

Angle of bed elevation and readmission rate in patients with congestive heart failure

JULIA PUZAK¹, FULD FELLOW, BSN CANDIDATE 2016; TANIA RANDELL², MS, RN, ACCNS-AG; MEI CHING LEE³, PHD, MS, RN; STUART D. RUSSELL², MD

¹JOHNS HOPKINS UNIVERSITY SCHOOL OF NURSING, BALTIMORE, MD 21205; ²PROGRESSIVE CARDIAC CARE UNIT, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD, 21287; ³UNIVERSITY OF MARYLAND SCHOOL OF NURSING, BALTIMORE, MD, 21201

1 Background

Congestive heart failure (CHF) is a chronic condition associated with high health care costs and a high mortality rate. About 5.7 million Americans are diagnosed with CHF and about half of them will die within five years of diagnosis⁶. Health care costs, medications, and missed work days related to CHF were estimated at \$30.7 billion annually³. Roughly 20% of patients with CHF are readmitted to the hospital within 30 days of discharge despite many strategies that have been developed to reduce readmissions². Fluid overload is the most common reason for hospital readmission⁴. Patients who received optimal diuresis had a significantly decreased risk of being readmitted within 30 days of discharge, but assessing fluid status to titrate diuretics is complex¹. Observing a patient's subjective symptoms may be a non-invasive method to assess fluid status. Patients often report orthopnea, which is associated with elevated jugular venous pressure⁵. The severity of orthopnea and level of fluid overload could be assessed by the number of pillows or angle of bed elevation that allows the patient to sleep without dyspnea. We hypothesize that the angle of bed elevation may be a reliable estimate of fluid status and effective diuresis would result in patients sleeping at a decreased angle of bed elevation.

2 Objectives

- To examine the correlation between the angle of bed elevation and the change in daily weight.
- To examine the correlation between the angle of bed elevation on the night prior to discharge and the incidence of hospital readmission within 30 days.

3 Methods

In-services: Education sessions were held with the nurses on the Progressive Cardiac Care Unit (PCCU) to explain the purpose of the study, procedures for data collection, and how to use the digital protractor (Figure 1).

Data collection: Study participants were identified per the inclusion criteria of admission to the PCCU with an admission diagnosis of CHF and being diuresed. During AM care while the patient was sleeping, the nurse measured the angle of bed elevation using the digital protractor. The angle of bed elevation, number of pillows used, vital signs, and oxygen saturation were recorded in order to provide a comprehensive assessment of their respiratory status and orthopnea at that angle of bed elevation. Also, the patient's weight from the day of enrollment into the study until discharge was recorded each day during AM care. The data collection form captured additional information about patient demographics, disease etiology, ejection fraction, NYHA classification, CHF medications administered during hospitalization, and lab values, weight and vital signs upon admission and discharge. Readmission status within 30 days post discharge was assessed.

