

The Effect of Respiratory Muscle Stretch Gymnastic (RMSG) on Pulmonary Function Test among Pregnant Ladies: An Experimental Study

Khyati Bhambhi¹, Priyanshu V. Rathod²

¹Post Graduate Scholar, RK University

²Dean faculty of Medicine, RK University

Abstract: *Background:* Respiratory function altered in pregnancy due to hormonal imbalances and size of uterus. With trimester progression, the relaxing position of diaphragm muscle moves 5 cm upward so the normal anatomy of chest will compromise. Because of these changes there is progressive decrease in lung volumes and capacities during pregnancy. So RMSG is Respiratory Muscle Stretch Gymnastic (RMSG) is the stretching exercise of respiratory muscle of chest wall. *Aim:* To find the effect of Respiratory Muscle Stretch Gymnastic (RMSG) on pulmonary function test among pregnant ladies. *Objectives:* 1) To find out the effect of RMSG on FEV1 in pregnant ladies. 2) To find out the effect of RMSG on FVC in pregnant ladies. 3) To find out the effect of RMSG on FEV1/FVC in pregnant ladies. *Methodology:* 60 subjects was taken according to the inclusion criteria. Then we assessed the subjects. Consent form was taken by the therapist as they have no any issue to participate in this study. Therapist divide subject in group of 30. There were be two group one was experimental and another was control group. Describe the procedure and protocol. Protocol was of 4 weeks and 7 days per week. The subjects were doing this according to the study duration. Before starting the procedure we were taken pre outcome measures. Subjects were performed the RMSG exercise. After completing protocol duration post outcomes were taken. *Result & Discussion:* Statistical analysis was done using SPSS version 20. Within the group pre and post data analysis was done using paired T test which shows significant improvement that is p value < 0.05. In control group there is not that much significance because there is some improvement in FEV1 and FVC. In experimental group FEV1/FVC ratio goes high because there is more improvement in FEV1. *Conclusion:* In context to result and discussion, we do conclude from our study that 2nd and 3rd trimesters in pregnant women are prone to have diminished pulmonary function test- FEV1, FVC and FEV1/FVC ratio considering the anatomical changes, however, intervention of RMSG must be taken into consideration for pregnant women to maintain pulmonary function. However, cellular gaseous exchange at central as well as peripheral levels must be assessed to understand the physiological changes.

Keywords: RMSG, Pulmonary function, Pregnant ladies, FEV1, FVC and FEV1/FVC

1. Introduction

There are major changes in pulmonary anatomy and physiology during Pregnancy period. For the safe delivery it is better to have knowledge of the pulmonary function test parameters.¹ Pregnancy induces marked changes in the cardiovascular and respiratory systems that are essential for meeting the increased metabolic demands of the mother and fetus. Important respiratory system changes are occur in the wall of chest, upper airway and static lung volumes.²

Pulmonary functions are altered due to hormonal imbalances and size of the uterus in pregnancy. Because there is an increase in abdominal volume, transverse diameter of chest will increase and it will resulting from a widened sub costal angle in which the normal anatomy of chest will compromise and pulmonary function altered. Suboptimal pulmonary function in pregnancy has been associated with adverse pregnancy outcome. Alteration in Pulmonary function can affect pregnancy outcome and pregnancy can affect the pulmonary function.³

In a study to determine pulmonary function results in the 2nd and 3rd trimester of pregnancy by Deolalikar⁴, FVC (Forced Vital Capacity) showed a significant decrease in second and third trimester of pregnancy. The FEV₁ and FEV₁/FVC% were significantly lower in third trimester pregnant women than that first trimester of pregnant lady and non-pregnant lady. FEV₁/FVC% gradually decreased from first to third

trimester of pregnant lady.⁵

Ventilation in lung occur through the Respiratory Muscle. To work in better way there should be maximal generation in the muscle, but maximal force generates when muscle is in their optimal length.⁸

In pregnant lady there is alteration in optimal length of respiratory muscle because of uterus size.⁸

Respiratory Muscle Stretch, Gymnastic (RMSG), is a stretching exercise of muscles of breathing in the chest, aimed at extending inspiration and expiration of muscles in the process of ventilation. Muscle stretching exercises will benefit from increased development of the chest wall and lung functions.⁶

RMSG is a group of stretching exercises sequentially performed to stretch specific muscles which are involved in respiration.⁷

Through the Respiratory Muscle Stretch Gymnastic (RMSG), Respiratory muscle spindle stimulate and it sends signal to alpha motor neuron as a result of extrafusil fiber of muscle spindle contracts. The more muscle contracts the more it will relax. So optimal length of the respiratory muscle can be reached.

