

University of Missouri, St. Louis

IRL @ UMSL

Dissertations

UMSL Graduate Works

1-21-2021

Integration of Kansas City Cardiomyopathy Questionnaire-12 in Clinical Practice

Norman Njihi
ncnt2d@umsystem.edu

Follow this and additional works at: <https://irl.umsl.edu/dissertation>



Part of the [Family Practice Nursing Commons](#)

Recommended Citation

Njihi, Norman, "Integration of Kansas City Cardiomyopathy Questionnaire-12 in Clinical Practice" (2021). *Dissertations*. 1038.

<https://irl.umsl.edu/dissertation/1038>

This Dissertation is brought to you for free and open access by the UMSL Graduate Works at IRL @ UMSL. It has been accepted for inclusion in Dissertations by an authorized administrator of IRL @ UMSL. For more information, please contact marvinh@umsl.edu.

Integration of Kansas City Cardiomyopathy Questionnaire-12 in Clinical Practice

Norman C. Njihi

B.S. Nursing, University of Missouri- St. Louis, 2015

A DNP Project Submitted to The Graduate School at the University of Missouri- St.

Louis In Partial Fulfillment of the Requirements for the degree

Doctor of Nursing Practice with an emphasis in Family Nurse Practitioner

May 2021

Advisory Committee

Dr. Nancy Magnuson, DSN, APRN, PCNs, FNP-BC
Chairperson

Committee Faculty Member: Dr. Tonya Haynes, DNP, RN

Committee project mentor: Dr. Osler Guzon, MD

Abstract

Problem: Congestive heart failure (CHF) is a high symptom disease in which patients tend to decompensate frequently, most often leading to hospitalization and poor quality of life.

Methods: This project involved educating nurses about using patient reported outcome(PRO) tools with an emphasis on the Kansas City Cardiomyopathy Questionnaire-12 (KCCQ-12). Pre and post surveys using a Likert scale tool designed by the author were used to determine if a change in knowledge occurred. Satisfaction of the providers was assessed using a survey, also designed by the author. A retrospective review of 13 patients was done to establish patients' baseline KCCQ-12.

Results: Six nurses and three physicians participated in this study. Results from surveys by the nurses indicated perceived familiarity with the KCCQ-12, scoring it both manually and electronically using an electronic scoring tool developed by the author and feasibility to integrate KCCQ-12 into their work flow when scoring was done electronically. Providers' feedback was obtained through a five item Likert satisfaction survey. Results indicated that the participants were very satisfied using KCCQ-12 using electronic scoring and would recommend integrating it into clinical practice. Changes in patients' follow up KCCQ-12 scores underscored the questionnaire's sensitivity to patient's clinical status.

Implications for Practice: This project demonstrated that, with ease in KCCQ-12 scoring and rapid interpretation of the scores, KCCQ-12 can be integrated in clinical practice. Utilization of this tool will contribute to quality improvement in the care for CHF patients.

Introduction

Background/Significance: Congestive heart failure (CHF) due to its high symptom burden, considerably affects patients' quality of life. The disease affects about 6.2 million Americans, and about half of the people who develop CHF die within five years of diagnosis (Centers for Disease Control and Prevention, 2019). In his article, O'Connor noted that more than 20 percent of CHF patients are readmitted within 30 days after hospital discharge, and 50 percent were readmitted within six months following hospital discharge. It is estimated that CHF costs about \$30.7 billion each year (Centers for Disease Control and Prevention, 2019).

According to the American Heart Association (2017), it is projected that there will be a 46 percent increase in CHF cases by the year 2030. This projection raises the urgency for clinicians to identify early clinical deterioration and intervene, thus preventing frequent hospitalizations and improving patients' quality of life. In their article, Sepehrvand & Ezekowitz (2015) did note that patients with CHF place a great value in quality of life. Due to the high symptom burden of CHF, and patients' quest for quality of life, it is crucial to closely monitor their health status. One of the most accurate ways is to use Patient Reported Outcomes (PRO) tools. PROs are reports that come directly from patients concerning how they feel or function in relation to a health condition and its therapy (Kelkar, A, et al, 2016).

