Early Identification and Intervention of Heart Failure Exacerbation

Alana Swift DNP

Touro University Nevada

ABSTRACT

Heart failure (HF) is a severe disorder in which a person's heart doesn't carry out its functions proficiently. The condition has a higher occurrence amongst the individuals who usually smoke. It has resulted in increased mortality, cost of health care, and missed work across the US. Early HF detection provides an opportunity for the health care professionals to examine and improve treatments and routine involvements that might help treat the disorder, thus reduce the negative implications. This quality improvement project aims to promote early detection of HF symptoms by implementing an HF monitoring tool and care provider training on the tool. The implementation aims to improve early HF treatment, promote adequate care, and reduce the rate of hospital readmission of HF patients. The project will utilize evidence-based clinical research and theoretical methods to design an HF monitoring tool and test its effectiveness.

INTRODUCTION

Heart failure is a severe disorder in which a person's heart doesn't work properly to pump the blood as it is supposed to (Komanduri, Jadhao, Guduru, Cheriyath, & Wert, 2017). Mozaffarian et al. (2016) reveal that HF currently affects roughly 5.7 million adults in the U.S. Roughly half of patients developing HF die within 5 years of diagnosis (CDC, 2019). Heart Failure costs US $30.7 billion each year in health-care related expenses (CDC, 2019). Timely HF detection provides the health care professional an opportunity to deliver early treatment, thus prevent complications (Wang et al., 2015). Health care providers should, therefore, be well-equipped with knowledge on HF symptoms to enable early detection. Clinical manifestations associated with HF include breath shortness during day-to-day activities, gaining weight categorized by feet, legs, ankles and stomach swellings; trouble to breathe when lying down; and overall fatigue or weakness feeling (CDC, 2019). Nurses should continually monitor and promote activities that will reduce their patients' weight.

PROBLEM STATEMENT

Numerous health care providers are unable to identify early signs of HF exacerbation and therefore do not act on early warning signs, resulting in delayed patient treatment. Health are providers need to perform standards of care necessary for the timely HF identification and intervention. Therefore, health care providers should have a superior understanding of the symptoms and warning signs of HF to implement early interventions.

PROJECT OBJECTIVES

1. Implement the HF symptom monitoring tool at the project site for early identification and intervention of HF exacerbation.
2. Achieve at least 90% nurse adherence with the tool.
3. Offer the nurse staff training and education for HF tool before DNP project implementation.
4. Attain a 90% nurse attendance for in-service training and education.
5. Reduce HF-related hospital readmissions.

RESULTS

Methods

Project Design

The quality improvement method was utilized. Heart Failure monitoring protocol for timely identification and intervention of HF exacerbation were designed and implemented. Pre and post-intervention analysis of the rate of admission of HF patients and quality of care were assessed and compared. The use of the tool should improve cardiovascular health, reducing hospital readmissions through early HF exacerbation identification and intervention.

Setting

The project was implemented at a home health care agency situated in Los Angeles County, California, a region with 2010 inhabitants of 10.6 million (United States Census Bureau, 2010).

Measurements

Home health nurses are the population of interest. The partakers undertook a test before the implementation of HF monitoring tools to comprehend how to use this tool. Reliant variables that were measured consist of pre and post-test scores, acquiescence with the use of a tool, and the readmission. Chart check tool allowed manual removal of data before and after the HF tool implementation. SPSS enabled the analysis of data.

