Associations between continuity of care, perceived control and self-care and their impact on health-related quality of life and hospital readmission—A structural equation model

Emma Säfström1,2,3 | Kristofer Årestedt4,5 | Maria Liljeroos2,3 | Lena Nordgren3,6 | Tiny Jaarsma2,7 | Anna Strömberg2,8

Abstract
Aim: The aim of this study is to examine whether a conceptual model including the associations between continuity of care, perceived control and self-care could explain variations in health-related quality of life and hospital readmissions in people with chronic cardiac conditions after hospital discharge.

Design: Correlational design based on cross-sectional data from a multicentre survey study.

Methods: People hospitalized due to angina, atrial fibrillation, heart failure or myocardial infarction were included at four hospitals using consecutive sampling procedures during 2017–2019. Eligible people received questionnaires by regular mail 4–6 weeks after discharge. A tentative conceptual model describing the relationship between continuity of care, self-care, perceived control, health-related quality of life and readmission was developed and evaluated using structural equation modelling.

Results: In total, 542 people (mean age 75 years, 37% females) were included in the analyses. According to the structural equation model, continuity of care predicted self-care, which in turn predicted health-related quality of life and hospital readmission. The association between continuity of care and self-care was partly mediated by perceived control. The model had an excellent model fit: RMSEA = 0.06, 90% CI, 0.05–0.06; CFI = 0.90; TLI = 0.90.

Conclusion: Interventions aiming to improve health-related quality of life and reduce hospital readmission rates should focus on enhancing continuity of care, perceived control and self-care.

Impact: This study reduces the knowledge gap on how central factors after hospitalization, such as continuity of care, self-care and perceived control, are associated with improved health-related quality of life and hospital readmission in people with cardiac conditions. The results suggest that these factors together predicted the quality of life and readmissions in this sample. This knowledge is relevant to researchers.
when designing interventions or predicting health-related quality of life and hospital readmission. For clinicians, it emphasizes that enhancing continuity of care, perceived control and self-care positively impacts clinical outcomes.

**Patient or Public Contribution:** People and healthcare personnel evaluated content validity and were included in selecting items for the short version.

**KEYWORDS**
adult nursing chronic illness, conceptual models of nursing, discharge planning, older people, quality of life, self-care

### INTRODUCTION

Worldwide, most of the aging population lives with chronic diseases such as cardiac conditions (World Health Organization, 2014). Cardiac conditions such as myocardial infarction, angina, atrial fibrillation and heart failure are common causes of hospitalization. Since the trajectory of cardiac conditions oscillates through stable, unstable and acute phases, the need for healthcare may continue after discharge from the hospital. Healthcare after hospitalization includes follow-ups or consultations at outpatient clinics or in primary care (Coleman & Boult, 2003; Granger et al., 2006; Wang et al., 2020). These care transitions between different healthcare providers demand continuity of care (World Health Organization, 2015).

It is well known that self-care is an essential variable for enhancing health-related quality of life (HRQoL) and reducing readmission among people with cardiac conditions. In addition, continuity of care is another crucial variable after hospitalization that has been found to be associated with HRQoL and hospital readmission (Nkemdirim Okere et al., 2020; Plate et al., 2018; Ye et al., 2016). However, there is a lack of knowledge about how these variables are related to each other and how these complex relationships affect outcomes such as HRQoL and hospital readmission.

#### 1.1 Background

Self-care is described as promoting health and managing illness (Jaarsma et al., 2017). After a period of deterioration or hospitalization, people with cardiac conditions need to perform self-care, including recognizing and managing symptoms, adhering to medication regimens and seeking consultation for health problems (Riegel et al., 2012). In addition, it is well known that adequate self-care can improve HRQoL and reduce hospital readmission in patients with heart failure (Jaarsma et al., 2017; Kato et al., 2013; Seto et al., 2011; Stamp et al., 2014; Vellone et al., 2017) which are important goals of treatment in the care of people with cardiac disease.

