Psychometric Evaluation of the Continuity of Care Questionnaire for Congestive Heart Failure Patients (CCQ-CHFP)

Wendy Gotschall

Walsh University
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**Background and Significance of Practice Problem**

As healthcare is rapidly changing and the baby boomers have begun turning 65, the need for efficient and cost effective healthcare is an area of concern (California Healthcare Foundation, 2008). When the transition to another setting is handled poorly, patients, clinicians, and the health care delivery system are affected (California Healthcare Foundation, 2008). Improving the management of these patients is a key strategy in improving health outcomes and expenditures (Billings, Dixon, Mijanovich, & Wennberg, 2006). Improved delivery of primary care services is critical to managing patients in the outpatient setting and improving access to healthcare while controlling costs (Flocke, 1997). Obtaining the patient’s perspective of their care is essential to making improvements (Gulliford, Cowie, & Morgan, 2011).

Continuity of care of the congestive heart failure patient can be a challenge across care settings and caregivers (Kowalyk, Hadijistavropoulos, & Biem, 2004). Medication and dietary management is difficult to manage in this population since conditions can deteriorate quickly (Kowalyk et al., 2004). It is often difficult for them to know who to contact when symptoms worsen, further complicating their continuity of care (Kowalyk et al., 2004).

There has not been as much research conducted due to the lack of appropriate instruments for measuring continuity of care, and few instruments are available to measure the interpersonal aspects of the patient-clinical interaction, which are considered key components of continuity of care (Saultz, 2003). By measuring the patient’s perception of continuity of care, it provides caregivers with problem areas and the opportunity to implement and evaluate improvement methods (Uijen, Schers, Schellevis, Mokkink, Van Weel, & van den Bosch 2012). The purpose
of this study is to conduct a psychometric evaluation on an investigator developed Continuity of Care Questionnaire for Congestive Heart Failure Patients (CCQ-CHFP).

**Review of Literature**

In order to understand the concept of continuity of care, it is essential to obtain information from the patient perspective (Chao, 1988; Flocke, 1997; Gremigni, Sommaruga, & Peltenburg, 2008; Gulliford, Cowie, & Morgan, 2011; Gulliford, Naithani, & Morgan, 2006; King, Jones, Richardson, Murad, Irving, Aslett, … & Nazareth, 2008; Kowalyk et al., 2004; Rose, Sweeney, Leese, Clement, Jones, Burns, … & Wykes, 2009). The literature currently supports that continuity of care consists of three main concepts: (1) informational, (2) management, and (3) relational continuity (Freeman, Woloshynowycz, Baker, Boulton, Guthrie, & Car et al. 2007; Gulliford et al., 2011; Heaton, Corden, & Parker, 2012; King et al., 2008; Wierdsma, Mulder, Vries, & Sytema, 2009).

Various instruments were found in the review of literature that have been developed, tested, and utilized in an attempt to gain knowledge and insight into continuity of care of patients with various disease processes. Gulliford et al. (2002) studied patients with type 2 diabetes by measuring patients’, carers’ and providers’ experiences of continuity of care. The team developed a 19-item measure of experienced continuity for diabetes called the Experienced Continuity of Care for Diabetes Mellitus (ECC-DM). King et al. (2008) developed an 18-item measure of experienced continuity of cancer patients and the relationship to outcomes. Young et al. (2011) developed and tested a 40-item questionnaire for cancer patients to assess eight components of effective cancer care coordination. Baker et al., (2001) studied patient experiences with primary care. Some participants kept a diary for six months of their primary care experience, while others participated in various levels of surveys conducted through an
interview process. The team identified relationship continuity as the key focus of patients in relations to primary care providers (Freeman, et al., 2007). Flocke (1997) developed a 20-item instrument, the Components of Primary Care Index (CPCI) to measure seven key areas of the delivery of primary care from the patients’ perspective and how they relate to patient satisfaction. Christakis, Wright, Zimmerman, Bassett, & Connell (2003) also utilized components of the CPCI that relate to care coordination for children with special healthcare needs. Hill, House, & Hewison (2008) studied continuity of care of stroke patients by using the Patient Perceived Continuity Interview (PPCI). Burns et al. (2007) conducted a research study in the mental health population. Two continuity questionnaires, CONTINU-UM for patients and CONTINU-ES for professionals, were developed.