Analysis

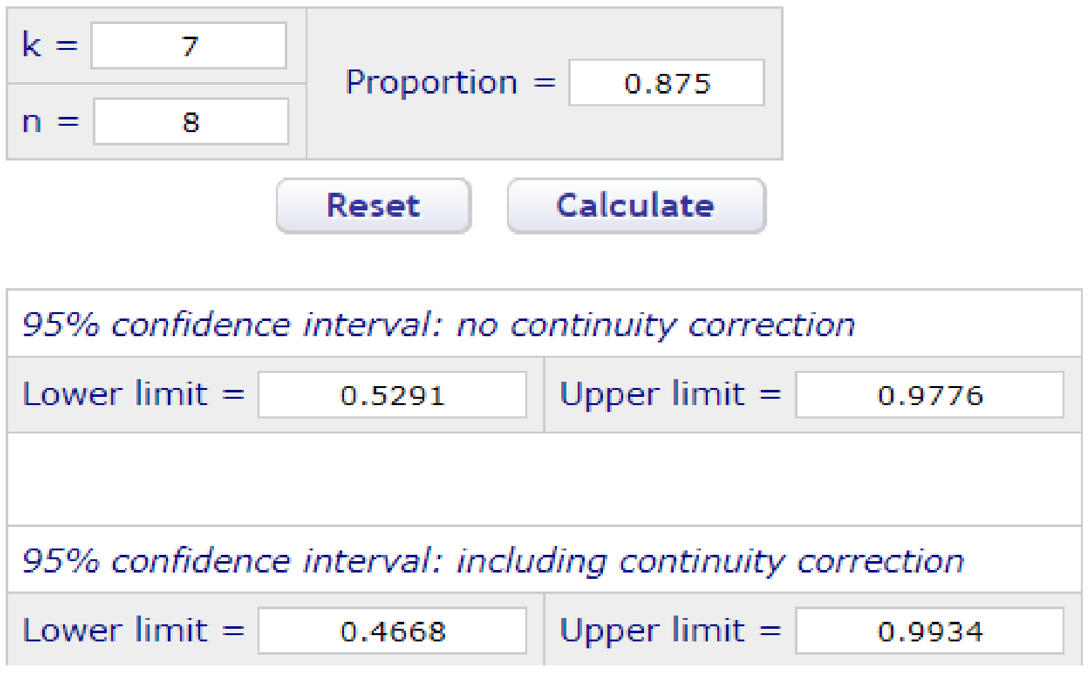
A combined t-test was used to relate home health nurses' awareness before and after the training. The compliance rate was considered using Vassar Stats that calculates the difference between two independent scopes (Lowry, 2020). The readmission rate was similarly considered using the Vassar stats before and after training.

Findings and Significance

Analysis of the collected data suggests that the application of HF monitoring tool results in the timely identification and treatment of HF, improved quality of care, and a reduced admission rate of HF patients. Use of a HF monitoring tool at the project site must enable timely identification and involvement of HF exacerbation. The project success may mean that at most 90 percent of nurses will adhere to the use of this tool. Home health nurses obtain HFEIP tool preparation before the implementation to guarantee 90 percent or a greater acquiescence. There is a predicted decline in the Heart Failure-related hospital readmissions in 30 days after applying HF monitoring tool. The project is significant to nursing as it enables the nursing leaders to find more resolutions to the problems in the health care industry and understand the significance of timely identification and intervention of HF exacerbations. It will also minimize hospital readmissions, deaths, and complications of common nurse stressors (Bui & Fonarow, 2012). Through the QI project, nurses will grow their evidence-based practice skills.

Staff Training Attendance

Proportion tests and use of *F* statistics were used to relate the number of those invited for study and those that attended the training. Seven (87.5%) out of 8 nurses that established an invite to the training participated in the practice. Vassar Statstest was used to analyze the significance of the proportions. Results indicated that the ratio of the nurses who attended training was 52.91 percent to 97.76 percent. The objective was achieved.


k = 7
n = 8
Proportion = 0.875

95% confidence interval: no continuity correction
Lower limit = 0.5291
Upper limit = 0.9776
95% confidence interval: including continuity correction
Lower limit = 0.4668
Upper limit = 0.9934

Figure 1. Proportion test for ratio of nurses who participated in the training.

Staff Understanding of Heart Failure Tool

The Wilcoxon Rank Test was used to calculate the pre- and post-training of the staff's understanding of the Heart Failure tool. Figures 2 and 3 show the nurses' conception was higher on the post-test (mean 95 percent), which was related to pretest (mean 89 percent). *F* statistic was used to define if there was a statistically significant difference in the staff conception before and after training. *T-test* steered for the pretest, and post-test combined data shows difference mean in the scores (pretest-posttest) to be -8.217, -2.550 (refer to figure 4). The data reveals that the post-test scores are considerably higher than the pretest scores, signifying that the staff conception substantially increased after the presentation. The probability value of *t*he t-test was lesser than the chosen 5 percent alpha implication level, therefore significant.