Another crucial factor after discharge from hospital is continuity of care. There are many descriptions and definitions of continuity of care, but the most commonly used descriptions include continuity of care being a seamless transition, including consistent communication and coordination of care over time and between settings and providers (Biem et al., 2003; Gulliford et al., 2006). In addition, continuity of care involves people perceiving healthcare as connected and coherent with their medical needs and personal circumstances (Haggerty et al., 2003). The World Health Organization has stated the importance of improving continuity of care and has identified that post-hospital people care is particularly challenging. This is especially relevant in people with cardiac disease since the follow-up after hospitalization often is at another healthcare provider, and especially challenging since many healthcare systems are organized as "silos," which increases the risk of fragmented and disjointed people care (World Health Organization, 2015).

Continuity of care after hospitalization is crucial and related to self-care in people with cardiac conditions. A recent systematic literature review concludes that continuity of care positively affects self-care in people hospitalized due to coronary artery disease (Posadas-Collado et al., 2022).

Perceived control is another factor related to self-care in people with cardiac conditions (Liljeroos et al., 2020). Perceived control relates to people's beliefs about their ability to cope and handle life events (Moser & Dracup, 1995). Even though perceived control is commonly considered a personality characteristic, it is not immutable and can be improved by information, education and counselling (Moser & Dracup, 2000). Moreover, it has been described as an enabler for adapting to a new diagnosis (Dracup et al., 2003). Perceived control has been found to be related to self-care and reduced healthcare utilization in people with cardiac conditions (Liljeroos et al., 2020). We found no study that explicitly evaluated the impact of continuity of care on perceived control; however, Hjelm and colleagues found that people perceived higher levels of control when receiving information and following hospital recommendations about medications (Hjelm et al., 2019).

In summary, the a person's situation after hospitalization is complex, and prior research reveals that continuity of care and self-care are fundamental factors for improving clinical and person-reported outcomes, especially in the post-hospital period. There is prior knowledge on the influence of self-care on HRQoL and hospital readmission, the association between perceived control and self-care and the association between continuity of care and self-care. However, there is a lack of knowledge about the complex relationships between these factors and their aggregated influence...
on outcomes such as HRQoL and readmissions. More insights into these complex relations are important when developing models to predict HRQoL or hospital readmission and can be used as a guide when planning interventions to increase HRQoL and reduce hospital readmissions.

2 | THE STUDY

2.1 | Aim

This study aimed to examine if a tentative conceptual model including the associations between continuity of care, perceived control and self-care could explain variations in health-related quality of life and hospital readmissions in people with chronic cardiac conditions after hospital discharge. More specifically, four hypotheses have been examined, which formed a hypothesized conceptual model:

**Hypothesis 1.** Higher levels of self-care predict higher levels of HRQoL and lower levels of hospital readmission.

**Hypothesis 2.** Higher levels of continuity of care predict higher self-care levels.

**Hypothesis 3.** A higher level of continuity of care predicts higher levels of perceived control. In addition, higher levels of perceived control predict higher levels of self-care.

**Hypothesis 4.** The association between continuity of care and self-care is mediated by perceived control.

2.2 | Design

A correlational design based on cross-sectional data from a multicentre survey study.

2.3 | Participants and settings

Data were collected from people with cardiac disease discharged from four hospitals in the southeast of Sweden – one district hospital, one county hospital, one regional hospital and one university hospital between 2017 and 2019. People hospitalized due to angina (ICD-10: I20.0, I20.1, I20.8, I20.9), atrial fibrillation (ICD-10: I48.0, I48.1, I48.2, I48.9), heart failure (ICD-10: I50.0, I50.1, I50.9), and myocardial infarction (ICD-10: I21.0, I21.1, I21.2, I21.3, I21.4, I21.9) were included using consecutive sampling. The inclusion criteria were dementia with severe cognitive decline, being unable to read or understand Swedish, expected survival of <3 months, being discharged to a nursing home or resident in another county. A total of 1000 people were included, and the response rate was 52%. For the analyses in the present study, a sub-sample of people with at least one comorbidity condition was selected (n = 542).

2.4 | Data collection

Lists of people discharged after hospitalization due to angina, atrial fibrillation, heart failure or myocardial infarction were compiled by administrative personnel. The first author or research nurses reviewed the medical records to evaluate whether each person fulfilled the inclusion criteria and/or exclusion criteria. Eligible people were contacted by regular mail 4–6 weeks after discharge. They received study information, a written informed consent form, the questionnaire and a prepaid postage envelope to return the survey. After another 4–5 weeks, a reminder was sent to those who had not responded. Further, data about comorbidities and readmission were collected through reviews of medical records.