The review of literature provided little evidence of studies related to perceptions of continuity of care of congestive heart failure patients. Many studies related to primary care. Kowalyk et al. (2004) developed the Heart Continuity of Care Questionnaire (HCCQ) to assess the transition of the congestive heart failure patient from hospital to home. The Continuity of Care Index (CCI) and the Minnesota Living with Heart Failure Questionnaire (MLHFAQ) were also utilized in the study (Kowalyk et al., 2004). The HCCQ demonstrated validity through a moderate to strong correlation on the subscales with the CCI ($r = 0.40$ to $0.87$), and reliability (alpha ranged from 0.80 to 0.93) in measuring continuity of care from the patient’s perspective, however, further studies on validity and generalizability are needed (Kowalyk et al., 2004).

Current research demonstrates the importance of continuity of care of patients with various disease processes. However, continuity of care, by definition, continues to be interpreted and utilized in various ways. The literature has demonstrated that there are unique variables to caring for specific patient populations when attempting to measure continuity of care. With this
disease specific approach in mind, the review of literature was also limited in research or psychometric evaluation of instruments related to the congestive heart failure patient. The literature related to patient’s perceptions of continuity of care primarily consists of such work being performed outside the United States.

**Theoretical/Conceptual Framework**

Continuity of care has been a concept utilized and studied for at least three decades. The challenge has been defining this multidimensional concept in order to define measures that would yield valuable information. The Freeman Model of Continuity of Care has evolved over the past decade (Freeman, Shepperd, Robinson, Ehrich, & Richards, 2001). Freeman et al., (2001) completed their report on a scoping study of continuity of care. Based on those findings, Freeman et al. (2001) proposed a conceptual framework for defining continuity of care that included six key elements: experienced continuity, continuity of information, cross-boundary and team continuity, flexible continuity, longitudinal continuity, and relational/personal continuity:


2. To achieve this central element the service needs: excellent information transfer following the patient (continuity of information)

3. Effective communication between professionals and services (crossboundary and team continuity)

4. To be flexible and adjust to the needs of the individual over time (flexible continuity)

5. Care from as few professionals as possible consistent with other needs (longitudinal continuity)
6. To provide one or more named individual professionals with whom the patient can establish and maintain a therapeutic relationship *(relational or personal continuity)*” (Freeman, et al., 2000).

Freeman et al., (2001) defines continuity of care as “the experience of a coordinated and smooth progression of care from the patient’s point of view” (p. 7).

The English National Institute for Health Research Service Delivery and Organization (NIHR SDO) funded research studies from 2000 to 2009 on the topic of continuity of care. The purpose was to fund six large primary studies and three reviews in the areas of primary care, mental health, diabetes, organizational and professional boundaries, stroke, cancer, human resource management, and children transitioning to adulthood with chronic illnesses or disabilities (Freeman et al., 2007). The final report of Freeman and colleagues only included three of the six main studies since the other three were not complete. Recommendations from this report include: (1) Invest in policies in order to support continuity of care (2) Define and specify continuity of care (3) Beware of hidden costs to organizational change (4) Create a continuity friendly service (Freeman et al., 2007). A Canadian review of research involving continuity of care was also conducted that led to the recommendation of a more general framework adopted by Freeman and colleagues, while continuing to use the six original concepts as subtypes of continuity (Haggerty et al., 2003, & Freeman et al., 2007). The general framework focuses on informational, relational, and management dimensional concepts (Freeman et al., 2007). Parker, Corden, & Heaton (2009) was commissioned by the NIHR SDO to complete a final synthesis of the studies. A key finding was the identified shift in paradigm from the patient and caregiver perspective paradigm to a new partnership paradigm involving patients, families, and professionals (Heaton et al., 2012).
The Freeman Conceptual Model will serve as the framework in the development of a new multi-disciplinary continuity of care questionnaire measuring this evolving paradigm shift. Due to limited studies on congestive heart failure patients, this population will be utilized in the psychometric evaluation of the new instrument measuring perceptions of continuity of care. The goal will be to establish an instrument that can be utilized in further nursing research studies related to continuity of care of the congestive heart failure patient.

**Statement of Research Question**

The purpose of this study is to conduct a psychometric evaluation of an investigator developed instrument measuring congestive heart failure patients’ perception of continuity of care.