Disease specific PROs are great but under-utilized tools. The Kansas City Cardiomyopathy Questionnaire (KCCQ) is a CHF PRO tool that, according to Spertus & Jones (2015) has been shown to be valid, reliable, sensitive to clinical change, and prognostic of both events and costs. Its use, notes Spertus & Jones (2015) has been

limited in part due to its length. They also note that KCCQ is a 23 item tool and takes the patient five to eight minutes to complete and the clinician cannot go through the entire questionnaire within a short glance. This makes it difficult to integrate into clinical practice. To remedy this, KCCQ-12 was developed. According to Spertus and Jones (2015), the KCCQ-12 is a shorter version of the original 23 item that is more feasible to implement while preserving the psychometric properties of the full instrument. Another limitation to using KCCQ-12 as noted by this author was difficulty in manual scoring and interpretation of the scores. Manual scoring was found to be time consuming making it unappealing to clinicians despite the noted benefits of KCCQ-12.

Purpose of the project: The purpose of this change implementation DNP project was to integrate the use of KCCQ-12 in CHF patients' routine office visits. This was to be achieved by utilizing an electronic scoring tool developed by the author and combining the KCCQ-12 with the conversion tool both developed by Spertus and Jones.

Aim: The aim of this project was to present the provider with an early opportunity to identify CHF exacerbation before it would lead to requiring hospitalization, and to improve patients' quality of life.

Outcome Measures: Using pre and post training survey developed by this author, the principle investigator was able to assess licensed nurses' knowledge on PRO and more specifically KCCQ-12, scoring KCCQ-12 in less than two minutes and feasibility of integrating the tool in their work load. Providers were also surveyed regarding their satisfaction in utilizing KCCQ-12 during patients' visits and more involvement of patients in their care.

Objective: The purpose of this change implementation DNP project was to integrate the use of KCCQ-12 in CHF patients' routine office visits. This would present the provider with an early opportunity to identify CHF exacerbation and provide mitigative measures, thus reducing the possibility of hospitalization. Consequently, there will be an improved quality of life for patients.

Review of literature

Literature review was accomplished using: University of Missouri St. Louis library data base through CINAHL and Cochrane library, PubMed, Medline, and Google Scholar. Key search words used were: congestive heart failure, hospitalization, re-admission rate, economic burden, Kansas City Cardiomyopathy Questionnaire, KCCQ-12, and PROs. Some of the search terms were used in combination in order to focus the search results to congestive heart failure and hospitalization or readmission. Inclusion criteria was studies that focused on: CHF, PROs, KCCQ, KCCQ-12, CHF hospitalization, cost of CHF related care or hospitalization. Seventeen studies were retrieved and eleven were selected for review.

Analysis: Congestive heart failure exacerbation occurs when patients decompensate from their clinical baseline relative to heart failure. In their article, Allen & O'Connor (2007) note that acute decompensated heart failure is a common and growing medical problem associated with major morbidity and mortality. They further state that it is the leading reason for hospital admission among patients over 65 years of age and the most costly cardiovascular disorder in western countries. Kosiborod, M., et al (2007) state that a critical challenge in caring for outpatients with CHF is to identify patient factors that can predict clinical deterioration. They further state that what is needed is a system capable of

predicting clinical outcomes, that is patient centered, sensitive to clinical change, scalable, and easy to administer. This will assist clinicians in determining the frequency of outpatient follow-up and directing therapy changes that could lead to better patient outcomes.

Currently, Hawwa, N et al (2017), postulates that the Kansas City Cardiomyopathy Questionnaire (KCCQ) lacks routine and widespread use in clinical practice. However, in their study they found that the KCCQ has an incremental value over the New York Heart Association (NYHA) functional classification system in predicting clinical outcomes. The NYHA is a functional classification tool that was developed in 1928 and has been revised several times since then for CHF patients (Raphael, C. et al 2007). The NYHA has four classes and the health care provider assigns a class to the patient depending on the clinician's interpretation of what construes "ordinary physical activity" and "slight" and "marked" limitations ((Raphael, C. et al 2007). They further state that this uncertainty has led to the reproducibility value of only 56% between two doctors.

According to Hawwa N., et al(2017), Kansas City Cardiomyopathy Questionnaire has emerged as a patient-centered heart failure specific health status measure. In their article, Spertus, et al (2020) state that when health status is captured directly from the patient, it is reliable, sensitive and a valid assessment of the patient's symptoms and function. Kosiborod, M., et al (2007) further predicate that the KCCQ can help to identify patients at increased risk for mortality and hospitalization. Disease specific PRO tools like KCCQ are great but seldom used. Some of the challenges that were noted to cause this underutilization were: length of time it takes to complete the questionnaire, for

example KCCQ take 5-8 minutes for the patient to complete the questionnaire (Spertus and Jones 2015), lack of rapid interpretation by the clinician, and difficulty to relate the scores to the disease process (Spertus, J. 2014).