2.4.1 | Patient reported measures

The questionnaire included demographic background characteristics and validated person-reported scales to assess perceived control (Control Attitudes Scale, CAS), HRQoL (EQ-SD-5L), psychological distress (Hospital Anxiety and Depression Scale, HADS), self-care (Self-Care of Chronic Illness Inventory, SC-CII) and continuity (Patient Continuity of Care Questionnaire 12-item version, PCCQ-12).

2.4.1.1 | Perceived control

The Control Attitudes Scale (CAS) measures people’s self-reported perceived control concerning their heart condition. The respondents rank the items on a seven-point Likert scale, with higher scores indicating higher perceived control (Moser & Dracup, 1995; Moser et al., 2007). The Swedish four-item version of the instrument has been validated in people with cardiac conditions and presented sound psychometric properties (Arestedt et al., 2015).

2.4.1.2 | Health-related quality of life

The five-level version EQ-5D 5 L is a generic instrument measuring HRQoL. The respondents rate the prevalence and severity of their health status in five health dimensions on a five-point Likert scale, from no problems (1) to severe problems (5); lower scores indicate better HRQoL (Herdman et al., 2011; The EuroQol Group, 1990). The instrument has been validated in various groups of people, including people with cardiovascular conditions (Janssen et al., 2018).

2.4.1.3 | Anxiety and depression

The Hospital Anxiety and Depression Scale (HADS) is a screening instrument for psychological distress with symptoms of anxiety and depression. The instrument includes seven items on anxiety and seven items on depression; each item is scored from 0 to 3, with a subscale score ranging from 0 to 21. Higher scores indicate
more problems, and a cut-off score of >7 indicates depression or anxiety (Zigmond & Snaith, 1983). In people with cardiac conditions, the depression subscale has proven sound psychometric properties (Christensen et al., 2020). The Swedish version of HADS has presented acceptable measurement properties in older persons (Djukanovic et al., 2017). Since previous studies have shown problems with overlapping items and strong correlation between the two subscales (Djukanovic et al., 2017; Helvik et al., 2011; Mykletun et al., 2001), only the depression subscale was used in the present study.

2.4.1.4 | Self-Care
Self-care was evaluated using the Self-Care of Chronic Illness Inventory (SC-CII), a generic measure of self-care based on the middle-range theory of self-care of chronic illness. The instrument consists of three subscales (self-care maintenance, self-care monitoring and self-care management). Respondents rate the items on a five-point Likert scale, from never/not likely (1) to always/very likely (5). The score for each subscale is standardized, with a total score ranging from 0 to 100, with higher scores indicating better self-care (Riegel et al., 2018). The SC-CII has been validated in a Swedish sample of people with cardiac conditions and chronic diseases (De Maria et al., 2019). We calculated a total score for the whole scale for this study, which has not been done in any previous study.

2.4.1.5 | Patients perception of continuity of care
The Patient Continuity of Care Questionnaire 12 item version (PCCQ-12) evaluates people’s perceptions of continuity of care. Respondents rate the items on a five-point Likert scale from strongly disagree (1) to strongly agree (5) with an additional “not applicable” response option. The total score ranges from 12 to 60, with higher scores indicating higher levels of continuity of care. The Swedish version of the instrument has presented sound psychometric properties in people with cardiac conditions (Säfström et al., n.d.).

2.5 | Ethical considerations
The study was performed in accordance with the Declaration of Helsinki and was approved by the Regional Ethical Review Board in Linköping (No. 2017-226-31, 2017/610-32). The people received written information about the study and confirmation that withdrawal from the study would not affect their future care. Further, they were assured of the confidential nature of the study and that no individual answers could be identified as data were treated at group level.

2.6 | Data analyses
For descriptive statistics, unordered categorical data are presented by frequency and percentage, and ordinal data or continuous data that are not normally distributed are presented by median and quartiles. Arithmetic mean and standard derivations are presented for normally distributed continuous data.