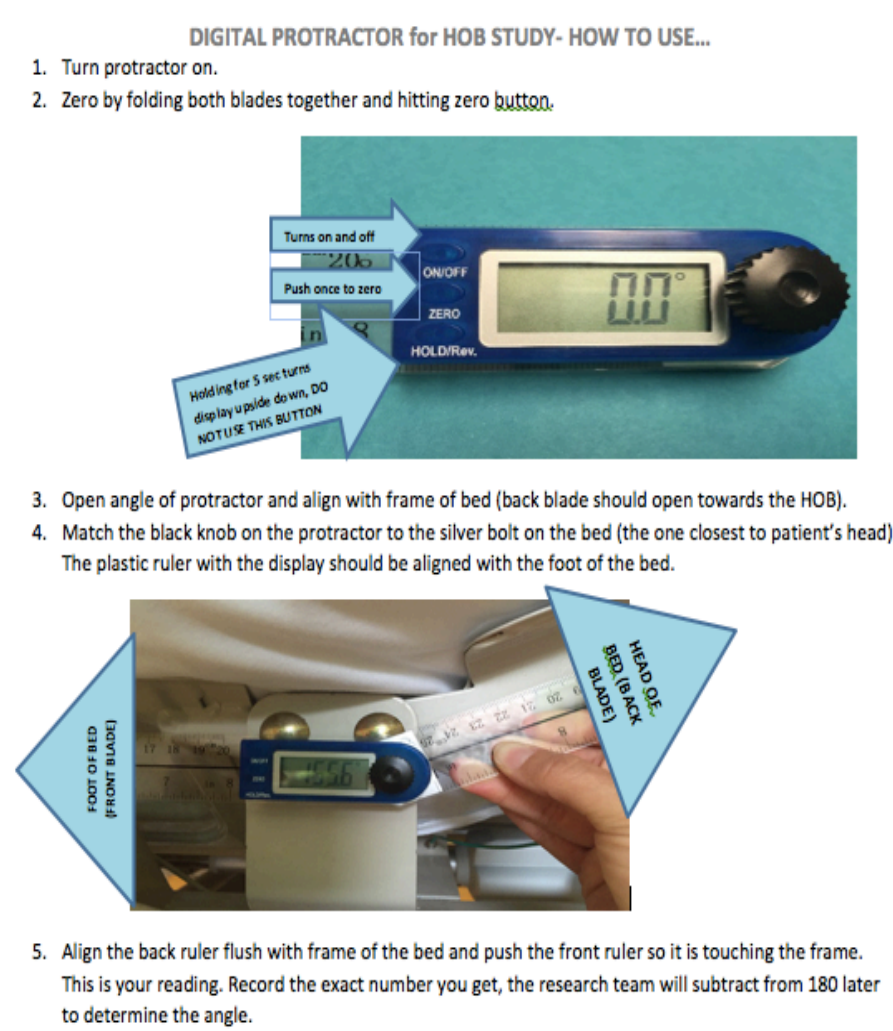


Figure 1. Training materials used to educate PCCU nurses about how to use the digital protractor.

4 Preliminary Data and Results

From August 2015 to May 2016, 100 study participants have been enrolled, which includes 53 males and 47 females. More than half of participants fall within the 60-79 age range and of participants enrolled, 42% were African American and 45% were Caucasian (Figure 2). The top three etiologies of CHF for the participants include idiopathic (54%), followed by ischemic (24%), and then restrictive (14%).