Volume 10 Issue 4, April 2021

www.ijsr.net

Licensed Under Creative Commons Attribution CC BY

RMSG Includes 5 Technique:⁸

- 1) Elevating the Shoulder
- 2) Stretching the Upper Chest
- 3) Stretching the Lower Chest
- 4) Stretching the Back Muscle
- 5) Elevating Elbow

Remarkable respiratory changes are found among pregnant lady. As dome of diaphragm moves 5 cm upward due to growing fetus in uterus. So optimal length of diaphragm is altered due to which diaphragmatic excursion is altered which directly affects tidal volume along with respiratory capacity and leads to respiratory problem. So there is a need to improve pulmonary function among pregnant lady. Hence Respiratory Muscle Stretching Gymnastic (RMSG) technique was selected as till now not significant research has been done on it.

2. Aim and Objectives

- To find out the effect of RMSG on FEV1 in pregnant ladies.
- To find out the effect of RMSG on FVC in pregnant ladies.
- To find out the effect of RMSG on FEV1/FVC in pregnant ladies.

Hypothesis:

Null hypothesis [H₀]: There is no significant effect of RMSG exercise on pulmonary function among pregnant ladies.

Alternate hypothesis [H₁]: There is significant effect of RMSG exercise on pulmonary function among pregnant ladies.

Materials

- Pen, paper
- Data collection sheet
- Consent form
- PFT machine (helios 401)
- Chair, watch, laptop

Methodology

- Research design: Experimental study
- Sample size: 60 subjects
- Sample source: Jetpur and around area

Inclusion criteria:

- 13th week of pregnancy to 32nd week of pregnancy
- A pregnant lady who understand the purpose of study and willing to participate
- Prior concern by gynecologist

Exclusion criteria

- Critical pregnancy
- 1st trimester of pregnant ladies

3. Procedure

Total 60 subjects were enrolled for the study according to the selection criteria from various places among Jetpur city. To check the effect of Respiratory Muscle Stretching

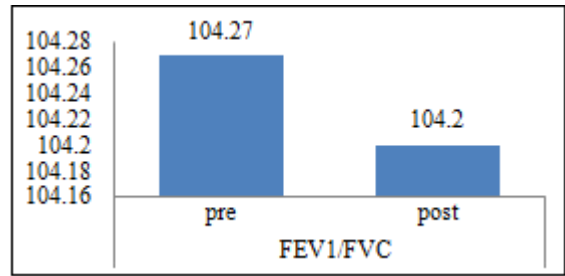
Gymnastic (RMSG) on pulmonary function among pregnant lady there were two groups.

Which were control group and experimental group. In experimental group the intervention was prescribed and control group was not under intervention.

Pre and Post data were taken after completing study duration.

- 1) Elevating the shoulder
- 2) Stretching the upper chest
- 3) Stretching the back muscle
- 4) Stretching the Lower chest
- 5) Elevating the Elbow

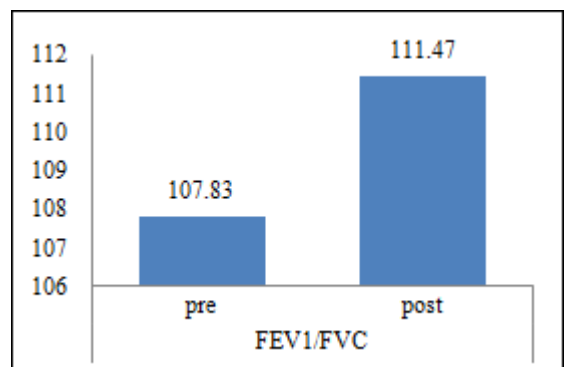
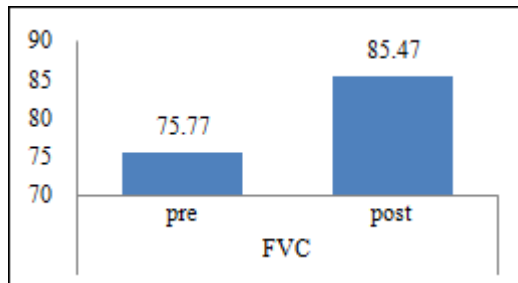
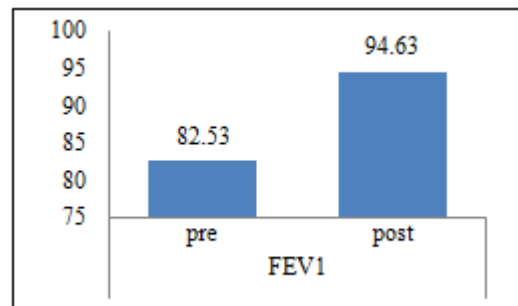




Interpretation: The above table shows that there is same reduction in FEV1 and FVC because of that there is not that much significant change in FEV1/FVC Ratio.