**Method**

Using a convenience sampling method, patients with the diagnosis of congestive heart failure will be selected from a northeast Ohio community based acute care hospital inpatient unit. The criteria for selection will be as follows: (a) patients admitted with a primary diagnosis of congestive heart failure for the current hospitalization, (b) age 18 years or older, (c) able to hear instructions, (d) speaks English and able to read and write, (e) have been admitted for at least one day on the coronary care unit (CCU), and (f) willing to participate. Human Research Review Board (HRRB) approval from the institution, as well as, Walsh University Human Subjects in Research Committee will be obtained so that all patients who meet inclusion criteria can be approached and asked to participate. A cover letter containing information about the purpose of the study, confidentiality of subjects and data, and reporting of data was presented to each patient along with the questionnaire. The patient was informed by the researcher that they will return daily to collect the questionnaire. Time was allowed to answer questions and address concerns.
The Continuity of Care Questionnaire for Congestive Heart Failure Patients (CCQ-CHFP) is an 18 item questionnaire that is summatively scored. Content validity was established by two experts in continuity of care. Content validity is used to determine whether or not the questions adequately represent the domain of content addressed by the instrument (Waltz, Strickland, & Lenz, 2005). The content validity index (CVI) is used to measure the agreement between experts (Walsh, Strickland, and Lenz, 2005). The CVI is defined as the proportion of items given a rating of quite/very relevant by the raters. A content validity index of greater than .80 was found for all items indicating content validity (Waltz, Strickland, and Lenz, 2005).

Cronbach’s alpha was calculated to estimate internal consistency reliability. Item-subscale correlations and alpha-if-item-deleted were taken into account as part of the reliability estimation. Factor analysis was conducted to assess the dimensionality of the scale. All items were subject to principal component factor analysis with varimax rotations. Factors having an eigenvalue above 1.00 were retained.

Human Research Review Board (HRRB) approval will be obtained from the institution as well as approval from the Human Subjects in Research (HSR) Committee at Walsh University. Upon approval, face validity was assessed by asking three patients to complete the questionnaire. Their completion time was approximately ten minutes and they were asked to identify any questions or concerns with the questionnaire. Data was organized by assigning a number to each questionnaire. Data will be stored in a locked fire proof area at Aultman. These will be kept for a period of seven years after completion of the research study.

**Ethical Considerations**

The institution HRRB and Walsh HSR approval was obtained. A letter of invitation to participate was reviewed with the patient as to the purpose of the study. Completion of the questionnaire implies informed consent. Participants were informed that they have the right to
refuse to participate in the study and can withdraw from the study at any time and their care will not be affected. Participants were informed that, although they may not benefit directly from the study, the information gained will help identify opportunities for improving continuity of care with patients experiencing congestive heart failure.

Data Analysis

Once data was collected, it was entered into the SPSS database. The quantitative data from the surveys was analyzed for item characteristics including means, standard deviations and ranges. Demographic background characteristics of the sample was analyzed and include age, gender, marital status, highest level of education, time of diagnosis of congestive heart failure, and who they currently live with. Data were analyzed for item characteristics (means, standard deviations (SDs), ranges), dimensionality, and reliability. Principal components factor analysis was conducted to explore the dimensionality of the scale; four factors had eigenvalues above 1.00. Internal consistency reliability (i.e., the extent to which a response on any one item is a good indicator of a response on any other item in the same instrument) was established by using Cronbach’s alpha. The alpha-if-item-deleted statistic was utilized to assess for item reliability.

Results

Sample

Of the 147 congestive heart failure patients, 50 (34%) completed the questionnaire to provide data on the reliability of the scale as well as face and content validity. Of the 50 participants, 17 (34%) were female and 33 (66%) were male. Marital status of the participants was 26 (52%) married, 8 (16%) divorced, 12 (24%) widowed, and 4 (8%) single. Their educational level included 37 (74%) high school, 7 (14%) college, and 3 (6%) graduate. The years since diagnosed with CHF ranged from newly diagnosed (26%) to 26 years (2%) since
diagnosis. Participants indicated who they live with as wife 21 (42%), husband 4 (8%),
daughter 5 (10%), son 4 (8%), no one 11 (22%), or extended family 4 (8%).

**Item Analysis**

Refer to Table 1 for the means, SDs, and range of scores for the 18 items on the
questionnaire. On the 11-option scale, a “good” item has a mean within the range of 5.5 to 6.5,
indicating that the item has maximum potential for meeting the normal distribution assumption
for parametric statistics. Items means on the questionnaire ranged from 6.29 to 8.92, with SDs
ranging from 1.58 to 4.08. Fifteen of the 18 items had an optimal range of 10. A ceiling and
floor effect may be seen by having scores at or near the lowest or highest possible value and can
constrain the amount of downward or upward change possible and reduce variability (Polit,
2010).