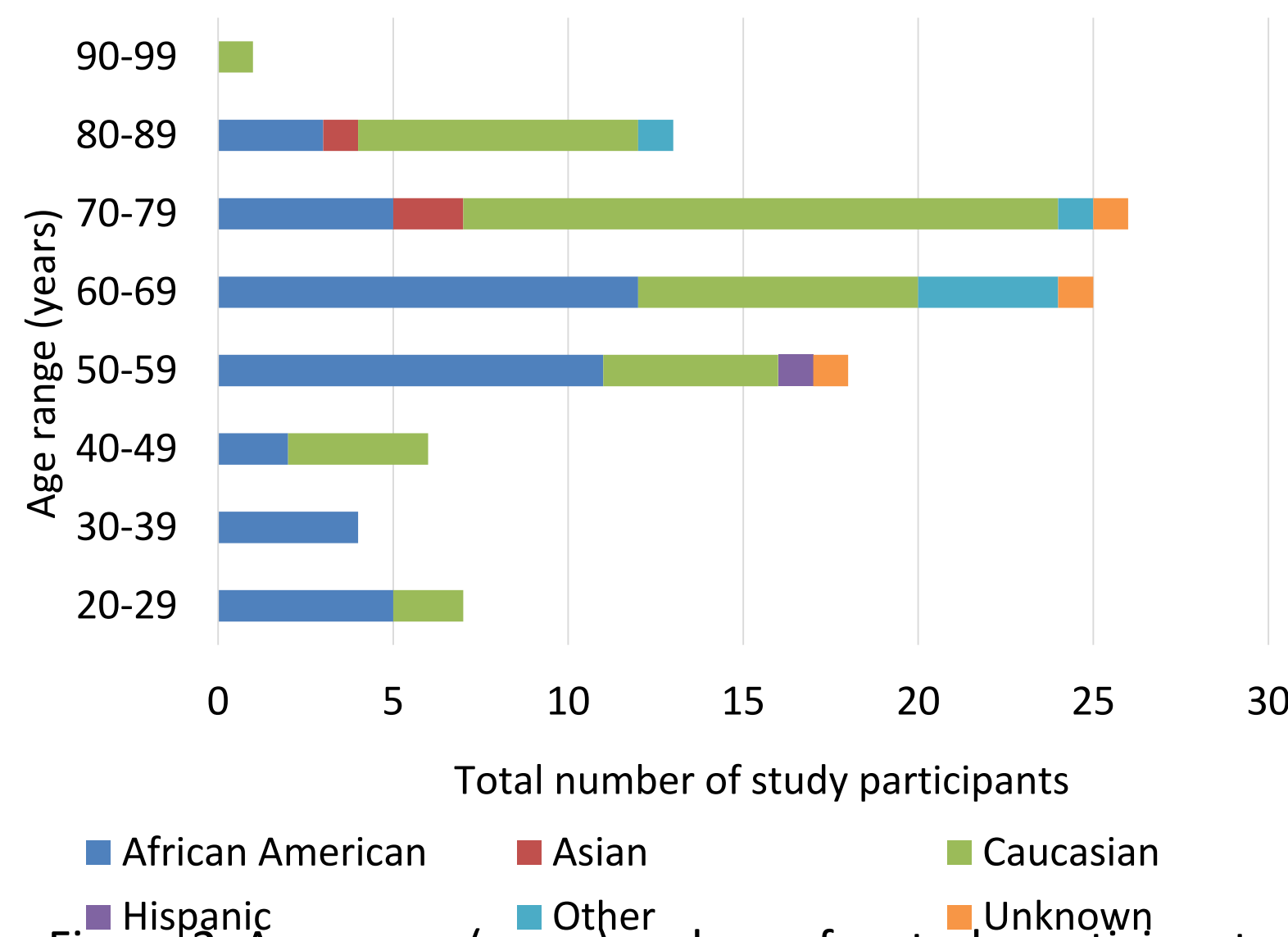


Figure 2. Age range (years) and race for study participants enrolled as of May 2016 (n = 100).