To test the hypothesized conceptual model, structural equation modelling (SEM) was used in two steps (Anderson & Gerbing, 1988). The measurement models were evaluated using confirmatory factor analyses (CFA) in the first step. The CFA was guided by prior validation studies of each instrument. Since the response categories for items in the instruments used in this study were considered ordinal, the weighted least squares mean and variance adjusted (WLSMV) estimator were used (Brown, 2015). When evaluating the measurement models, the following criteria for model fit were used: root mean square error of approximation (RMSEA) ≤0.06, comparative fit index (CFI) of ≥0.95, Tucker–Lewis Index (TLI) of >0.95 and standardized weighted root mean square residual (SRMR) of <0.08 (Hu & Bentler, 1999).

In the second step, the structural relationship between the variables in the hypothesized conceptual model was examined. To examine if the association between continuity of care and self-care was mediated by perceived control (hypothesis 4), the association between continuity of care and self-care was first estimated, whereafter the indirect effect through perceived control was assessed. A significant indirect effect indicates the presence of mediation (Hayes, 2017). As depression is a well-known predictor of poor self-care (Chang et al., 2017; Lin et al., 2004; Riegel et al., 2007), we used depression as an adjusting variable for self-care.

The criteria for evaluating model fit in the SEM were RMSEA ≤0.08, CFI ≥0.90 and TLI >0.90 (Kim & Bentler, 2006). Further, we also used χ² statistics to evaluate the model fit, which should be non-significant. Data were analysed using SPSS 25 for Windows (IBM Corp.), R v 4.2.1 (the R foundation for Statistical Computing, Vienna, Australia) and Mplus 8.1 for Windows (Muthén & Muthén). The level of statistical significance was set at p <.05.

2.7 | Validity and reliability
All the used instruments have documented validity and reliability and have been evaluated in Swedish. To evaluate the measurement properties of the instruments in the present sample, CFA was conducted to examine the factor structure. The CFA for the latent variables in the present study revealed that EQ-SD-5L and the measure for continuity of care (PCCQ-12) had an excellent model fit and could be managed as unidimensional measures. Further, the CFA of the SC-CII revealed that item 14 (‘The last time you had symptoms, how quickly did you recognize it as a symptom of your illness?’) did not fit the model and was therefore excluded from the model. Item 14 has also been found problematic in other studies and is recognized as a debatable item by the constructors (Riegel et al., 2022). For SEM analysis, we evaluated a higher-order model of the SC-CII, which had an excellent model fit (Table 1); thus, we used a unidimensional version in the SEM analysis.

In contrast to the other measures, the CAS presented a poor model fit, which is expected since it has only two items per
TABLE 1  Confirmatory factor analysis and reliability of the latent variables.

<table>
<thead>
<tr>
<th>Latent variables</th>
<th>$\chi^2$ goodness of fit</th>
<th>RMSEA</th>
<th>90% CI</th>
<th>CFI</th>
<th>TLI</th>
<th>SRMR</th>
<th>Composite reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS* (two-factor model)</td>
<td>62.952</td>
<td>1</td>
<td>&lt;.001</td>
<td>0.343</td>
<td>0.274–0.417</td>
<td>0.966</td>
<td>0.795</td>
</tr>
<tr>
<td>EQSD (one-factor model)</td>
<td>15.305</td>
<td>5</td>
<td>.009</td>
<td>0.062</td>
<td>0.028–0.098</td>
<td>0.995</td>
<td>0.989</td>
</tr>
<tr>
<td>HADS Depression subscale</td>
<td>42.241</td>
<td>14</td>
<td>&lt;.001</td>
<td>0.061</td>
<td>0.041–0.083</td>
<td>0.992</td>
<td>0.988</td>
</tr>
<tr>
<td>PCCQ-12 (one-factor model)</td>
<td>158.676</td>
<td>52</td>
<td>&lt;.001</td>
<td>0.062</td>
<td>0.051–0.073</td>
<td>0.986</td>
<td>0.982</td>
</tr>
<tr>
<td>SC-CII (higher-order model)</td>
<td>513.985</td>
<td>149</td>
<td>&lt;.001</td>
<td>0.068</td>
<td>0.061–0.074</td>
<td>0.944</td>
<td>0.935</td>
</tr>
</tbody>
</table>

Abbreviations: CAS, Control Attitudes Scale; CFI, Comparative Fit Index; EQSD, EuroQol-SD-5 level; HADS, Hospital Anxiety and Depression Scale; PCCQ-12, patient continuity of care questionnaire 12-item version; RMSEA, root mean square error of approximation; SC-CII, self-care of chronic illness inventory; SRMR, standardized weighted root mean square residual; TLI, Tucker–Lewis Index.

