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## Testing the performance of the ENRICHD Social Support Instrument in cardiac patients

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### Abstract

**Background:** Previous investigations suggest an important role of social support in the outcomes of patients treated for ischemic heart disease. The ENRICHD Social Support Instrument (ESSI) is a 7-item self-report survey that assesses social support. Validity and reliability of the ESSI, however, has not been formally tested in patients undergoing percutaneous coronary intervention (PCI).

**Methods:** The ESSI, along with the Short Form-36 (SF-36), was sequentially administered to a cohort of 271 patients undergoing PCI. The test-retest reliability was examined with an intra-class correlation coefficient by comparing scores among 174 patients who completed both instruments 5 and 6 months after their procedure. Internal reliability was assessed using Cronbach's alpha at the time of patients' baseline procedure. The concurrent validity of the ESSI was assessed by comparing scores between depressed (MHI-5 score < 44) vs. non-depressed patients. The correlation between the ESSI and the SF-36 Social Functioning sub-scale, an accepted measure of social functioning, was also examined.

**Results:** Test-retest reliability showed no significant differences in mean scores among ESSI questionnaires administered 1 month apart (27.8±1.4 vs 27.8±1.5,  $p = 0.98$ ). The intra-class correlation coefficient was 0.94 and Cronbach's alpha was 0.88. Mean ESSI scores were significantly lower among depressed vs. non-depressed patients (24.6±1.7 vs 27±1.4,  $p < 0.018$ ) and a positive albeit modest correlation with social functioning was seen ( $r = 0.19$ ,  $p = 0.002$ ).

**Conclusion:** The ESSI appears to be a valid and reliable measure of social support in patients undergoing treatment for coronary artery disease. It may prove to be a valuable method of controlling for patient variability in outcomes studies where the outcomes are related to patients' social support.

## Background

Social support is broadly defined as the existence or availability of people on whom one can rely; people who let one know that they are cared about, valued, and loved [1]. Lack of social support is associated with increased morbidity and mortality in patients with ischemic heart disease [2,3]. Growing awareness of the importance of social support on cardiovascular outcomes has necessitated the development of instruments to measure social support. The ENRICH Social Support Instrument (ESSI) is one such measure derived from questions on the Medical Outcomes Survey and earlier work examining the influences of social support [3-5]. The ESSI is a seven-item measure, used in recent clinical trials, that assesses the four defining attributes of social support: emotional, instrumental, informational, and appraisal [6,7].

The ESSI has demonstrated acceptable internal consistency and has shown to correlate positively with other social support instruments and negatively with measures of depression [6,8,9]. Despite these scattered findings, the literature lacks a strong validation study of the questionnaire's psychometric properties. Therefore, our objective was to test the validity and reproducibility of the ESSI in patients undergoing percutaneous coronary intervention (PCI). In the absence of a "gold standard" for social support, the construct validity of the instrument was assessed by a series of comparisons of the ESSI with depression, social, mental, and physical functioning, disease-specific symptom severity, and quality of life. These analyses were undertaken to support the use of the ESSI when examining the relationship between social support and outcomes in cardiovascular disease.

## Methods

### Subjects and procedures

Participants in this study were from a consecutive cohort of PCI patients participating in the Post-revascularization REcovery StudieS (PRESS) at the Mid-America Heart Institute. The process of patient recruitment, mechanism, success and potential selection biases of baseline health status data collection have been previously described [10]. In brief, 271 consecutive patients undergoing PCI from February to April 1999 were asked to participate in an observational research study documenting the recovery of their health status after coronary revascularization. Each consenting patient was administered a series of questionnaires at baseline and monthly thereafter for six months. During the 6-month recovery period, patients completed monthly a packet of self-report questionnaires identical to those at baseline, omitting the demographic information. These data were used to supplement an existing procedural database. Approval from the Saint Luke's Hospital Institutional Review Board was obtained prior to the beginning of this study.

## Instruments

### ENRICH Social Support Instrument (ESSI)

As noted previously, the ESSI is a seven-item, self-report measure used in the ENRICH trial [6,7]. Individual items are then summed for a total score, with higher scores indicating greater social support. During this study, data on patients' marital status were collected at baseline, but omitted in follow-up questionnaires to eliminate redundant collection. Therefore, baseline marital status was extrapolated to each survey period although actual follow-up data was not collected. The seven ESSI items are presented in the Appendix (see Table 3).