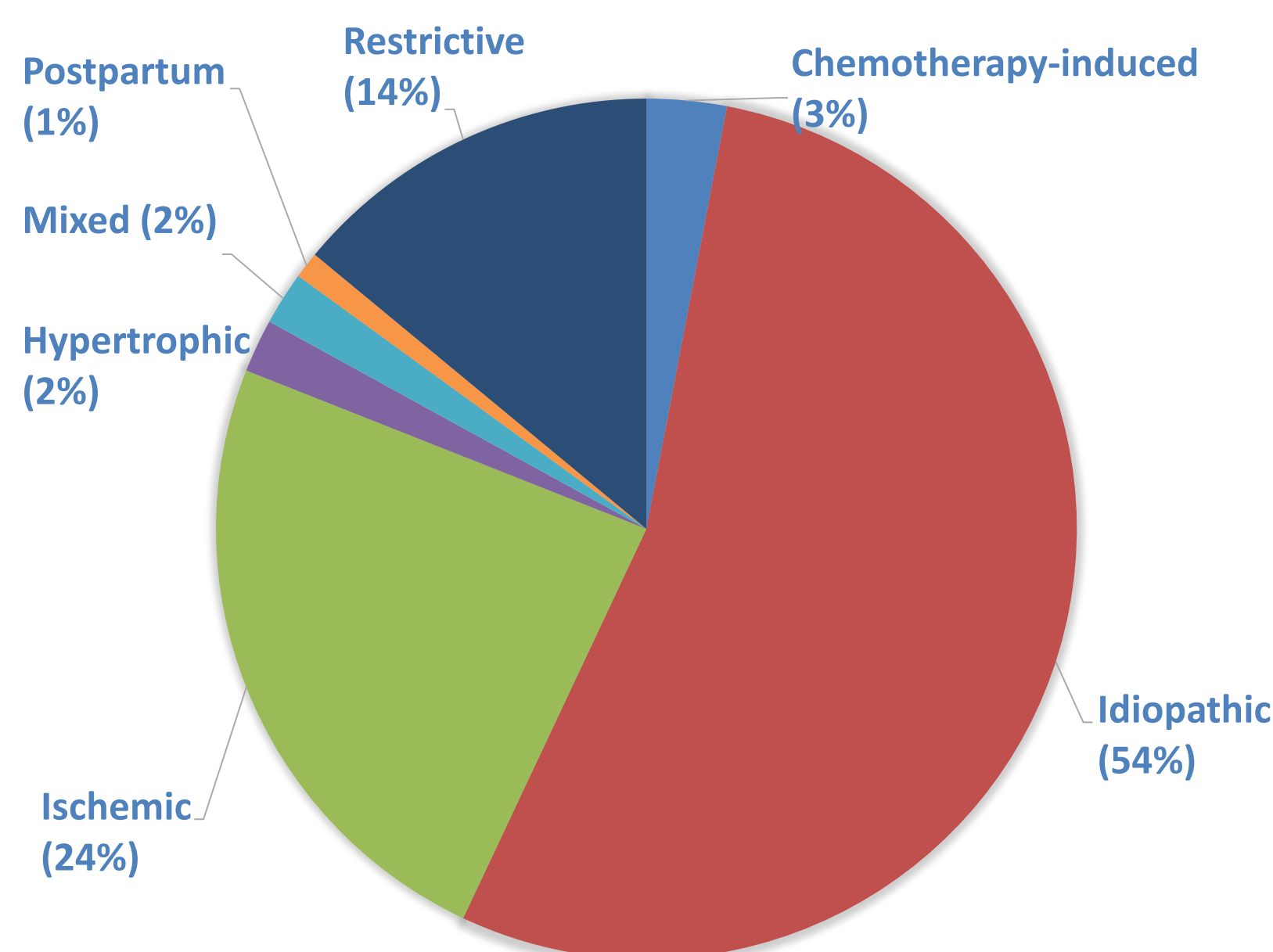


Figure 3. Etiology of CHF for study participants enrolled as of May 2016 (n = 100).

5 Conclusions and Future Directions

With 95% confidence level and 10% weight change, it was estimated a sample size of 150 is needed to detect any significant correlation. Depending on the results, the study may continue and be expanded to other units within Johns Hopkins Hospital. Also, if there is a strong correlation, measuring the angle of bed elevation may become part of the nursing assessment for patients with CHF and be an important consideration for discharge planning.

6 Acknowledgements

Thank you to the PCCU Research Committee for your continual dedication and hard work on the project.

7 References

- Barsuk, J. H., Gordon, R. A., Cohen, E. R., Cotts, W. G., Malkenson, D., Yancy, C. W., & Williams, M. V. (2013). A diuretic protocol increases volume removal and reduces readmissions among hospitalized patients with acute decompensated heart failure. *Congest Heart Fail*, 19(2): 53-60.
- Go, A. S., Mozaffarian, D., Roger, V. L., Benjamin, E. J., Berry, J. D., Borden, W. B., ... Turner, M. B. (2013). Heart disease and stroke statistics-2013 update: a report from the American Heart Association. *Circulation*, 127(1): e6-e245.
- Heidenreich, P. A., Albert, N. M., Allen, L. A., Bluemke, D. A., Butler, J., Fonarow, G. C., ... Trogdon, J. G. (2013). Forecasting the impact of heart failure in the United States: a policy statement from the American Heart Association. *Circ Heart Fail*, 6(3): 606-19.
- Kahwash R. (2013). Aggressive Salt and Water Restriction in Acutely Decompensated Heart Failure: Is It Worth Its Weight in Salt? *Expert Rev Cardiovasc Ther*, 11(9): 1125-1128.
- Kakouros, N. S., & Kakouros, S. N. (2015). Clinical Assessment in Acute Heart Failure. *Hellenic J Cardiol*, 56(4): 285-301.
- Mozaffarian, D., Benjamin, E. J., Go, A. S., Arnett, D. K., Blaha, M. J., Cushman, M., ... Turner, M. B. (2016). Executive Summary: Heart Disease and Stroke Statistics-2016 Update: A Report from the American Heart Association. *Circulation*, 133(4): e38-e599.



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Funding Source: The Helene Fuld Leadership Program for the Advancement of Patient Care Quality and Safety