*The latent variable for perceived control was not included in the SEM analysis due to poor measurement properties. Instead, only the first item from CAS was used as an indicator of perceived control.

3 | RESULTS

3.1 | Participant characteristics

Of the 542 patients included, 37% were women, and the mean age was 75 years (SD = 9). The people were hospitalized due to heart failure (32%), myocardial infarction (27%), atrial fibrillation (21%) and angina pectoris (20%). In total, 52% of the people had a prior diagnosis of heart failure. Non-cardiac comorbidities included diabetes (37%), cancer (20%), chronic obstructive pulmonary disorder (18%) and cerebrovascular disease (15%). A total of 15% of the people were readmitted in 30 days of the index hospitalization (Table 2).

3.2 | The structural equation model; goodness of fit and hypotheses testing

The results of the analysis confirmed Hypothesis 1 since it showed that higher levels of self-care predicted higher levels of HRQoL ($\beta = -0.169, p = .006$) (lower scores on the EQ-5D health dimension represent high HRQoL, explaining the negative relationship) and lower levels of hospital readmission ($\beta = -0.179, p = .038$). Hypothesis 2 was also confirmed since we found that higher levels of continuity of care predicted a higher level of self-care ($\beta = 0.417, p < .001$). After perceived control was included in the model, also Hypothesis 3 was confirmed since continuity of care predicted perceived control ($\beta = 0.195, p < .001$), and perceived control predicted with self-care ($\beta = 0.100, p = .045$). Finally, Hypothesis 4 was confirmed since the association between continuity of care and self-care decreased ($\beta = 0.398, p < .001$), indicating that perceived control partly mediated the effect of continuity of care on self-care as the direct effect between continuity of care and self-care decreased when the measure for perceived control was added to the model. Furthermore, the indirect effect between continuity of care and perceived control and self-care was 0.021 ($p = 0.031$), and the total effect was 0.431 ($p < 0.001$).

The final model, presented in Figure 1, had an acceptable model fit according to the global fit indices: RMSEA = 0.06, 90% CI, 0.05–0.06; CFI = 0.90; TLI = 0.90. However, there was a significant deviation between the model and the data according to the $\chi^2$ goodness of fit ($p < 0.001$).

4 | DISCUSSION

In this study on people hospitalized due to cardiac conditions and suffering from at least one additional comorbid condition, the results indicate that continuity of care improves outcomes after hospitalization through the positive association with perceived control and self-care, which in turn are associated with better outcomes, increased HRQoL and fewer hospital readmissions.
TABLE 2  Patient characteristics of the included patients and scores for self-reported measures.

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Total n = 542</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD)</td>
<td>75.2 (9.4)</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>343 (63)</td>
</tr>
<tr>
<td>Readmitted in 30 days, n (%)</td>
<td>80 (15)</td>
</tr>
<tr>
<td>Diagnosis at index hospitalization, n (%)</td>
<td></td>
</tr>
<tr>
<td>Angina pectoris</td>
<td>109 (20)</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>116 (21)</td>
</tr>
<tr>
<td>Heart failure</td>
<td>176 (33)</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>142 (26)</td>
</tr>
<tr>
<td>Non-cardiac comorbidity, n (%)</td>
<td></td>
</tr>
<tr>
<td>Cancer or tumour</td>
<td>108 (20)</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>81 (15)</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disorder</td>
<td>99 (18)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>201 (37)</td>
</tr>
</tbody>
</table>

