

## The Correlation Between Limited Range of Movement And Functional Ability of Frozen Shoulder Patient at Medical Rehabilitation Department RSUPDr Mohammad Hoesin Palembang

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### Abstract

**The Correlation Between Limited Range of Movement and Functional Ability of Frozen Shoulder Patient at Medical Rehabilitation Department RSUP Dr Mohammad Hoesin Palembang.** Frozen shoulder is the inflammation of shoulder joint, marked by a painful, adhesive, atrophic and shortened joint capsule. As a result, movement range of the joint becomes limited. In frozen shoulder patients, the limitation can affect and lessen functional ability. Therefore, this study is aimed to analyze the correlation between the limited range of movement of shoulder joint and the functional ability of frozen shoulder patients in Department of Medical Rehabilitation of RSUP Dr. Mohammad Hoesin Palembang. This study is an observational analysis using correlation test with cross-sectional design. Twenty nine frozen shoulder patients in Department of Medical Rehabilitation of RSUP Dr. Mohammad Hoesin Palembang in November 2018 that met the inclusion criteria were taken as subjects of this study by using consecutive sampling technique. Functional ability was assessed with quickDASH questionnaire while shoulder joint range of movement with goniometry. Data analysis was conducted subsequent to the assessments. The result of correlation test between functional ability and shoulder joint range of movement is significant. The study findings include active flexion ( $p=0,000$ ;  $r=-0,669$ ), active extension ( $p=0,004$ ;  $r=-0,520$ ), active abduction ( $p=0,000$ ;  $r=-0,663$ ), active adduction ( $p=0,022$ ;  $r=-0,423$ ), passive flexion ( $p=0,001$ ;  $r=-0,589$ ), extension passive ( $p=0,002$ ;  $r=-0,543$ ), passive abduction ( $p=0,000$ ;  $r=-0,676$ ) and passive adduction ( $p=0,038$ ;  $r=-0,388$ ). There is a significant correlation between limited range of movement and functional ability in frozen shoulder patients from Department of Medical Rehabilitation of RSUP Dr. Mohammad Hoesin Palembang.

Keywords: Frozen Shoulder, Range of Movement, Functional Ability

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### 1. Introduction

The shoulder joint or glenohumeral joint is one of the greatest range of movements in all joints. Range of movement (ROM) in the shoulder joint is abduction, adduction, antehversion, retroversion, external rotation and internal rotation.<sup>1</sup> The extent of motion in the shoulder joint and the structure of the angle of the human head are 180 ° and the angle of the scapula glenoid fossa basin is only 120 ° causing 1/3 of the surface of the humeri head not to be surrounded by the glenoid fossa scapulae, so that the shoulder joint becomes unstable. Because the instability causes the

shoulder joints to be injured, inflammation occurs, and muscle and ligament tears are one of *frozen shoulder*.<sup>2</sup>

*Frozen shoulder* or *adhesive capsulitis* is a condition in which inflammation, pain, adhesion, atrophy and shortening of joint capsules occur so that there is limited movement of the shoulder joint.<sup>1</sup> The average prevalence of *frozen shoulder* occurs most often at the age of 40 to 60 years and is more common in women ( 58.4%) of men (41.6%)<sup>3</sup>

The broad limitations of the motion of the shoulder joint can result in a decrease in functional activity. Decreasing functional ability can cause a person's quality of life to be

disturbed especially in the ability of physical activity such as using shampoo, rubbing his back while bathing, wearing and removing t-shirts, wearing buttoned shirts, wearing pants, picking up objects, carrying heavy loads, taking objects in the pants back pocket.<sup>4</sup>

Based on the symptoms experienced by sufferers of *frozen shoulder* in the form of pain and the limited range of motion of the shoulder joint that can affect functional activities that can be carried out by patients with *frozen shoulder*, this study aims to determine whether there is the correlation between limited range of movement and functional ability of *frozen shoulder* patient. In addition, by identifying common characteristics in the form of age, sex, and diagnosis to find out whether this can affect the incidence of *frozen shoulder* and find out how much influence the joint motion has on the functional ability of the *frozen shoulder* patient.

## 2. Research Methodology

This study used observational analytic research, correlation test, with cross sectional design to determine the correlation between limited range of movement and functional ability of frozen shoulder patient at Medical Rehabilitation Department RSUP Dr Mohammad Hoesin Palembang. This research was conducted in November 2018 at the Medical Rehabilitation Installation Dr. RSUP Mohammad Hoesin Palembang.

