

# Salsa Dance Could Improve Effectively to Body Balance in Elderly with Risk of Falls

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## Abstract

Currently the number of elderly in Indonesia tends to increase. Based on 2014 Susenas data, the number of elderly in Indonesia reaches 20.24 million people (8.03%). One of the most common physical disorders in the elderly is disruption of the body's balance and risk to falls. The risk of falling in the elderly can be prevented by doing physical exercise in the form of Salsa dance. Salsa dance has movements that can improve stability, flexibility, mobility and body balance. This study aims to analyze the effectiveness of Salsa dance on body balance in the elderly. The research method used quasi-experimental with the pre test-post test design control group. As many as 70 elderly who experienced balance disruption in the Puskemas Sarijadi had participated in this study. The sample was taken by using consecutive sampling, then divided equally between the control group and the intervention group. The instrument used to measure elderly balance is Short Physical Performance Battery (SPPB). Data analysis is carried out in two stages, namely univariate analysis using the mean, standard deviation, maximum value and minimum value and percentage; then followed by bivariate analysis using the Wilcoxon signed rank test and independent T test. The result shows that there are differences in the balance of the elderly before and after the intervention in the treatment group, whereas in the control group there were no significant differences. Therefore, it can be concluded that Salsa dance can significantly improve elderly body balance, especially if done regularly. The increase will appear significant after the intervention carried out for 10 and 20 times. It is suggested that nurses utilize Salsa dance as an alternative in dealing with symptoms of body balance disorders in the elderly. This intervention can be implemented along with other activities of the elderly in community centre health services.

## Keywords

Elderly Body Balance, Salsa Dance, Risk of Falls

## 1. Background

Currently the number of elderly in Indonesia tends to increase. Based on 2014 Susenas data, the number of elderly in Indonesia reached 20.24 million people (8.03%) with more elderly women, with the ratio of 10.77 million women to as much as 9.47 million men. In elderly body there is a decrease in joint movement function, muscle strength, sensory processes and impaired sensory motor integration [1].

The degenerative process in the elderly causes various physical, psychological, social and spiritual problems. One of the physical problems in the elderly is the disruption of the body's balance and the risk of falling which causes femur fractures. Hirsh, Sommer, Olsen (1990) in American Family (2000) state that 44.9% elderly people fall due to disturbances in body balance associated with increasing age, drug use, disorders (cognitive, vision, neuromuscular), unsafe environments and behavior. Other research shows that femur fractures in elderly women are twice as large as in elderly male [2]. Thigh fractures in elderly can cause diseases and disabilities which will interfere with the elderly's independence in carrying out daily activities and in turn lead to social isolation [3].

The risk of falling in the elderly can be prevented by doing exercises that can improve balance. Some physical exercises that are effective in improving the ability to maintain balance, flexibility, strength and muscle strength and mobility include walking, Tai Chi [4] [5] and dancing, such as Tango [6] waltz and salsa [1].

Salsa dance has repetitive movements which can improve stability, flexibility, mobility and body balance [7]. Salsa dance is one type of motion therapy/dance therapy performed by nurses in providing care to clients [8]. Previous studies on Salsa dance still heavily emphasized on its aesthetic and physical fitness aspects [3] [9]. Studies that are related to health aspects of Salsa dancing, such as on balance disturbances in elderly at risk of falling, are still rarely explored [1] [10].

This study aims to analyze the effectiveness of Salsa Dance to the body balance of the elderly where the results are expected to be applied by nurses when implementing Elderly coaching program, so that it can help to increase the body balance of the elderly, their wellbeing, and prevents the incidence of femur fractures among elderly.

## 2. Research Methodology

This research is a Quasi experimental study, using the control group pretest-posttest design carried out on active elderly who take part in the elderly gymnastic activities in Bandung, west Java Province. A total of 70 elderly people who participated in this study was obtained by consecutive sampling technique, and then divided equally into 2 groups, namely the control group and the intervention group with each of them having 35 elderly people. Through this design, researchers giving intervention in the form of Salsa dance in the intervention group. The intervention was carried out by giving Salsa dance training 20 times

for 7 weeks, 3 times weekly exercise, with duration of therapy between 30 - 60 minutes.

This study has ethical approved by ethical commission of Bandung Health Polytechnic, with the number: 17/KEPK/PE/V/2017 on the date May, 8, 2017 that signed by drg. RR. Megananda Hiranya Putri, M. Kes., as a head of ethical commission, and also has got permission by head of Bandung health district on the date July, 05, 2017 with the number of letter: 070/8916-Dinkes.