To help overcome these primary challenges of KCCQ having 23 items, a shorter version KCCQ-12 was developed. Of great importance, notes, Spertus & Jones (2015) is that KCCQ-12 preserves the psychometric properties of the full KCCQ. This gives an assurance of the scores obtained from the shorter version. According to Spertus (2014), it takes less than two minutes for the patient to complete the questionnaire during an office visit. To further aid in rapid interpretation of the results, a table (Appendix A) was developed that would help in converting the KCCQ-12 results into the more familiar NYHA classification.

In the review of literature, KCCQ-12 and KCCQ score converting scale were found in two different documents. To encourage the use of this PRO tool, the principal investigator (PI) found it more helpful combining them into one document (Appendix A). This provided a one- stop shop for the provider. The provider had a KCCQ-12 score and a corresponding NYHA classification thus helping in interpreting the results quickly and incentivize its use. A quick and reliable way to score KCCQ-12 was also needed, which is an added incentive to the clinicians.

Theoretical Framework: The theoretical framework used in this DNP project was Stetler Model. According to Stetler (2001), this model of evidence based practice outlines the criteria used to determine the desirability and feasibility of applying a study to address an issue. These criteria are: substantiating evidence, current practice (relating to the extent of need for change), fit of the substantiated evidence for the user group and

settings, and feasibility of implementing the research findings. As a change implementation project, this framework facilitated practical application of an evidence-based tool that enhances patient health outcomes.

Method

Design: The design for this project was descriptive and retrospective chart review. Chart review was limited to an initial KCCQ-12 score for patients with CHF diagnosis, hospitalization, and demographic information including age and gender. The Department of Health and Human Services Safe Harbor approach for patient de-identification was used in order to comply with HIPAA.

Setting: This DNP project was implemented in two privately owned cardiovascular clinics. They are both located in rural Missouri. Both clinics attend to about 50 CHF patients weekly.

Sample: The KCCQ-12 scores for 35 patients were initially obtained. However, the KCCQ-12 follow up scores were obtained from only 13 patients. Due to COVID-19, follow-up was done over the phone since most patient visits were converted to remote visits. As a result, some patients could not be reached by phone, one transferred care, and others were deceased. Three providers and six nurses participated in this project.

Procedure: A pre-survey using Likert tools developed by the author to assess licensed nurses knowledge of PROs and KCCQ-12 was administered. An education session was held teaching about PRO tools, KCCQ-12 manual and electronic scoring utilizing this author's developed electronic scoring tool. A post survey was done to assess knowledge on the items above and to assess feasibility of integrating KCCQ-12 in their work load.

Providers' were surveyed on their satisfaction utilizing KCCQ-12 during their visit with patients. Patients' consent was obtained prior to obtaining data from their charts.

Data Collection: Data from nurses was obtained by utilizing a pre-and post- Likert score survey and physicians' satisfaction was also obtained by utilizing a Likert scaled survey. Patients' information was stored in an excel sheet and all the information was stored in password secured computer.

Approval Processes: Approval to implement this DNP project was obtained from the doctoral committee and human subject approval from the University of Missouri- St. Louis Internal Review Board (IRB). The project setting did not have an IRB. No risks to the participants were identified.

Results

Six nurses and 3 physicians participated in this study. The nurses completed a pre and post training survey and the physicians completed the satisfaction survey.

Nurses' Results: Results from the surveys by nurses demonstrated a perceived increase in knowledge about PROs and more specifically KCCQ-12, ability to manually and electronically score the KCCQ-12. There was also an increase in the number who believed that it was feasible to integrate KCCQ-12 into their work load when utilizing the electronic scoring tool and to score it in less than two minutes.

Nurses Pre and Post survey data

Questionnaire Item	Strongly Agree N(%)	
	Pre	post
1. I know what a PRO is	16	100
2. I'm familiar with KCCQ-12	0	100
3. I know how to score KCCQ-12 manually	0	83
4. I can manually score KCCQ-12 in less than 4 minutes	0	16
5. I can score KCCQ-12 in less than 2 minutes using the electronic scoring tool	0	100
6. Scoring KCCQ-12 manually is feasible to incorporate in my work	0	0
7. Scoring KCCQ-12 electronically is feasible to incorporate in my work	0	83

Nurses' knowledge and KCCQ-12 integration assessment

Providers' Feedback: Providers' feedback was obtained using a five item Likert satisfaction survey. Their feedback indicated that it was very feasible to integrate KCCQ-12 in clinical practice, while using an electronic scoring tool would recommend its integration in clinical visits with CHF patients.