### SF-36 Mental Health Index and Social Functioning subscale

The SF-36 is a well-known and widely used generic measure of health status. The 36 items cover eight domains including: physical functioning, social functioning, role-physical, role-emotional, mental health, vitality, bodily pain, and general health [11]. For the purposes of this study, we examined the Mental and Physical Health Component Scores, and Social Functioning subscale, which is a measure of the individual's functioning as a member of society. We also used the Mental Health Index (MHI) subscale, which assesses the individual's level of depression. The MHI subscale has demonstrated validity as a depression screen when compared to the Diagnostic Interview Schedule (area under the receiver operating curve = 0.89) [12].

### Seattle Angina Questionnaire (SAQ) – Angina Frequency and disease-specific Quality of Life

The SAQ is a valid, reliable and responsive disease-specific measure of health status for patients with coronary disease [13-16]. SAQ subscales used in this study were the angina frequency (SAQ-AF) and quality of life (SAQ-QOL) scales. The SAQ-AF measures the frequency of angina during the previous four weeks and the SAQ-QOL measures patients' perceptions of how their coronary disease impacts their quality of life. The SAQ-QOL has been found to be predictive of both 1-year mortality and 1-year hospital admission for acute coronary syndrome in univariate models. In addition, the SAQ-AF was a significant predictor of 1-year admission in adjusted multivariate models [17].

## Statistical analysis

### Determining reliability

The internal consistency of the ESSI was calculated using Cronbach's  $\alpha$ , which measures the dispersion of different items within a single domain [18]. Reproducibility, or test-retest reliability of the instrument was examined using paired t-tests of the mean ESSI scores at months 5 and 6. The most distant time points after patients procedure were selected to capture a stable and consistent period patients' social support; a period during which

**Table 1: ESSI inter-item correlations**

	ESSI Q1	ESSI Q2	ESSI Q3	ESSI Q4	ESSI Q5	ESSI Q6	ESSI Q7	ESSI Total
ESSI Q1	1.0	0.78	0.63	0.47	0.70	0.65	0.26	0.84
ESSI Q2		1.0	0.56	0.41	0.70	0.57	0.18*	0.80
ESSI Q3			1.0	0.46	0.65	0.65	0.37	0.79
ESSI Q4				1.0	0.49	0.48	0.42	0.74
ESSI Q5					1.0	0.76	0.28	0.87
ESSI Q6						1.0	0.25	0.83
ESSI Q7							1.0	0.38
ESSI Total								1.0

All ESSI inter-item correlations  $p < 0.001$ , except \*  $p = 0.004$ .

transient changes in social support around the time of coronary revascularization should have dissolved. In addition, the intra-class correlation coefficient (ICC) also was used to assess test-retest reliability between months 5 and 6. The ICC ranges from 0 – 1 and describes the proportion of total score variability due to between person differences [13]. Higher ICCs reflect greater reproducibility.

#### Determining validity

In the absence of a "gold standard" measure of social support, several constructs were examined to support the validity of the ESSI. We expected that ESSI scores among depressed patients would be lower than non-depressed patients. To define depression, we used the SF-36 MHI score where those patients with scores less than 44 were classified as depressed. To quantitatively assess construct validity, independent sample t-tests of baseline mean ESSI scores were compared among depressed versus non-depressed patients.

Concurrent and predictive validity were examined by calculating the correlation coefficient between the ESSI total score and the SF-36 Social Functioning subscale, the SF-36 Physical and Mental Component Scores, and the SAQ-QOL scale at baseline and 6-months post-revascularization. We anticipated positive associations between social support and social functioning, general, and disease-specific QOL at both time points.

## Results

### Patient demographics

The study population consisted of 271 patients ranging in age from 37 to 87 years old who underwent PCI to treat ischemic coronary artery disease. The mean patient age was 64.1 years old (SD = 11.2). The population consisted of 32.5% women and 5.9% minorities. Seventy-four percent (74 %) of the patients reported being married. The mean level of education was 12.4 years (SD = 2.0) with 72% of the cohort reported attending some college or vocational school. On average, patients were able to com-

plete the ESSI in 2–3 minutes. Furthermore, the data collectors reported no complaints from patients about completing the instrument.

### Reliability

Internal consistency for the ESSI, using Cronbach's  $\alpha$ , was 0.88. The inter-item correlations were examined, with significant associations being found between all items and item-total score ( $p < 0.001$ ). However, question 7 (patient's marital status) consistently had the lowest correlation with the other ESSI items and total score. These results are presented in Table 1.

Test-retest analysis was used to compare mean scores of ESSIs administered at months 5 and 6 after PCI. These time points were selected because they were thought to represent post-procedural periods of relative medical stability. The mean score at month 5 was  $28.5 \pm 5.6$  (M  $\pm$  SD) and month 6 was  $28.5 \pm 5.8$  ( $p = 0.98$ ), indicating no significant differences in ESSI scores. The intra-class correlation coefficient was 0.94, reflecting excellent reproducibility.