The research was conducted in the area of Sarijadi community health centre Kota Bandung for 4 months from July 2017 until October 2017, consist of 2 months for intervention group and two months for control group. Short Physical Performance Battery (SPPB) was used to measure the balance of the elderly before and after the Salsa training [11]. The analysis was carried out in 2 stages, namely univariate analysis using central tendency, and bivariate analysis using Wilcoxon test in each group. After that, independent t-test was used to find out the effectiveness of salsa dance to the body balance between the elderly in control and in treatment groups.

### 3. Results

#### 3.1. Univariate Analysis

##### 3.1.1. Characteristic of Respondents

Distribution of the characteristics of respondents based on age and gender can be seen in **Table 1**.

**Table 1** shows that the mean age of respondents in the intervention and control groups was almost the same: 63.6 years in the intervention group with a standard deviation of 1.82 years, and in the control group 62.8 years with a standard deviation of 1.98 years.

Men is the gender minority among the study participants, which only consisted of 6 people (17.10%) in the control group and none in the intervention group, because in Indonesia culture Salsa dance did not popular for man elderly, therefore most of them did not want to participate in the intervention group. Then, the participant of this study is mainly consisted of women, where the

**Table 1.** Distribution of characteristics of respondents in the Sarijadi Health Center area Bandung City (n = 35 people in each group).

Respondents Characteristic	Group	Characteristic Category	f	%	mean	median	SD	Min - Max
Age	Intervention	-	-	-	63.6	62.5	1.82	60 - 65
	Control	-	-	-	62.8	62.5	1.98	60 - 65
Gender	Intervention	Male	0	0	-	-	-	-
		Female	35	100	-	-	-	-
	Control	Male	6	17.10	-	-	-	-
		Female	29	82.90	-	-	-	-

intervention group composed of 35 women (100%) and 29 women (82.90%) in the control group.

### 3.1.2. Respondents Blood Pressure

Based on **Table 2**, it appears that in the intervention and control groups, most of them tend to have no increase in diastolic blood pressure from before intervention, 10 interventions, and 20 interventions, ranging from 70 - 80 mmHG. Whereas the increase in systolic pressure was seen in the intervention group. Most respondents experienced an increase in systolic pressure after 10 interventions, and respondents in the control group experienced an increase in systolic blood pressure after 20 interventions.

### 3.2. Bivariate Analysis

Test of Wilcoxon signed ranked is used to analyze the effect of Salsa dance intervention on the Average SPPB Test Score in the intervention group and the control group. After the normality test with the Saphiro wilk test was performed, the result had shown that the data were not normally distributed.

**Table 3** shows the results of analysis using Wilcoxon test. The results obtained shows that there are significant differences with p value of 0.00 ( $p \leq 0.05$ ), meaning that at 5% alpha there is a significant difference in the mean between SPPB Test score before and after intervention in the treatment group. Whereas the control group obtained p value 0.450, which is greater than 0.05. This means that there is no statistically significant difference between the SPPB Test score before and after the intervention in the control group.

Furthermore, an independent T test was conducted to analyze the effectiveness of Salsa dance intervention on the Average SPPB Test Score (Body Balance) which results can be seen in **Table 4**.

**Table 2.** Respondent's blood pressure frequency distribution (n = 35 people in each group).

Blood Pressure	Intervention Group						Control Group						
	Pre-int		10 times		20 times		Pre-int		10 times		20 times		
	f	%	f	%	f	%	f	%	f	%	f	%	
Diastole (mmHg)	70 - 80	26	74.3	26	74.3	25	71.4	23	65.7	23	65.7	22	62.9
	81 - 90	9	25.7	9	25.7	10	28.6	12	34.3	12	34.3	13	37.1
	Total	35	100	35	100	35	100	35	100	35	100	35	100
Sistole (mmHg)	110 - 119	5	14.3	3	8.6	5	14.3	4	11.4	2	5.7	3	8.6
	120 - 129	9	25.7	8	22.9	8	22.9	8	22.9	9	25.7	7	20.0
	130 - 139	21	60.0	24	68.6	22	62.9	23	65.7	24	68.6	25	71.4
	Total	35	100	35	100	35	100	35	100	35	100	35	100

**Table 3.** The difference in average SPPB test score (Body balance) for elderly in the intervention group and control group.

Variable	Mean	SD	<i>p Value</i>	n
<b>Intervention Group</b>				
Before intervention	8.029	1.124	0.00	35
After intervention	10.829	0.985		
<b>Control Group</b>				
Before intervention	8.229	1.114	0.450	35
After intervention	8.286	1.506		

**Table 4.** Hypothesis test of differences in SPPB test score in the control group and treatment group.

	Mean	<i>p value</i>	N
Treatment Group	10.81	0.00	70
Control Group	8.25		

The analysis results in **Table 4** show that the results of statistical tests using independent t test obtained p value  $\leq 0.05$  after 20 interventions, which means that at 5% alpha there is a significant difference between the increase in SPPB scores in the elderly who received Salsa training intervention compared to the control group.