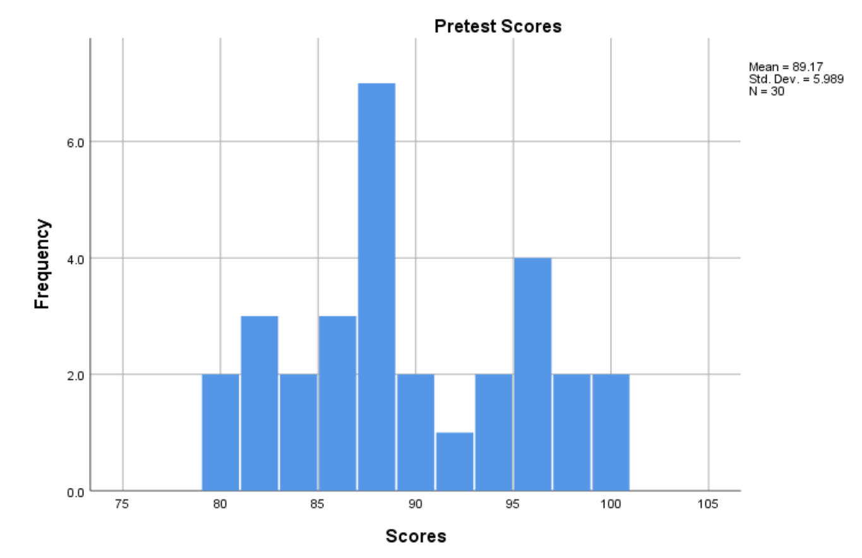


Figure 2. Histogram of distribution of the pretest scores.

RESULTS CONTINUED

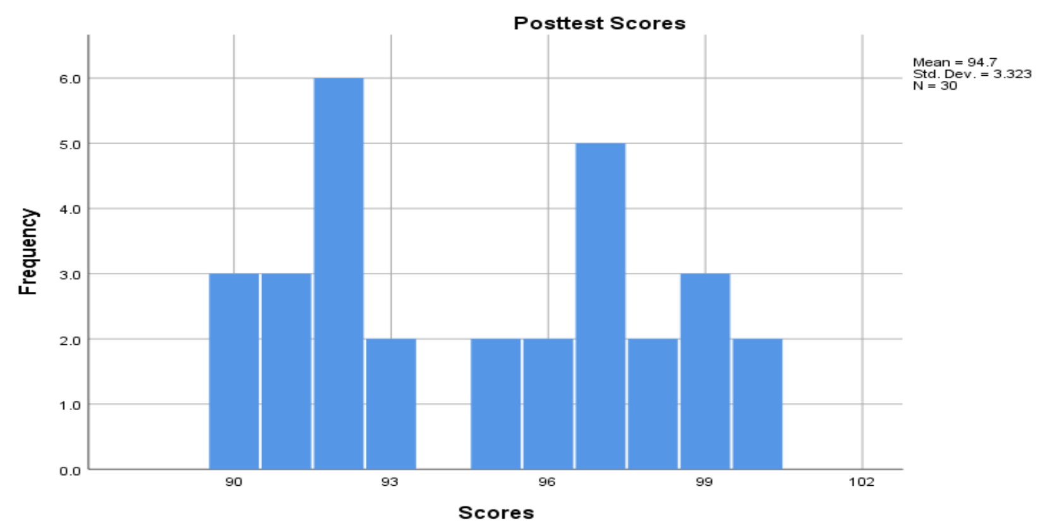
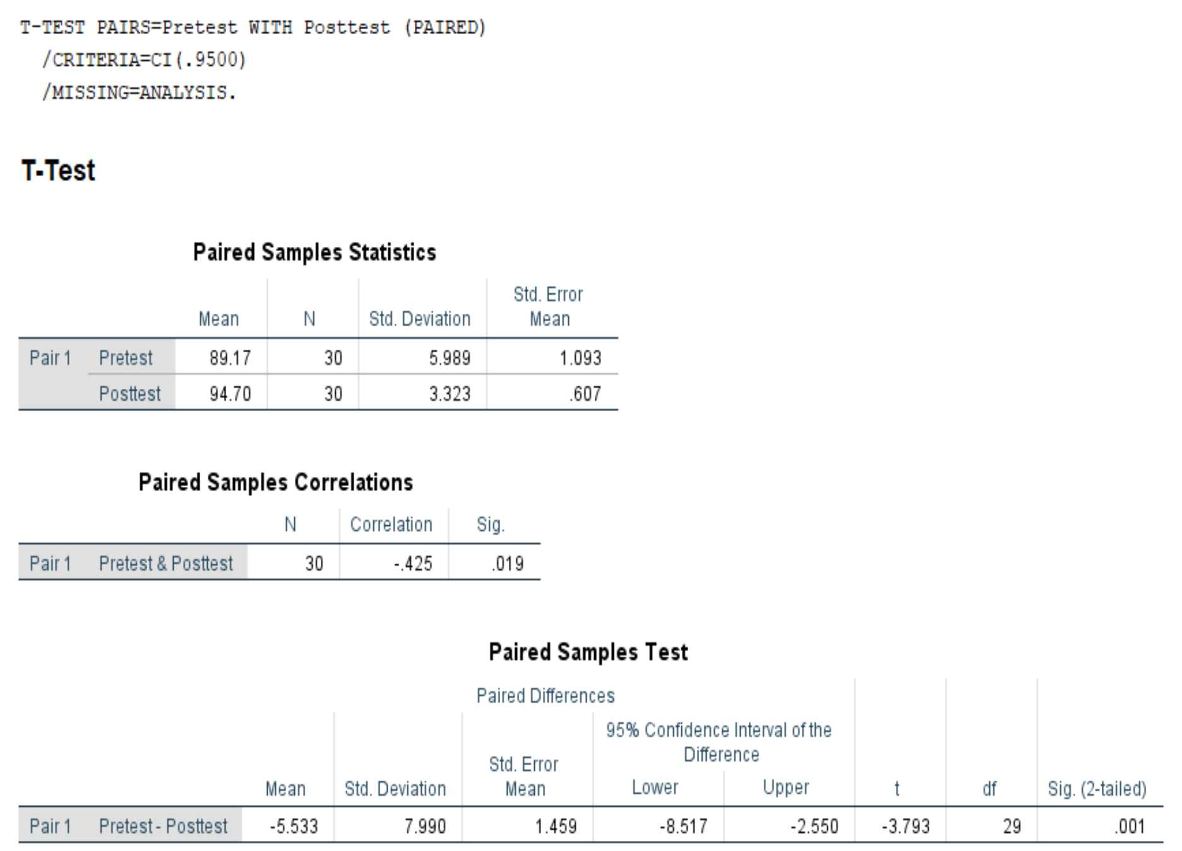