The subjects of this study were 29 patients with *frozen shoulder* who met the inclusion and exclusion criteria at the Medical Rehabilitation Installation of Dr. RSUP. Mohammad Hoesin Palembang. The sample selection used consecutive sampling technique. The dependent variable in the study is the functional ability of patients with *frozen shoulder* while the independent variable is the limited range of movement in patients with frozen shoulder. Data analysis is done by univariate, bivariate and multivariate analysis. Univariate analysis is done by calculating the frequency distribution. Bivariate analysis was

performed using a correlation test. Multivariate analysis was performed using multiple linear regression tests because it has more than one independent variable. The analysis was carried out by the backward method, ie variables that did not meet P-out (0.10) were excluded from the model.

## 3. Result

Of the 29 *frozen shoulder* patients, 7 patients (24.1%) were man and 22 patients (75.9%) were women.

Based on age, most people with *frozen shoulder* occur at the age of 50-59 years (51.7%). There were 2 patients (6.9%) at age less than 49 years, 8 patients (27.6%) at the age of 60-69 years, and 4 patients (13.8%) at the age of more than 70 years.

Based on the diagnosis of frozen shoulder, most occur in the right side of frozen shoulder as many as 25 patients (86.2%). Then in the left and bilateral frozen shoulder each of 2 people (6.9%).

**Table 1. Sample Distribution Based on General Characteristics (N=29)**

No	General Characteristic	N	%
1.	Gender		
	Man	7	24,1
	Woman	22	75,9
2.	Age		
	≤ 49 years	2	6,9
	50-59 years	15	51,7
	60-69 years	8	27,6
	≥70 years	4	13,8
3.	Diagnosis of <i>frozen shoulder</i>		
	Right side	25	86,2
	Left side	2	6,9
	Bilateral	2	6,9

ROM in *frozen shoulder* patients is measured using a goniometer that assesses active and passive flexion, extension, abduction and adduction. The average value, standard deviation, minimum and maximum of

active and passive movements of flexion, extension, abduction and adduction can be seen in table 2.

The functional ability in frozen shoulder patients was assessed using the quickDASH questionnaire which had a score range from 0 to 100, where the greater the quickDASH score the more limited or the decreased the functional ability of the patient. Of the 29 patients with frozen shoulder in this study, the average value was 34.455 with a standard deviation of 16.7416, a minimum value of 11.4 and a maximum value of 75.

**Table 2. Frequency Distribution of Range of Movement Frozen Shoulder Patient**

	Mean	Std. deviasi	Min	Maks
Active Flexion	117,24	31,498	50	180
Active Extension	35,69	7,874	20	60
Active Abduction	112,59	36,120	35	180
Active Adduction	56,38	21,251	10	90
Passive Flexion	123,79	29,691	60	180
Passive Extension	42,07	8,610	25	60
Passive Abduction	117,41	31,527	45	180
Passive Adduction	62,93	19,754	20	90

The correlation between the limitations of range movement of joint motion and the functional ability of frozen shoulder patient can be seen in table 3. Range of Movement Frozen Shoulder Patient

**Table 3. The correlation between the limitations of range movement of joint motion and the functional ability of Frozen Shoulder**

	<i>QuickDASH</i> Score correlation coefficient (r)	P value
Active motion		
Active Flexion	-0,669	0,000
Active Extension	-0,520	0,004
Active Abduction	-0,663	0,000
Active Adduction	-0,423	0,022
Passive motion		
Passive Flexion	-0,589	0,001
Passive Extension	-0,543	0,002
Passive Abduction	-0,676	0,000
Passive Adduction	-0,388	0,038

Based on table 3, the limitation movement of joint motion flexion, extension, abduction, adduction both actively and passively with functional abilities measured using the quickDASH questionnaire has a significant correlation with the direction of negative correlation which means the higher the value of ROM motion of the shoulder joint the smaller the score of functional ability which shows that the increased functional ability that can be done by sufferers of frozen shoulder. But it can also be the opposite, namely the lower the value of shoulder joint ROM ROM, the greater the functional ability score which indicates that the decreased functional ability that can be performed by people with frozen shoulder.

In table 3 also can be seen the value of the correlation coefficient in each motion of the shoulder joint. The active flexion motion is -0.669 which means it has a strong correlation, the active extension movement is -0.520 which means it has a moderate correlation, the active abduction movement is -0.663 which means it has a strong correlation, the active adduction movement is -0.423 which means it has a moderate correlation. In the passive flexion movement of -0.589 which means it has a moderate correlation, passive extension movement is -0.543 which means it has a moderate correlation, passive abduction movement is -0,676 which means it has a strong correlation, passive adduction movement is -0,388 which means a weak correlation.

