taking pretest and posttest there was an average increase of 2.77.

**Table 6.** Descriptive Analysis of Balance Data Collection in Group 2  
**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
PRETEST	10	12.70	25.50	18.5100	5.64357
POSTEST	10	17.40	31.20	22.9700	5.08113
PENINGFKTAN	10	1.70	37.00	7.8100	10.42235
Valid N (listwise)	10				

The results of the balance in group 2, namely in the pretest the minimum value is 12.70, and the maximum is 25.50, while the average is 18.51. In taking the post test, the lowest value is 17.40, the maximum value is 31.20, while the average is 22.97. From taking the pretest and posttest there was an average increase of 7.81 which showed a greater increase than in group 1.

**Table 7.** Descriptive Analysis of Balance Data Collection in Group 3  
**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
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PRETEST	10	14.50	24.00	19.5500	3.66614
POSTTEST	10	16.00	24.00	20.4000	2.99333
PENINGFK TAN	10	-1.20	12.40	2.0700	3.74790
Valid N (listwise)	10				

The results of the balance in group 3, namely in the pretest the minimum value is 14.50, and the maximum is 24 while the average is 19.5. In the post test, the lowest score was 16, the maximum value was 24, while the average was 20.4. From taking the pretest and posttest there was an average increase of 2.07 which showed a smaller increase than the two groups that received treatment.

### 3.1 Hypothesis Testing Terms

After describing the research data, the next step before testing the hypothesis is to test for normality and test for homogeneity. The aim is to find out whether the data is normally distributed and homogeneous.

#### a. Normality Test

The data normalization test using the Kolmogorov-Smirnov test (Maksum, 2018: 65) aims to ensure that the data obtained is normally distributed (symmetrically).  $P\text{value} > 0.05$ , the data is normally distributed.  $P\text{value} < 0.05$ , the data is not normally distributed. Analysis of normality Kolmogorov-Smirnov test data collection flexibility group 1.

**Table 8.** One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		10
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	1.53627472
Most Extreme Differences	Absolute	.126
	Positive	.126
	Negative	-.088
Test Statistic		.126
Asymp. Sig. (2-tailed)		.200 <sup>c,d</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Data sig. the significance of  $0.200 > 0.05$ , it can be concluded that the flexibility data of group 1 resulted in a residual value with a **normal contribution**.

Analysis of normality Kolmogorov-Smirnov test data collection flexibility group 2

**Table 9.** One-Sample Kolmogorov-Smirnov Test

		Unstandardi zed Residual
N		10
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	1.99037618
Most Extreme Differences	Absolute	.103
	Positive	.097
	Negative	-.103
Test Statistic		.103
Asymp. Sig. (2-tailed)		.240 <sup>c,d</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Data sig. the significance of  $0.240 > 0.05$ , it can be concluded that the flexibility data of group 2 resulted in a residual value with a **normal contribution**.

Analysis of normality Kolmogorov-Smirnov test data collection flexibility group 3

**Table 10.** One-Sample Kolmogorov-Smirnov Test

		Unstandardi zed Residual
N		10
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	1.03696386
Most Extreme Differences	Absolute	.234
	Positive	.234
	Negative	-.151
Test Statistic		.234
Asymp. Sig. (2-tailed)		.129 <sup>c</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Data sig. the significance of  $0.129 > 0.05$ , it can be concluded that the flexibility data of group 2 resulted in a residual value with a **normal contribution**.

Analysis of normality Kolmogorov-Smirnov test data collection balance group 1

**Table 11.** One-Sample Kolmogorov-Smirnov Test  
Unstandardized Residual

N		10
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	1.33681582
Most Extreme Differences	Absolute	.192
	Positive	.192
	Negative	-.110
Test Statistic		.192
Asymp. Sig. (2-tailed)		.200 <sup>c,d</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Data sig. the significance of  $0.200 > 0.05$ , it can be concluded that the flexibility data of group 2 resulted in a residual value with a **normal contribution**.

Analysis of normality Kolmogorov-Smirnov test data collection balance group 2

**Table 12.** One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		10
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	1.65527345
Most Extreme Differences	Absolute	.126
	Positive	.126
	Negative	-.123
Test Statistic		.126
Asymp. Sig. (2-tailed)		.200 <sup>c,d</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Data sig. the significance of  $0.200 > 0.05$ , it can be concluded that the flexibility data of group 2 resulted in a residual value with a **normal contribution**

Analysis of normality Kolmogorov-Smirnov test data collection balance group 3



**Table 13.** One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		10
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	.97493500
Most Extreme Differences	Absolute	.240
	Positive	.165
	Negative	-.240
Test Statistic		.240
Asymp. Sig. (2-tailed)		.106 <sup>c</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Data sig. the significance of  $0.106 > 0.05$ , it can be concluded that the flexibility data for group 3 resulted in a residual value with **normal contributions**.

#### b. Homogeneity Test

Homogeneity testing in this study using the *Lavene Test* on the SPSS program. If the statistical value is greater than 0.05 then the data has an ariant homogeneous variance.

**Table 14.** Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
PENINGKATAN	Based on Mean	1.822	2	27	.181
	Based on Median	1.737	2	27	.195
	Based on Median and with adjusted df	1.737	2	23.928	.197
	Based on trimmed mean	1.842	2	27	.178

The significance value is more than 0.05 ( $0.178 > 0.05$ ) so it can be concluded that the data variance is homogeneous.

