



# ASSOCIATION OF LUNG CAPACITY IN MUSICIANS AND SINGERS

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## ABSTRACT

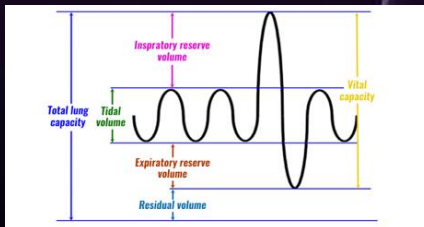
The present study examines the association of lung capacities with musicians playing a woodwind or brass instrument and singing, versus individuals who have no musical history. The purpose of this study is to see if there is a relationship in the lung capacity of participants who have played a musical instrument or sang, versus those who have not.

## BACKGROUND

The research question was raised when examining previous studies done on the effectiveness of music therapy that drew inconclusive results (Harode, D., Shahu, R., 2015). Harode and Shahu (2015) explored previous studies already done on music therapy's effectiveness in published journals.

## METHODOLOGY

Participants were 23 adults between 18-30 years of age. The sample consisted of 15 males, and 8 females. 78% of participants were Caucasian, 17% Latinx, and 5% African American. Individuals then took a self-report survey in which they recorded any prior singing or musical experience, if any. They then proceeded to complete the experimental trials.



## ANALYSIS

Participants were then divided into two groups based on musical history. One group contained participants who reported musical history, whereas the other group was for individuals who reported no prior musical history. Next, a balloon experiment was conducted where the participant would exhale into the balloon to the fullest extent of their ability. Then, a researcher would measure the balloon's circumference. This measure would be repeated three times per participant. Based on these results, the participants were then rated in an ordinal measure, from the highest balloon circumference to the lowest balloon circumference. Once all of the samples were attained, a graph was utilized to convert the participant's balloon measurements into lung volumes (cm). This graph represents the proportional relationship between the volume of air blown into the balloon based upon the balloon's circumference. Then each participant's demographics, such as age, sex, and weight, were applied to a formula to calculate what their predicted lung volume should be. Finally, each participant's actual lung volume was divided by the predicted lung volume in order to establish a ratio of how close participants were to their predictions. With these ratios in mind, the Kruskal-Wallis test was used to examine the two groups. Kruskal-Wallis is a non-parametric test that evaluates whether two groups originate from the same distribution. This form of testing results in a p-value that indicates how closely related the two groups are.

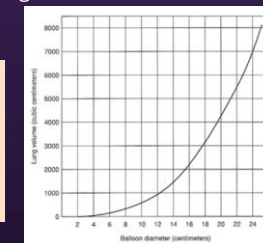
## WORKS CITED

- 1. Harode, D., Shahu, R. (2015). Study of Pulmonary Function and Its Effect on the Wind Instrument Players: A Review. *International Journal for Innovative Research in Science & Technology*, 11(1), 551-554.

## PROCEDURE

All participants were read the IRB statement and informed of the studies intentions. If the participant wanted to volunteer, each would sign up for the study with their email. There were no direct benefits or foreseeable risks involved. The participant then filled out a survey and completed the experimental portion where they would blow into a balloon three times. All of the individual's data was kept in a secure file. Next, all of the lung volumes from each participant were converted into ratios and ran under the Kruskal-Wallis test. The study concluded, finding no clear associations within the two data groups.

Predicted Vital Capacity  
Males =  $0.052(\text{height}) - 0.022(\text{age}) - 3.60$   
Females =  $0.041(\text{height}) - 0.018(\text{age}) - 2.69$   
VC = vital capacity in liters  
H = height in centimeters  
A = age in years



## CONCLUSION

Results of the Kruskal-Wallis test had a high p-value (p=0.412) signifying that there were no major differences in the lung capacity ratios between musicians versus non-musicians. Limitations of this study were prevalent in participant outreach. Preventative health measures taken during the COVID-19 outbreak lead to a smaller sample size which prevented access to more potential participants.