**Dimensionality**

Principle components factor analysis was used to estimate the dimensionality of the scale.
In the unrotated solution, four factors had eigenvalues above 1.00. In the rotated factor solution,
Item 7 did not load on any of the factors, therefore, it was deleted from the scale (Table 2).
Factor analysis was then conducted without Item 7. As previously seen in the unrotated solution,
four factors had eigenvalues above 1.00. These four factors accounted for 71 percent of the total
variance explained. Specifically, Factor 1 accounted for 34.5 percent of the variance, Factor 2
accounted for 20.3 percent of the variance, Factor 3 accounted for 9.8 percent of the variance,
and Factor 4 accounted for 6.7 percent of the variance. The rotated factor component matrix
revealed the following:

- Factor 1 (Caregiver communication): Items 1, 2, 3, 4, 5, 6, 8, 9, and 12
- Factor 2 (Consistency of caregiver): Items 13, 16, and 17
Factor 3 (Variability/Flexibility of caregiver): Items 10, 11, and 18

Factor 4 (One location for care): Items 14 and 15

The factor loadings of the rotated factor matrix using varimax with Kaiser normalization ranged from .63 to .94.

Reliability

Cronbach alphas for the four subscales were found to be as follows: Subscale 1 (Items 1, 2, 3, 4, 5, 6, 8, 9, and 12), .92; Subscale 2 (Items 13, 16, and 17), .83; Subscale 3 (Items 10, 11, and 18), .78; and Subscale 4 (Items 14 and 15), .59. Scales with reliability estimates greater than or equal to .70 were considered to have internal consistency (Waltz, Strickland, and Lenz, 2005).

Discussion

It is too early to draw conclusions from this pilot study due to the sample size of the population. Once the psychometric properties of the CCQ-CHFP are established, the scale can aid caregivers in identifying opportunities to enhance the care delivered to the CHF patient in both the inpatient and outpatient settings. Moreover, the CCQ-CHFP needs to be revised to increase the internal consistency reliability of subscale 4. However, the four factors did account for 71 percent of the total variance explained.

Instrument development is a process of continual improvement and change. Once the instrument is fully evaluated, it will help caregivers identify opportunities to enhance the continuity of care for the CHF population. With limited tools to assess continuity of care with congestive heart failure and other healthcare providers such as nurses, the development of a new continuity of care instrument, if psychometrically tested to demonstrate validity and reliability, will give nurse researchers the ability to study this paradigm further. As the baby boomers are
aging and managing chronic illness continues to present its challenges, a perfect storm is brewing. The ability to manage patients in the outpatient setting will be critical in reducing readmissions and ultimately reducing costs.

**Limitations**

The study findings are not generalizable beyond this sample due to the sample size and setting. Therefore, additional research will be needed to assess the generalizability of the findings of the present study. Three items did not achieve the optimal range of 10. There was also an overall ceiling-effect noted on the scale. Similar items may require revision to increase their variability. Subscale 4 had a suboptimal level of reliability.

**About the Authors** The authors consist of one faculty member and one student at Walsh University School of Nursing, North Canton, Ohio. Sharon L. Oetker-Black, PhD, RN, JD, a professor, is director of nursing research. Wendy Gotschall, MSN, RN, NE-BC is a student in the Doctorate of Nursing Practice (DNP) program.

**Key Words** Continuity of Care - Psychometric – Communication – Congestive Heart Failure – Perceptions.
References


Table 1: Means, SDs, and Ranges of the 18-Item Continuity of Care Questionnaire for Congestive Heart Failure Patients (CCQ-CHFP)