#### 4. Discussion

The purpose of this research is to determine the effectiveness of Salsa Dance on body balance and mobility in 70 elderly people between the ages of 60 - 65 years, which then divided into 2 (two) groups; treatment group and the control group. The effectiveness of Salsa dancing on elderly body balance is measured by using Short Physical Performance Battery (SPPB) which aims to measure physical function of the elderly, especially lower limb functions that might experience balance disorders, muscle weakness, and walking difficulty.

The intervention was carried out for 20 times, with the frequency of the exercise of 3 times weekly for 60 minutes. Measurements were carried out at the pretest, after 10 treatments, and posttest (after 20 treatments). In the pre test, the treatment group has mean value of 8.03 with a standard deviation of 1.12 and the control group has mean value of 8.23 with a standard deviation of 1.11. It means that most elderly experienced balance disorder and mobility. That is because according to Gomez, *et al.* 2013, (Appendix 9) if the SPPB value is less than 9.95, it means that there have been difficulties in carrying out daily tasks.

Furthermore, the measurement taken after the 10<sup>th</sup> interventions shows an increase in the value of mean in the treatment group as much as 9.70, and in the control group as much as 8.31. The reason that SPBB was carried out after the 10<sup>th</sup> interventions is in accordance to Earhat's (2009) statement that stated that

in 2x/week exercise sessions in 10 weeks, increase in body balance can be observed in the 5 - 10 weeks, that is why after the 10<sup>th</sup> interventions, there is a sure increase in body balance. So in accordance to the statement, the measurement was carried out after the 10<sup>th</sup> Salsa dance interventions. Even though both groups shown an increase in mean, the treatment group shows more significant increase than the control group.

After 20 interventions were given, there was an increase in both groups, which means that the elderly were no longer experience imbalance and mobility disorders. However, the hypothesis test shows that the mean score in SPPB test in the treatment group has significant difference compared to the control group. This result proves that Salsa dancing can effectively improve body balance and mobility in the elderly. In the treatment group there was an increase in the SPPB score, both after 10 interventions (data attached) and after 20 interventions, but the SPBB scores in the control group tended to be more uniform compared to the treatment group. This is due to elderly in the control group only doing the usual exercise.

The Salsa dancing intervention in this study resulted in an increase in the balancing ability, walking speed, and mobility from sitting to standing position, and made it easier for the elderly to carry out daily activities.

Several studies have shown that Salsa dancing is a safe, and easy physical exercise for the elderly, especially for those who experience impaired control of body balance and walking speed, and it also prevent the risk of falling [8] [12].

Salsa dancing consists of special signs in each of its steps, and is usually between 8 - 16 counts in the music [13]. Some of the movements of Salsa and Tango are similar to the movements performed in physiotherapeutic exercises, such as changing body position, twisting, and backward walking movements [5].

Salsa dancing is usually done in pair, which one partner becomes the leader and other as the follower, where the follower plays a role to conform to the movements that is directed or communicated by the leader so it can create a harmonious movement and build an intimate and enjoyable socialization atmosphere [14].

The Salsa dance is usually accompanied by music where the participants must follow the music at every step, and usually the music presented is music that is often heard/familiar, so that it is easier for participants to synchronize motor movements to the rhythm [15]. Musical accompaniment will activate the amygdala, hypothalamus, hippocampus, orbiturofrontal cortex [16], thereby stimulating the release of hormones such as endorphins, dopamine, endocannabinoids, and nitric acid [13] and increase excitement and desire to continue training, and eliminate fatigue during exercise [17].

Besides, Salsa dance is an important physical exercise for the elderly to be able to achieve excitement in training, improve memory and can increase motivation to dance, and also a useful tool as a strategy in promoting regular elderly physical activity in community health centre [18] [19].

## 5. Conclusions

Based on this research, the following conclusions can be drawn:

- 1) There is a difference in the body balance before intervention and after intervention of the elderly in the treatment group, whereas in the control group there is no significant difference.
- 2) Salsa dance can significantly improve the body balance of the elderly especially after the interventions were given for 10 and 20 times.

## 6. Suggestions

The results of this study can be used as a scientific basis for health workers, especially nurses in the community health centre who are responsible for elderly activities to be used as an alternative to overcome the symptoms of body balance disorders in the elderly, and can be applied to elderly gymnastics activities. The results of this study also can be used as the Evidence-Based Practice in Complementary Therapy conducted by nurses as a part of implemented the Indonesian Nursing Law.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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