Data Analysis of homogeneous results of increased flexibility using the Lavene's Test

**Table 15.** Multiple Comparisons

Dependent Variable: PENINGKATAN

LSD

(I)	(J)	Mean Difference	Std. Error	Sig.	95% Confidence Interval
KELOMPOK	KELOMPOK				

		(I-J)			Lower Bound	Upper Bound
kelompok 1	kelompok 2	.55000*	.34599	.124	-.1599	1.2599
	kelompok 3	1.98000*	.34599	.000	1.2701	2.6899
kelompok 2	kelompok 1	-.55000*	.34599	.124	-1.2599	.1599
	kelompok 3	1.43000*	.34599	.000	.7201	2.1399
kelompok 3	kelompok 1	-1.98000*	.34599	.000	-2.6899	-1.2701
	kelompok 2	-1.43000*	.34599	.000	-2.1399	-.7201

\*. The mean difference is significant at the 0.05 level.

**Table 16.** Variable

VARIABLE		yes/no difference
Group 1	group 2	There is
Group 1	group 3	There is
group 2	Group 1	There is
group 2	group 3	There is
group 3	Group 1	There is
group 3	group 2	There is

The conclusion in table 16 is that each group *has differences*. Homogeneous analysis data results of increased balance.

**Table 17.** Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
PENINGKATAN	Based on Mean	2.579	2	27	.094
	Based on Median	1.162	2	27	.328
	Based on Median and with adjusted df	1.162	2	11.258	.348
	Based on trimmed mean	1.611	2	27	.218

The significance value is more than 0.05 ( $0.178 > 0.05$ ), so it can be concluded that the data variance is **homogeneous**

Data Analysis of homogeneous results of increased flexibility using the *Lavene's Test*.

**Table 18.** Dependent Variable: PENINGKATAN LSD

(I) KELOMPOK	(J) KELOMPOK	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
kelompok 1	kelompok 2	-5.04000*	2.87311	.091	-10.9351	.8551
	kelompok 3	.70000*	2.87311	.809	-5.1951	6.5951
kelompok 2	kelompok 1	5.04000*	2.87311	.091	-.8551	10.9351
	kelompok 3	5.74000*	2.87311	.056	-.1551	11.6351
kelompok 3	kelompok 1	-.70000*	2.87311	.809	-6.5951	5.1951
	kelompok 2	-5.74000*	2.87311	.056	-11.6351	.1551

The conclusion in table is that each group *has differences*

**Table 19.** Different Test Statistical Analysis ANOVA

VARIABLE		yes/no difference
Group 1	group 2	There is
Group 1	group 3	There is
group 2	Group 1	There is
group 2	group 3	There is
group 3	Group 1	There is
group 3	group 2	There is

To find out the difference in the effect of increasing before and after treatment between groups, using statistical analysis ANOVA (Analysis of Variance) with a hypothesis rejection level at = 0.05 (Maksum, 2018: 107).

**Table 20.** Statistical Analysis ANOVA (Analysis of Variance) Flexibility Data Collection ANOVA

PENINGKATAN					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20.893	2	10.446	17.453	.000

Within Groups	16.161	27	.599		
Total	37.054	29			

Based on the table above (ANOVA) it is known that the significance value is less than 0.05 ( $0.00 < 0.05$ ), the conclusion is that the average flexibility of the three groups is significantly **DIFFERENT**.

**Table 21.** Statistical Analysis ANOVA (Analysis of Variance) Data Collection Balance ANOVA

PENINGKATAN					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	196.131	2	98.065	2.376	.012
Within Groups	1114.391	27	41.274		
Total	1310.522	29			

Based on the table above (ANOVA) it is known that the significance value is less than 0.05 ( $0.12 < 0.05$ ), the conclusion is that the average balance results of the three groups are significantly **DIFFERENT**.

#### IV. Conclusion

Yoga is an approach to health that aims to help all components of the body work together in harmony. Annurina (2012: 348). In general, according to Wirawanda (2013) in Akbar, 2016: 03) Yoga can increase strength, increase flexibility, train balance, reduce pain, practice breathing, smooth organ function, inner calm and increase concentration and intelligence.

In this study, it resulted in an increase in flexibility in group 1, namely the group that received the Hatha yoga exercise treatment in the pre-test the average value was 30.5 and in the post-test the average value became 33.1, the increase in the average value was 2.9. then group 2 who received the Surya Namaskara yoga practice treatment in the pre-test the average value was 31.6 and in the post-test the average value became 34.15, the increase in the average value was 2.35 while the value of flexibility in group 3, namely the control group that did not receive any treatment in the pre-test the average value was 30.3 and in the post-test the average value became 33.6, the increase in the average value was 0.4

And the results of increasing balance in group 1, namely the group that received the Hatha yoga exercise treatment in the pre-test the average value was 18.48 and in the post-test the average value became 21.31, the increase in the average value was 2.77. then group 2 who received the Surya Namaskara yoga practice treatment in the pre-test the average value was 18.51 and in the post-test the average value became 22.97, the increase in the average value was 4.56 while the flexibility value in group 3, namely the control group that did not receive any treatment in the pre-test the average value was 19.55 and in the post-test the average value became 20.4, the increase in the average value was 2.7

There is a significant effect on increasing flexibility in the group that does Hatha Yoga with an average increase in flexibility of 2.9 or an increase of 9%. To the increase in balance in the group that did Hatha with an average increase in balance of 2.77 or 13%. Increased flexibility in the group who did Surya Nakasmara Yoga with an average increase in flexibility of 2.35 or an increase of 7%. Improved balance in the group who did Surya Nakasmara Yoga with an average increase in balance of 4.56 or an increase of 19%. There is a difference between Hatha yoga and Surya Namaskara yoga in terms of flexibility and balance in women.

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