<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Providers in hospital communicate with community providers.</td>
<td>7.85</td>
<td>2.694</td>
<td>10</td>
</tr>
<tr>
<td>2. After last hospitalization, primary provider was informed about my hospitalization.</td>
<td>7.83</td>
<td>3.065</td>
<td>10</td>
</tr>
<tr>
<td>3. After last discharge from hospital, my provider had information about the plan of care for my CHF while in hospital.</td>
<td>8.08</td>
<td>2.608</td>
<td>9</td>
</tr>
<tr>
<td>4. Healthcare providers communicated effectively about plan of care while in hospital.</td>
<td>8.08</td>
<td>2.906</td>
<td>10</td>
</tr>
<tr>
<td>5. Providers were able to access updated and accurate information from my medical record that they needed for my care while hospitalized.</td>
<td>8.44</td>
<td>2.434</td>
<td>10</td>
</tr>
<tr>
<td>6. Healthcare providers while I was hospitalized know my health history and plan for my care.</td>
<td>8.92</td>
<td>2.029</td>
<td>10</td>
</tr>
<tr>
<td>7. I have established a relationship with my healthcare providers in the community who care for me.</td>
<td>8.08</td>
<td>2.790</td>
<td>10</td>
</tr>
<tr>
<td>8. I feel my healthcare providers who care for me listen to me and understand my concerns.</td>
<td>8.86</td>
<td>1.578</td>
<td>6</td>
</tr>
<tr>
<td>9. I feel “known” by my healthcare providers in the hospital that care for me and my CHF.</td>
<td>8.62</td>
<td>2.194</td>
<td>9</td>
</tr>
<tr>
<td>10. I go to different healthcare providers depending on my concerns.</td>
<td>6.64</td>
<td>4.075</td>
<td>10</td>
</tr>
<tr>
<td>11. I prefer to see different healthcare providers depending on my needs.</td>
<td>6.46</td>
<td>3.986</td>
<td>10</td>
</tr>
<tr>
<td>12. If a different healthcare provider sees me for the first time, it seems as though they have my health history.</td>
<td>6.29</td>
<td>3.531</td>
<td>10</td>
</tr>
<tr>
<td>13. I have been a patient of my primary care physician for more than 2 years.</td>
<td>8.52</td>
<td>2.950</td>
<td>10</td>
</tr>
<tr>
<td>14. I prefer to have one healthcare provider oversee all of my care for my CHF.</td>
<td>8.08</td>
<td>2.625</td>
<td>10</td>
</tr>
<tr>
<td>15. I go to one office for all of my care for my CHF.</td>
<td>7.53</td>
<td>3.507</td>
<td>10</td>
</tr>
<tr>
<td>16. I often repeat information about my CHF to new providers in the hospital.</td>
<td>7.65</td>
<td>3.323</td>
<td>10</td>
</tr>
<tr>
<td>17. I often repeat information about my CHF to new providers in the community.</td>
<td>6.98</td>
<td>3.461</td>
<td>10</td>
</tr>
<tr>
<td>18. Information provided TO ME about my CHF is consistent and does not conflict with information provided by another healthcare provider.</td>
<td>8.11</td>
<td>2.867</td>
<td>10</td>
</tr>
<tr>
<td>Item</td>
<td>Factor 1</td>
<td>Factor 2</td>
<td>Factor 3</td>
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<td>----------------------------------------------------------------------</td>
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<tr>
<td>1. Providers in hospital communicate with community providers.</td>
<td>.942</td>
<td></td>
<td></td>
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<tr>
<td>2. After last hospitalization, primary provider was informed about my hospitalization.</td>
<td>.882</td>
<td></td>
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<tr>
<td>3. After last discharge from hospital, my provider had information about the plan of care for my CHF while in hospital.</td>
<td>.783</td>
<td></td>
<td></td>
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<tr>
<td>4. Healthcare providers communicated effectively about plan of care while in hospital.</td>
<td>.807</td>
<td></td>
<td></td>
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<tr>
<td>5. Providers were able to access updated and accurate information from my medical record that they needed for my care while hospitalized.</td>
<td>.634</td>
<td></td>
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<tr>
<td>6. Healthcare providers while I was hospitalized know my health history and plan for my care.</td>
<td>.827</td>
<td></td>
<td></td>
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<tr>
<td>8. I feel my healthcare providers who care for me listen to me and understand my concerns.</td>
<td>.663</td>
<td></td>
<td></td>
</tr>
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<td>9. I feel “known” by my healthcare providers in the hospital that care for me and my CHF.</td>
<td>.849</td>
<td></td>
<td></td>
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<tr>
<td>10. I go to different healthcare providers depending on my concerns.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>13. I have been a patient of my primary care physician for more than 2 years.</td>
<td></td>
<td></td>
<td>.719</td>
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<tr>
<td>14. I prefer to have one healthcare provider oversee all of my care for my CHF.</td>
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