Statistical analysis of pulmonary function for experimental group

Outcome	Experimental group		t Value	p Value
	Pre mean	Post mean		
FEV1	82.53	94.63	-5.361	0.000
FVC	75.77	85.47	-8.641	0.000
FEV1/FVC	107.83	111.47	-2.331	0.027



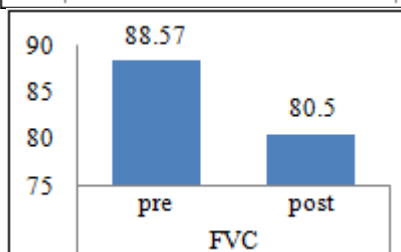
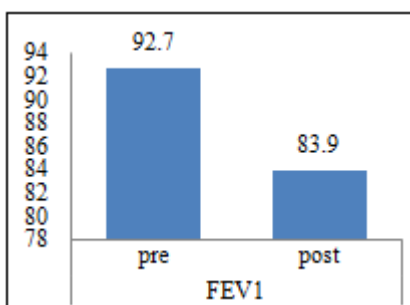
Statistical analysis

After collection of data, pre and post value for FEV1, FVC and FEV1/FVC were analyzed by statistical software and result were found. The statistical software named SPSS 20 was used for data analysis. Microsoft Excel and Word were used to generate graphs and tables.

4. Result & Discussion

Statistical analysis of pulmonary function in control group

Outcome	Control group		t Value	p Value
	Pre mean	Post mean		
FEV1	92.70	83.90	7.287	0.000
FVC	88.57	80.50	6.672	0.000
FEV1/FVC	104.27	104.20	0.055	0.956



Interpretation: The above table shows there is more improvement in FEV1 than FVC because of that the FEV1/FVC Ratio comes high.

5. Conclusion

In context to result and discussion, we do conclude from our study that 2nd and 3rd trimesters in pregnant women are prone to have diminished pulmonary function test- FEV1, FVC and FEV1/FVC ratio considering the anatomical changes, however, intervention of RMSG must be taken into consideration for pregnant women to maintain pulmonary function. However, cellular gaseous exchange at central as well as peripheral levels must be assessed to understand the physiological changes.

References

- [1] Contreras G, Gutierrez M, Beroiza T, Fantin A, Oddo H, Vilarroel L, et al. ventilatory drive and respiratory muscle function in pregnancy Am Rev Respir Dis 1991; 144:837-41.
- [2] Dipok Kumar Sunyal¹, Md Ruhul Amin Study of Forced Expiratory Volume in First Second (FEV1) and Ratio of Forced Expiratory Volume in First Second and Forced Vital Capacity in Percentage (FEV1/FVC) in Pregnant Women, Journal of Enam Medical College (2012) Vol 2, No 1.
- [3] Purvi K changela, Role of physiotherapist in Obstetric and Gynecological conditions.
- [4] Matthew J. Hegewald, Respiratory physiology in pregnancy, Clin Chest Med 32 (2011) 1-13.
- [5] Indian Journal of Public Health Resarch & Development, July 2020, vol 11, No.7.
- [6] M YAMADA, M SHIBUYA, A KANAMARU Benefits of respiratory muscle stretch gymnastics in chronic respiratory disease, Journal of Medical Sciences (1996) 8(1), 63-71.
- [7] Mistry Hetal¹, Borkar Prajakta Ashok² Respiratory Muscle Stretch Gymnastic in Elderly: Impact on Maximum Breathing Capacity, Peak Expiratory Flow Rate and Exercise Capacity, : International journal of health science and research. (2020) vol 10: issue: 3.
- [8] Nikhil Aggarwal¹, Nidhi Ved². A Study to Compare the effect of respiratory muscle stretch gymnastic (RMSG) and diaphragmatic breathing on pulmonary function test among geriatric population Indian Journal of Public Health Resarch & Development (2020) Vol. 11, No. 7.