Figure 3. Histogram of distribution of the post-test scores.



```
T-TEST PAIRS=Pretest WITH Posttest (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	89.17	30	5.989	1.093
	Posttest	94.70	30	3.323	.607

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest & Posttest	30	-.425	.019

Paired Samples Test

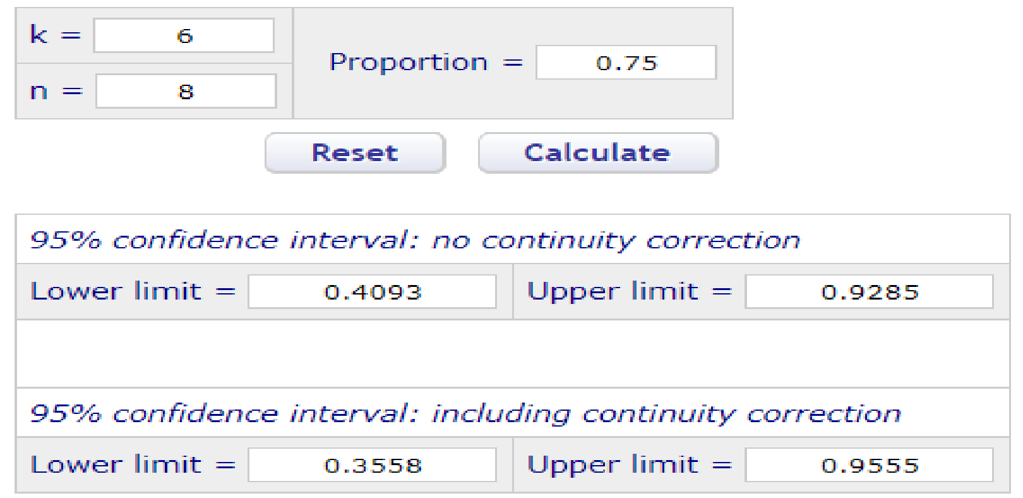
		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Pretest - Posttest	-5.533	7.990	1.459	-8.517	-2.550	-3.793	29	.001

Figure 4. Results of the *t*-test paired data for pre and post-test scores.

Staff Adherence to Tool

Of the eight nurses, 6 (75 percent) observed to the tool. Additional tests were a means to assess the importance of the ratio (see Figure 5). Ratio tests and *F* statistics were used to relate the proportions in the sample. Lower and upper restrictions were 40 percent and 93 percent, correspondingly. The target was 90 percent compliance. Because 90% is encompassed in the interval, the study objective was attained.

RESULTS CONTINUED

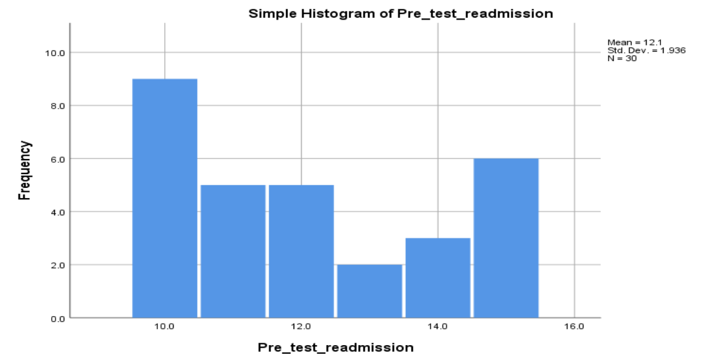

k = 6
n = 8
Proportion = 0.75

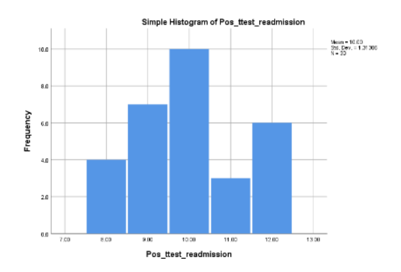
95% confidence interval: no continuity correction
Lower limit = 0.4093
Upper limit = 0.9285
95% confidence interval: including continuity correction
Lower limit = 0.3558
Upper limit = 0.9555

Figure 5. Ratio test for the proportion of the nurses who observed the Heart Failure tool.

Readmission

An average number of the monthly readmissions pre– Heart Failure tool application was 12, value lesser than average after the application, which was 10 (see Figures 6 and 7 paired sample *t*-test were used to test the significance of the results. A 5 percent alpha significance level was obtained (see Figure 8). The prospect value of *t*he t-test is zero, which is lesser than the chosen alpha significance level, indicating a significant reduction in readmission of Heart Failure -linked problems.





Conclusion

Heart failure is one of the most prevalent and high-risk health conditions across the US. It is associated with high mortality, morbidity, and frequent hospitalization, making it one of the costliest health problems in the US (Mozaffarian et al., 2016). Evidence-based studies have indicated that early identification of HF symptoms results in early intervention, reducing complications, and death from heart failure (Golden, 2016). A pre and post-intervention quality improvement analysis of the impact HF monitoring tool on timely identification