Questionnaire Item	Strongly Agree N(%)
1. Scoring KCCQ-12 electronically significantly reduced its scoring time	100
2. I found it easy to discuss KCCQ-12 scores with my patients	100
3. KCCQ-12 was helpful in supporting my decision making in the plan of care	100
4. KCCQ-12 was valuable in identifying supportive care needs for my CHF patients	100
5. Based on the experience I would recommend integrating KCCQ-12 in routine clinical care for CHF patients	100

Providers' Feedback

Discussion

This DNP project evaluated the feasibility of integrating KCCQ-12 in clinical practice. Patient centered care is of great import and this includes obtaining patient's input about their care. "PROs offer a unique perspective on treatment effectiveness. They may be more reliable than an informal interview," (Victorson, 2018). Quantifying a patient's symptoms, function, and quality of life helps to mitigate healthcare provider-patient symptoms mismatch, thus promoting shared goals of care objectives.

The KCCQ-12 is a PRO tool that helps to quantify CHF symptoms. Due to its prognostic quality, patient decompensation can be detected early, and interventions can be initiated, thus assuaging the symptoms and preventing hospitalization. The burden of scoring and interpreting KCCQ-12 was a barrier to its utilization in clinical practice. Manual scoring was time consuming, and the nurses found it not feasible to integrate in their workload and the providers were finding it difficult to rapidly interpret the scores. Findings for this project indicated that when an electronic scoring tool was used, scoring time was significantly reduced and nurses found it feasible to integrate KCCQ-12 administration and scoring feasible. The providers also reported availability of KCCQ-12 scores and the conversion table on the questionnaire made it practical to utilize KCCQ-12.

This project encountered limitations. The sample size for participant nurses, providers, and patients was small. Due to COVID-19, patient follow-up was done over the phone. This affected the amount of time that the KCCQ-12 and electronic scoring tool was utilized during the project duration. However, despite the limitations, the electronic

scoring tool was widely accepted by the nurses and healthcare providers. The nurses also appreciated their increased knowledge of PROs and their value in promoting patient centered care.

Implications for practice: Results from this project indicated that when scoring and interpretation of KCCQ-12 barriers are overcome, integrating KCCQ-12 into clinical practice is feasible. This will lead to quality improvement in care for CHF patients. This could also increase revenue for a practice due to the higher level of visit depending on a patient's KCCQ-12 scores.

Although patient follow ups were done over the phone, the ability to quantify their symptoms and rapidly interpret them made it possible to make appointments for the patients to be seen in person sooner than they could have otherwise been seen. In some case, they were able to be seen on the same day due to their symptoms which corresponded with their KCCQ-12 scores.

Recommendations for further study: Future studies using larger sample sizes are recommended to improve knowledge in utilizing PROs like KCCQ-12 and assessing the feasibility of adding a nurse practitioner in a practice who would closely follow CHF patients integrating KCCQ-12 in their care.

Conclusion

Summary of findings: Congestive heart failure is a debilitating disease with a high symptom burden. It grossly affects a patient's quality of life especially due to frequent hospitalization. Closely monitoring of patients with a tool like KCCQ-12 with an added benefit of scoring efficiency can help mitigate exacerbations, thus reducing hospitalizations and improving quality of life.

Maintaining change: Development of a mobile application with KCCQ-12 that patients can download on their mobile phone and complete the questionnaire with instructions to call their provider's office in case of a drop in score is going to be utilized in sustaining the change.