### Concurrent and predictive validity

At baseline, the mean ESSI score among depressed patients was  $22.8 \pm 4.6$  while the non-depressed group mean score was  $26 \pm 4.3$  ( $p < 0.001$ ). Similarly, patients living alone had significantly lower scores ( $16 \pm 5.1$ ) vs. patients living with someone ( $20 \pm 3.8$ ;  $p < 0.001$ ). The SF-36 Social Functioning subscale showed a statistically significant albeit modest correlation with the ESSI ( $r = 0.19$ ,  $p = 0.002$ ).

Concurrent and predictive validity also was assessed by examining the correlations between the ESSI total score and the SF-36 Social Functioning, Mental Health Index, Mental Component, and Physical Component scales and the SAQ-QOL scale at both baseline and 6-months post-PCI. As can be seen in Table 2, the ESSI demonstrated modest, but statistically significant correlations with these

**Table 2: ESSI correlations with the SF-36 scales and the SAQ-QOL**

		Correlations at Baseline					
		SF-36 Social Functioning	SF-36 MHI	SF-36 PCS	SF-36 MCS	SAQ-AF	SAQ-QOL
ESSI Total		0.20 (p = .001)	0.36 (p < .001)	0.13 (p = .040)	0.31 (p < .001)	0.14 (p = .029)	0.22 (p = .001)
		Correlations 6-Months Post-Revascularization					
		SF-36 Social Functioning	SF-36 MHI	SF-36 PCS	SF-36 MCS	SAQ-AF	SAQ-QOL
ESSI Total		0.33 (p < .001)	0.29 (p < .001)	0.20 (p = .004)	0.29 (p < .001)	0.18 (p = .008)	0.22 (p = .002)

**Table 3: ENRICHD Social Support Instrument**

Item 1	Is there someone available to whom you can count on to listen to you when you need to talk?					
	None of the time	A little of the time	Some of the time	Most of the time	All of the time	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Item 2	Is there someone available to you to give you good advice about a problem?					
Item 3	Is there someone available to you who shows you love and affection?					
Item 4	Is there someone available to help with daily chores?					
Item 5	Can you count on anyone to provide you with emotional support (talking over problems or helping you make a difficult decision)?					
Item 6	Do you have as much contact as you would like with someone you feel close to, someone in whom you can trust and confide in?					
Item 7	Are you currently married or living with a partner?					
	Yes	No				
	<input type="checkbox"/>	<input type="checkbox"/>				

measures at both time points. This suggests that patients with greater social support also experience better social functioning, improved symptom control, and better general and disease-specific quality of life.

**Discussion**

The present study confirms the concurrent and predictive validity and utility of the ESSI as an index of social support for use with PCI patients. The internal and test-retest reliability exceeds the recommended level of 0.70 for group assessments [19]. The ESSI also demonstrated a positive correlation with social functioning (r = 0.20) and demonstrated the anticipated relationship of significantly lower scores among those who were depressed or living alone. In addition, it correlated with symptom improvement and better general and disease-specific quality of life at both baseline and 6-months post-PCI.

The results also provide conceptual insight into the nature of social support. The majority of questions on the ESSI consider general feelings about being loved and valued rather than instrumental types of support. This supports

the theory that social support is not a tally of actual supportive "services" rendered, but rather a patient's belief that others care about them and are available if needed [20]. This trend can be seen when examining the inter-item correlations presented in Table 1. Two items in particular, questions four and seven, have considerably lower correlations with the other questions. Question four has instrumental overtones and asks "Is there someone available to help you with daily chores?" The weaker associations with these items support the contention that instrumental support is a distinct construct when compared with other types of support that impact patients' health and well-being.

This study has several design limitations that should be noted. First, baseline social support was measured using a self-report questionnaire at the time of PCI and patient responses were not substantiated with family members, as would have ideally been the case. Secondly, the size and diversity of the patient sample was limited. With 271 patients and only 6% minorities, drawn from a single region of the United States, the population number and

make-up limits the ability to generalize these results to the general population.

Despite these limitations, the results confirm the reliability and validity of the ESSI for gathering social support data among PCI patients. This study supports its use in outcomes research that may help define the role of social support in affecting health outcomes. With psychometrically validated instruments in hand, future researchers should further elucidate the effects of social support on health and recovery in cardiac patients.

### Authors' contributions

JV conceived the study and drafted the manuscript. MC participated in coordination of the study and statistical analyses. CP participated in design and coordination of this project. JO & KH contributed to the conception of the study. JH performed the statistical analysis. JS oversaw the execution of this project and edited the manuscript. All authors have read and approved the final manuscript.

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