Self-reported measures

<table>
<thead>
<tr>
<th>Equation</th>
<th>Possible total score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>5</td>
</tr>
<tr>
<td>Self-care</td>
<td>7</td>
</tr>
<tr>
<td>Usual activities</td>
<td>60</td>
</tr>
<tr>
<td>Pain/discomfort</td>
<td>100</td>
</tr>
<tr>
<td>Anxiety/depression</td>
<td>100</td>
</tr>
<tr>
<td>Perceived control</td>
<td>6</td>
</tr>
<tr>
<td>PCCQ-12</td>
<td>12.2</td>
</tr>
<tr>
<td>SC-CII maintenance</td>
<td>13.1</td>
</tr>
<tr>
<td>SC-CII monitoring</td>
<td>17.6</td>
</tr>
<tr>
<td>SC-CII management</td>
<td>17.2</td>
</tr>
</tbody>
</table>

Abbreviations: EQ, EuroQol-5D-5 level; PCCQ-12, patient continuity of care questionnaire 12-item version; SC-CII, self-care of chronic illness inventory.

We found that higher levels of self-care predicted higher levels of HRQoL and lower levels of hospital readmission in this sample. This finding is in line with a recent randomized control trial on people hospitalized for coronary heart disease, using an e-health intervention to support self-care after discharge. People in the intervention group had significantly higher HRQoL compared with people in the control group (Su & Yu, 2021). An explanation for the association between self-care, higher levels of HRQoL and reduced risk for readmission might be that sufficient self-care often reduces the symptom burden and thereby improves HRQoL. Further, monitoring and managing symptoms, including contacting healthcare providers due to deterioration, might contribute to reduced hospital readmission (Jaarsma et al., 2017).

The results of this study support that experiencing a higher level of continuity of care predicts higher levels of self-care, as hypothesized. Studies examining the association between continuity of care and self-care in people with cardiac disease are scarce; however, interventions to strengthen continuity of care have been found to enhance self-care in people discharged from a cardiac hospital emergency department (Cossette et al., 2015). Further, our results align with the conclusions of a quasi-experimental study on people who had undergone heart surgery. After a nursing continuity of care intervention that started during hospitalization and continued until 15 days after discharge, self-care was significantly higher in the intervention group compared with the control group (Negarandeh et al., 2012).

We did not find any previous studies evaluating the association between continuity of care and perceived control. However, since perceiving continuity of care includes receiving information on diagnosis, prognosis, medication, symptom management and planned follow-up (Hadjistavropoulos et al., 2008), our hypothesis was that continuity would increase the feeling of having control concerning the heart condition after hospital discharge. This hypothesis is in line with the findings of Gabay (2021), who found that when clinicians informed people what to expect next in the process and what was planned, this enhanced their sense of control over the situation and contributed to resilience after discharge (Gabay, 2021). These findings highlight the importance of involving people in care and providing clear information about implementing their agreed care plan and follow-up on discharge from hospital since this will increase their perception of control.

Moreover, as hypothesized, our model suggests that high levels of perceived control predicted high levels of self-care. This has also been confirmed in studies on people with heart failure, where significant associations between high levels of perceived control and high levels of self-care were found (Biddle et al., 2020; Hwang et al., 2014; Lin et al., 2020). Altogether, our findings support the suggestion that activities to ensure continuity of care and facilitate perceived control will also enhance self-care in people with cardiac problem after hospitalization.

The mediation analysis showed that perceived control partly mediates the relationship between continuity of care and self-care. This implies that continuity of care has both a direct and indirect effect on self-care. Therefore, the interpretation is that when a person perceives continuity of care (i.e., receives information on diagnosis and prognosis and participates in decisions on medical treatment after hospitalization, planned follow-up, etc.), the perceived control over the heart condition increases, which in turn has a positive effect on performing self-care. At the same time, continuity of care directly affects self-care. However, there are no previous studies evaluating the mediating role of perceived control on continuity of care and self-care, and future studies on these relationships in other samples and settings are warranted.

The conceptual model (Figure 1) suggests that higher levels of continuity of care predicted higher levels of self-care, positively impacting HRQoL. In a recent systematic literature review and meta-analysis, Tonapa and colleagues found the same association. They focused on outcomes of nurse-led tele-coaching interventions in people with...
heart failure, as these types of interventions are recommended for maintaining continuity of care. They found that the interventions significantly affected self-care behaviour and HRQoL (Imanuel Tonapa et al., 2021). Therefore, when developing interventions aiming to improve HRQoL, these interventions should include activities to enhance continuity of care, perceived control and self-care.