References

- Allen, Larry and O'Connor, Christopher (2007). Management of acute decompensated heart failure. PMC. Retrieved from:
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1808524/>
- Hawwa, N., Vest AR, Kumar, R., Lahoud, R., Young, JB, Wu, Y., Gorodeski, EZ, Cho, L. (2017). Comparison between the Kansas City Cardiomyopathy Questionnaire and New York Heart Association in assessing functional capacity and clinical outcomes. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/27940335>
- Kosiborod, M., Soto, G., Jones, P., Krumholz, H., Weintraub, W., Deedwania, P., and Spertus, J. (2007). Identifying heart failure patients at risk for near-term cardiovascular events with serial health status assessments. *Circulation*. AHA journals. Retrieved from:
<https://ahajournals.org/doi/10.1161/circulationaha.106.670901>
- O'Connor, Christopher (2017). High heart failure rates. Is it the health system's fault? *JACC heart failure*. Retrieved from
<http://heartfailure.onlinejacc.org/content/5/5/393>
- Raphael, C., Briscoe, C., Davies, J., Whinnett, Z., Manisty, C., Sutton, R., Mayet, J., and Francis, D. (2007). Limitations of the New York Heart Association functional classification system and self-reported walking distances in chronic heart failure <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1861501/>
- Sepehrvand, Nariman & Ezekowitz, Justin (2015). How to do more with less. *American Heart Association*. Retrieved from:
<https://www.ahajournals.org/doi/pdf/10.1161/circoutcomes.115.002126>
- Spertus, J. (2014). Barriers to the use of patient reported outcomes in clinical care. Retrieved from:
<https://www.ahajournals.org/doi/full/10.1161/CIRCOUTCOMES.113.000829>
- Spertus, John (2005). CV Outcomes, Inc. Our work KCCQ, SAQ and PAQ. Retrieved from: <https://cvoutcomes.org>
- Spertus, John and Jones, Philip (2015). Development and validation of a short version of the Kansas City Cardiomyopathy Questionnaire. *Circulation*. Cardiovascular Quality and outcomes. Retrieved from:
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4885562/>
- Stetler, C. (2001). Stetler model of evidence-based practice. McMaster University. Retrieved from: <https://www.nccmt.ca/knowledge-repositories/search/83>

Victorson, David (2018). Patient reported outcomes (PROs) tools for measurement of health related to quality of life. National Institute of Dental and Craniofacial research. Retrieved from <https://www.nidcr.nih.gov/grants-funding/grant-programs/behavioral-social-sciences-research-program/patient-reported-outcomes-tools-for-measurement-of-health-related-quality-of-life>

Appendix A

The KC Cardiomyopathy Questionnaire (KCCQ – 12)

The following questions refer to your **heart failure** and how it may affect your life. Please read and complete the following questions. There are no right or wrong answers. Please mark the answer that best applies to you.

1. **Heart failure** affects different people in different ways. Some feel shortness of breath while others feel fatigue. Please indicate how much you are limited by **heart failure** (shortness of breath or fatigue) in your ability to do the following activities over the past 2 weeks.

Place an **X** in one box on each line

Activity	Extremely Limited	Quite a bit Limited	Moderately Limited	Slightly Limited	Not at all Limited	Limited for other reasons or did not do the activity
Showering/Bathing	<input type="checkbox"/>					
Walking 1 block on level ground	<input type="checkbox"/>					
Hurrying or jogging (as if to catch a bus)	<input type="checkbox"/>					

2. Over the past 2 weeks, how many times did you have **swelling** in your feet, ankles or legs when you woke up in the morning?

Every morning	3 or more times a week, but not every day	1-2 times a week	Less than once a week	Never over the past 2 weeks
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Over the past 2 weeks, on average, how many times has **fatigue** limited your ability to do what you want?

All of the time	Several times per day	At least once a day	3 or more times per week but not every day	1-2 times per week	Less than once a week	Never over the past 2 weeks
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Over the past 2 weeks, on average, how many times has **shortness of breath** limited your ability to do what you wanted?

All of the time	Several times per day	At least once a day	3 or more times per week but not every day	1-2 times per week	Less than once a week	Never over the past 2 weeks
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Over the past 2 weeks, on average, how many times have you been forced to sleep sitting up in a chair or with at least 3 pillows to prop you up because of **shortness of breath**?

- | | | | | |
|--------------------------|---|--------------------------|--------------------------|-----------------------------|
| Every night | 3 or more times a week, but not every day | 1-2 times a week | Less than once a week | Never over the past 2 weeks |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6. Over the past 2 weeks, how much has your **heart failure** limited your enjoyment of life?

- | | | | | |
|--|--|---|---|---|
| It has extremely limited my enjoyment of life | It has limited my enjoyment of life quite a bit | It has moderately limited my enjoyment of life | It has slightly limited my enjoyment of life | It has not limited my enjoyment of life at all |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

7. If you had to spend the rest of your life with your **heart failure** the way it is right now, how would you feel about this?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Not at all satisfied | Mostly dissatisfied | Somewhat satisfied | Mostly satisfied | Completely satisfied |
| <input type="checkbox"/> |