To find out how big the motion of the shoulder joint affects the functional ability of frozen shoulder patients using the multiple linear regression tests with the backward method, the variable that does not meet the P-out (0.10) is excluded from the model. In this study 6 models were obtained and in the 6th model the variables that met P-out were passive extension, passive and active abduction. The results of multivariate analysis can be seen in table 4.

**Table 4. Multivariate Analysis Dependent variables with independent variables**

Variabel	p value	(B)	Koef. Beta	t	Stand. Error
ExtensionPasif	0,002	-0,825	-	-	0,251
AbductionPasif	0,002	-0,245	0,425	3,419	0,072
Adduction Aktif	0,061	-0,200	0,462	3,430	0,102
Constant	0,000	109,298	0,254	3,430	9,366
			-	9,366	11,619

Based on table 4, an equation is obtained to assess functional ability by looking at the value of passive extension, passive abduction and passive adduction by looking at the value (B).

Functional Ability = 109,298 - (0,825) Passive Extension - (0,245) Passive Abduction - 0,200 Active Adduction

In table 4 can also be seen from the coefficient value B for each variable, namely: Each increase in passive extension ROM is 1, then the functional ability will be lower by 0.825 after controlled by the passive abduction variable, and active adduction. Each increase in passive abduction ROM is 1, then the functional ability will be lower by 0.245 after controlled by the passive and active adduction extension variables. Each increase in active adduction ROM is 1, then the functional ability will be lower by 0.200 after the passive extension variable is controlled, and passive abduction.

#### 4. Discussion

The results of this study were conducted at the Medical Rehabilitation Installation of Dr. RSUP Mohammad Hoesin Palembang showed that out of 29 patients with frozen shoulder, women had experienced frozen shoulder 22 (75.9%) patients and 7 (24.1%) patients.

This is in accordance with previous studies which stated that frozen shoulder is most

prevalent in women (53.5%) than men (46.5%) .<sup>5</sup> In another study also mentioned that women had a percentage of 58.4% and men by 41.6%, which means women suffer more from frozen shoulder more often than men.<sup>6</sup> In addition, the theory in the journal entitled Frozen Shoulder- A stiff problem that requires a flexible approach which states that women have a risk suffer from frozen shoulder more often than men due to the influence of estrogen and progesterone hormones especially in the elderly and those who have experienced menopause.

Based on age, most people with frozen shoulder occur at the age of 50-59 years (51.7%). This is supported by previous research which states that the age most often suffers from frozen shoulder at the age of 50-59 years.<sup>6</sup> Then in another study stated that frozen shoulder most often occurs at the age of 40-60 years.<sup>8</sup>

Based on the diagnosis of frozen shoulder, in this study it was found that the right shoulder (86.2%) was more frequently affected than the left shoulder or both. This is supported by other research which states that the right shoulder is more often affected by frozen shoulder with a percentage of 95.3% of the left shoulder with a percentage of 4.7% caused by the right hand is more often used for activities that resulting in easier trauma.<sup>5</sup> In addition, in another study mentioned that frozen shoulder most often occurs on the right shoulder with a percentage of 54%, followed by the incidence of left frozen shoulder with a percentage of 36% and rarely occurs in both shoulders with a percentage of 10% .<sup>9</sup>

This study shows that there is a significant correlation between the limitations of the movement of joint motion and the functional ability of patients with frozen shoulder. This is supported by previous research stating that extension and abduction movements both actively and passively have a correlation value of 0.001 (p <0.05) with a correlation coefficient of -0.33 which has a negative correlation direction.<sup>9</sup> In another study mentioned that in patients with frozen shoulder

who most often experience extensive limitations of joint motion usually in flexion, abduction and external rotation.<sup>10</sup> In addition, in a clinical practical guideline on *Shoulder Pain and Mobility Deficits: Adhesive capsulitis* states that in addition to flexion, abduction and external movement rotation, limitations of ROM in patients with frozen shoulder also occur in adductional movements and internal rotation

## 5. Conclusion

Based on the results of research on the correlation between limited range of movement and functional ability of the shoulder joint in patients with frozen shoulder at the Medical Rehabilitation Installation of RSUP Dr. Mohammad Hoesin Palembang, it can be concluded that there is a significant correlation between the width of joint motion flexion, extension, abduction and adduction actively and passively with the functional ability of patients with frozen shoulder which shows the higher ROM motion of the shoulder joint, the smaller the score of functional ability shows that increasing functional ability can be carried out by sufferers of frozen shoulder. However, it can also be the opposite, namely the lower the value of ROM of the shoulder joint movement, the greater the score of functional ability indicates that the decreased functional ability can be performed by sufferers of frozen shoulder.

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