Finally, the conceptual model suggests that the association between continuity of care and self-care reduces the 30-day readmission rate. Numerous studies have aimed to create models to predict the 30-day readmission rate (Amarasingham et al., 2010; Eapen et al., 2013; Frizzell et al., 2017; Hammill et al., 2011; Kansagara et al., 2011), but their ability to discriminate has been insufficient. For example, Frizzell et al. (2017) recently tried to build a model to predict the 30-day readmission rate in people hospitalized due to heart failure. They included variables such as vital signs and labs on discharge as well as ejection fraction and comorbidities, but they could not find a reliable model (Frizzell et al., 2017). However, they did not include person-reported variables such as continuity of care, self-care or perceived control. Based on the results from our study, these variables might impact the 30-day readmission rate and should be considered for inclusion in such a model in future research. Further, our results suggest that interventions to improve continuity of care can also improve self-care and HRQoL and reduce hospital readmission.

This study indicates that continuity of care, perceived control and self-care are relevant explanatory variables for HRQoL and hospital readmissions. Predictive variables for self-care and perceived control are already known, and future studies should focus on finding variables relevant for predicting continuity of care, such as age, gender and socioeconomic factors.

4.1 Methodological aspects and limitations

Since we wanted to capture the person’s perception and situation during this critical initial period at home, data were collected in the first weeks after hospital discharge. It is possible that collecting data a long time after hospitalization might have altered the results, but we wanted to focus on the first weeks since the 30-day readmission rate is an essential quality indicator.

One strength of this study is handling data as ordinal and using the appropriate estimation WLSMV, which reduces the risk of attenuated estimates and artefact factors (Brown, 2015; Holgado–Tello et al., 2010). An additional strength is that the psychometric properties of all instruments used in this study have been evaluated in previous studies and are valid and reliable. Further, each instrument’s factor structure has been evaluated in the present sample. Finally, when the measurement model was unsatisfactory (i.e. the CAS), it was not included in the SEM. This was done to ensure that only high-quality measurement models giving accurate measures were included in the analysis.

The mediation model is a causal model, and the lack of causality reduces its importance (Baron & Kenny, 1986). Even if the
design of the present study rules out the opportunity of conclusive causal inferences, it is unlikely that self-care should predict continuity of care and perceived control. Future studies should try to replicate these findings using designs that allow stronger causal conclusions.

We have examined the relationship between continuity, perceived control, self-care, HRQoL and hospital readmission in the present study, without considering more complex associations, such as adjusting covariates. One exception was that the association between continuity and self-care was adjusted for symptoms of depression. The reason for this was that numerous studies describe depression or psychological distress as a predictor of poor self-care (Chang et al., 2017; Lin et al., 2004; Riegel et al., 2007).

Another weakness of this study is that we did not conduct an a priori sample size calculation since the data were collected as part of another study. Furthermore, considering that the SEM model includes many parameters, this study might be underpowered (Kline, 2015). Even so, all hypotheses have been confirmed.

5 | CONCLUSION

People who perceive higher levels of continuity of care experience a higher perceived level of control over their heart condition and perform self-care to a greater extent, significantly improving their HRQoL and reducing the risk of hospital readmissions. As previously known, high levels of self-care are crucial to improve HRQoL and avoid readmission. However, our study indicates that higher levels of continuity of care and perceived control are of great relevance as there are significant associations between these explanatory variables. The relationships between continuity of care, perceived control and self-care are clinically relevant, and these concepts should be targeted in interventions to improve quality of life and healthcare utilization.

AUTHOR CONTRIBUTIONS

Conceptualization, methodology and validation ES, KÅ, ML, LN, TJ and AS; software, formal analysis and investigation ES, KÅ; writing—original draft preparation, ES; writing—review and editing and visualization, ES, KÅ, ML, LN, TJ and AS; supervision, ML, LN, TJ and AS; securing funding, AS. All authors have read and agreed to the published version of the manuscript.

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CONFLICT OF INTEREST STATEMENT

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DATA AVAILABILITY STATEMENT

Data are available upon reasonable request from the authors.

ORCID

Emma Säfström https://orcid.org/0000-0001-6548-1042
Tiny Jaarsma https://orcid.org/0000-0002-4197-4026

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