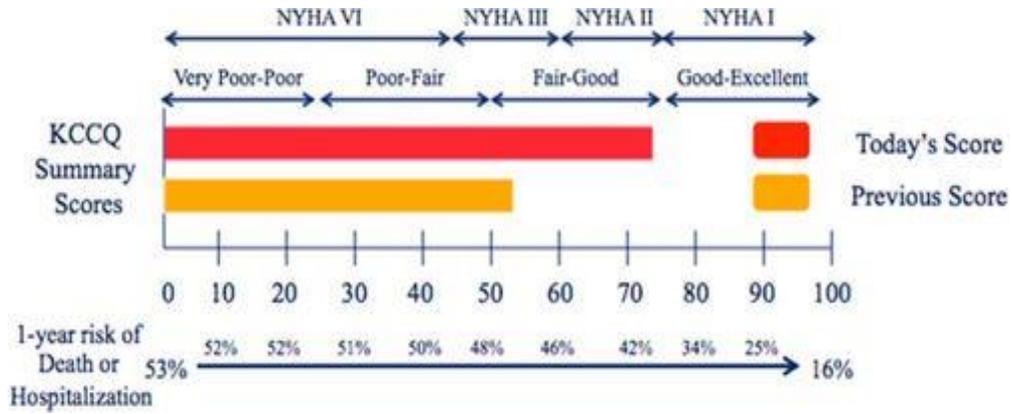
8. How much does your **heart failure** affect your lifestyle? Please indicate how your **heart failure** may have limited your participation in the following activities over the past 2 weeks.

Please place an **X** in one box on each line

Activity	Severely limited	Limited quite a bit	Moderately limited	Slightly limited	Did not limit at all	Does not apply or did not do for other reasons
Hobbies, recreational activities	<input type="checkbox"/>					
Working or doing household chores	<input type="checkbox"/>					
Visiting family or friends out of your home	<input type="checkbox"/>					

Appendix B

KCCQ-12 Scores Converting Scale (Spertus, J. 2014)



Appendix C

Patient Reported Outcomes (PRO) Tools Knowledge Assessment for Nurses

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
1.I know what a PRO is	4	0	0	1	1
2.I'm familiar with KCCQ-12	5	0	0	1	0
3.I know how to score KCCQ-12 manually	5	0	1	0	0
4.I can manually score KCCQ-12 in less than 4 minutes	6	0	0	0	0
5.I can score KCCQ-12 in less than 2 minutes using electronic scoring tool	6	0	0	0	0
6.Scoring KCCQ-12 manually is more feasible to incorporate in my work	3	0	3	0	0
7.Scoring KCCQ-12 electronically is more feasible to incorporate in my work	0	0	6	0	0
8.Scoring KCCQ-12 electronically is more feasible to incorporate in my work	0	0	6	0	0

Comments:

Appendix D

Post Patient Reported Outcome Tool KCCQ-12 Teaching Assessment for Nurses

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
1.I know what a PRO is	0	0	0	0	6
2.I'm familiar with KCCQ-12	0	0	0	0	6
3.I know how to score KCCQ-12 manually	0	0	0	1	5
4.I can manually score KCCQ-12 in less than 4 minutes	3	0	0	2	1
5.I can score KCCQ-12 in less than 2 minutes using electronic scoring tool	0	0	0	0	6
6.Scoring KCCQ-12 manually is more feasible to incorporate in my work	0	0	0	0	6
7.Scoring KCCQ-12 electronically is more feasible to incorporate in my work	5	0	0	1	0
8.Scoring KCCQ-12 electronically is more feasible to incorporate in my work	0	0	0	1	5

Appendix E

Provider Satisfaction Assessment Tool

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
1. Scoring KCCQ-12 electronically significantly reduced its scoring time	0	0	0	0	3
2. I found it easy to discuss KCCQ-12 scores with my patients	0	0	0	0	3
3. KCCQ-12 was helpful in supporting my decision making in the plan of care	0	0	0	0	3
4. KCCQ-12 was valuable in identifying supportive care needs for my CHF patients	0	0	0	0	3
5. Based on the experience I would recommend integrating KCCQ-12 in routine clinical care for CHF patients	0	0	0	0	3

Comments:

Appendix F

Nurses Pre and Post survey data (Nurses' knowledge and KCCQ-12 integration assessment)

Questionnaire Item	Strongly Agree N(%)	
	Pre	post
1. I know what a PRO is	16	100
2. I'm familiar with KCCQ-12	0	100
3. I know how to score KCCQ-12 manually	0	83
4. I can manually score KCCQ-12 in less than 4 minutes	0	16
5. I can score KCCQ-12 in less than 2 minutes using the electronic scoring tool	0	100
6. Scoring KCCQ-12 manually is feasible to incorporate in my work	0	0
7. Scoring KCCQ-12 electronically is feasible to incorporate in my work	0	83