of HF symptoms and reducing hospital readmission of HF symptoms was performed. The project utilized a quality improvement design, where the pre and post-intervention outcomes of HF monitoring tools were compared in regards to early treatment and hospital readmission rate. The findings indicated that the application of a HF monitoring tool resulted in increased care providers' knowledge of HF monitoring, timely identification and early treatment of HF, and a significant reduction in the rate of hospital readmission of HF patients. The project is essential to the nursing profession because the decrease in hospital readmission results in reduced workload, professional stressors, and increased job satisfaction.

REFERENCES

Bui, A. L., & Fonarow, G. C. (2012). Home monitoring for heart failure management. *Journal of the American College of Cardiology, 59*(2), 97-104. https://doi.org/10.1016/j.jacc.2011.09.044

Centers for Disease Control and Prevention. (2019). *Heart failure fact sheet*. Retrieved from https://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_heart_failure.htm

Golden, S. A. (2016). The effect of heart failure education on knowledge and readmission. *Evidence-Based Practice Project Reports*, 85. Retrieved from https://scholar.valpo.edu/ebpr/85/

Komanduri, S., Jadhao, Y., Guduru, S. S., Cheriyath, P., & Wert, Y. (2017). Prevalence and risk factors of heart failure in the USA: NHANES 2013–2014 epidemiological follow-up study. *Journal of Community Hospital Internal Medicine Perspectives, 7*, 15-20. https://doi.org/10.1080/20009666.2016.1264696

Lowry, R. (2020). Significance of the difference between two independent proportions. Retrieved from vassarstats.net/propdiff_ind.html

Mozaffarian, D., Benjamin, E. J., Go, A. S., Arnett, D. K., Blaha, M. J., Cushman, M., & Turner, M. B. (2016). Heart disease and stroke statistics – 2016 update. A report from the American Heart Association. *Circulation, 133*, e38-e360. https://doi.org/10.1161/cir.0000000000000350

United States Census Bureau. (n.d.). Artesia City Los Angeles. Retrieved from https://www.census.gov/search-results.html?q=artesia+city+los+angeles&page=1&stateGeo=none&searchtype=web&cssp=SERP&_charset_=UTF-8

Wang, Y., Ng, K., Byrd, R. J., Hu, J., Ebadollahi, S., Daar, Z., & Stewart, W. F. (2015). Early detection of heart failure with varying prediction windows by structured and unstructured data in electronic health records. *Conference proceedings: Annual International*