

Development of an instrument to measure cardiac illness dependency

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OBJECTIVE: Dependency is frequently mentioned in the literature as a response of patients with cardiac disease. The purpose of this study was to develop and test a measure of dependency occurring in response to a cardiac illness. Illness dependency is defined as the need for emotional protection and social support after a significant change in health.

DESIGN: Instrument development study.

SAMPLE: Convenience sample of 311 patients with cardiac disease.

RESULTS: The final version of the instrument has 25 items, each of which is measured on a 5-point Likert-type scale. Content validity was demonstrated using a panel of experts. Internal consistency of the total scale was 0.90; subscale alpha coefficients ranged from 0.64 to 0.81. Exploratory factor analysis supported a four factor solution: Attention, Reassurance, Concern, and Assistance, which accounted for 57.4% of the variance in scores. Discriminant validity was demonstrated by a low correlation with neuroticism. Social desirability of responses was minimal.

CONCLUSION: Internal consistency reliability, content validity, and discriminant validity of the Illness Dependency Scale have initial support. This instrument is ready for use in research in which the investigator wishes to measure dependency associated with cardiac illness. (*Heart Lung*® 1997;26:448-57)

Psychosocial dependency is a familiar response to stress, and one seen commonly in patients with cardiac disease who are ill or recovering.¹⁻⁹ Dependency slows recovery and interferes with adjustment to an illness event.^{2,3,8} Investigators of cardiac illness have rarely attempted to measure dependency directly. Instead, they have measured sick role⁴ or return to work,¹⁰ and then discussed these behaviors in terms of dependency. This approach assumes that these responses are synonymous, thereby ignoring the complexity of the various psychosocial responses to illness. Measuring one specific response allows investigators to test hypotheses regarding its cause with use of sophisticated research design and analytic procedures. For

example, a focused measure of dependency could be used—with other precise measures (e.g., health perceptions, emotions) in structural equation modeling—to identify the mechanisms operant among the various concepts contributing to cardiac invalidism.

The purpose of this article is to report on the development and testing of a measure of dependency occurring in response to a cardiac illness. Dependency occurring in response to illness is manifested as a transient need for emotional protection and social support. This definition includes components of both social and emotional dependency as defined by others.¹¹ Social dependency implies requiring help from others to negotiate interpersonal relationships to accomplish activities of daily living. Emotional dependency is characterized by the need for emotional support, proximity, and contact with significant others.

The concept of dependency has been defined in various ways by different disciplines, but the most comprehensive definition includes five categories: social, emotional, financial, institutional,

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and psychomedical.¹¹ Many existing instruments operationalize dependency as psychomedical or physical dependency evoked by illness or handicap.^{12,13} Others include dependency as part of a multidimensional tool.¹⁴⁻¹⁶ For example, the Sixteen Personality Factor Questionnaire lists dependence versus independence as one of the personality factors, as does the Defense Mechanism Index, the Interpersonal Behavior Survey, the Lorr Interpersonal Behavior Inventory, the Revised Hand Test, and the Irrational Beliefs Test.¹⁷ Measures of sick role operationalize the concept using several attributes, only one of which is dependency.^{18,19}

Several instruments focus exclusively on dependency and operationalize it as a social or emotional response, or both, as these authors have done. These instruments were judged to be inadequate for our purposes because they measured dependency as a stable personality trait,^{20,21} or the instrument was developed for use in a special population, such as children or hospitalized patients.²¹⁻²⁵ One instrument was designed to be used within the learned helplessness theoretic framework.²⁶ There was clearly a need for an instrument that could measure dependency in the manner expressed by ill and recovering patients with cardiac disease.

Psychologists argue that dependency is a normal human response that decreases with maturity and fluctuates during times of stress.^{20,27} This statement suggests that dependency occurring in response to illness may be normal rather than an abnormal, dysfunctional response as suggested by prior investigators.^{1-4,7-10,28,29} Operationalizing dependency as a social-emotional phenomenon reflects the proposition that dependency may occur in response to normal social or emotional needs. Inherent in this proposition is the hypothesis that social support may influence dependency after an illness. If one were able to measure dependency directly, the effectiveness of social support interventions could be tested.

DEVELOPMENT OF THE SCALE

Background. The construct dependency was defined as a social-emotional response and operationalized, based on Johnson's Behavioral System conceptual model, as reflecting the need for attention, assistance, and reassurance.⁵ Attention was defined as careful, close observation or listening. Assistance was defined as the act of aiding or supporting another. Reassurance was defined as those actions performed with the intention of restoring confidence. A list of behavioral descriptors was generated for each dimension to facilitate speci-

ficity and clarity.²⁹ Use of behavioral descriptors to guide item construction also assured that the items adequately reflected the cardiac population for whom the instrument was intended. Forty behavioral descriptors—thought to be evidence of the need for attention, assistance, or reassurance—were generated from clinical experience and a review of the cardiac literature.³⁰⁻³⁹ Two to four items were written for each behavioral descriptor; a total of 86 preliminary scale items were generated. Redundant items were purposefully included to allow for subsequent elimination during content validity and pilot testing.²⁹ Our two expert cardiac clinicians discussed and refined the list, and classified each behavioral descriptor as evidence of the need for attention, assistance, or reassurance (Table I). One of our clinical experts is a doctorally prepared cardiac nurse specialist with a minor in psychology and more than 20 years of experience caring for patients with cardiac disease. Our other clinical expert is a practicing physician cardiologist, who also has more than 20 years of clinical experience. Our coinvestigator on the study is also a clinical psychologist.

TESTING OF THE SCALE

Psychometric testing consisted of content validity testing with a panel of five experts, pilot testing with patients, internal consistency testing, exploratory factor analysis, discriminant validity testing, and assessment of social desirability of responses.

Social desirability of responses has been recognized since the 1950s as a statistically important influence on the variance of self-report instruments.⁴⁰ According to Nunnally,⁴¹ social desirability of responses is probably a function of an individual's adjustment, awareness of one's own traits, and frankness in stating what one knows about oneself. Although items were written in a non-judgmental manner in an attempt to avoid socially desirable responses, the complexity of the phenomenon warranted testing in an attempt to identify whether particular items (e.g., "I demand more attention than other people") tended to elicit socially desirable responses.

Content validity testing. The definition of dependency, the 40 behavioral descriptors in Table I, and the set of 86 preliminary scale items were submitted to a judge panel of five experts in the care of patients with cardiac disease with the request that they evaluate (1) the definition of illness dependency, (2) the operationalization of the phenomenon as attention, assistance, and reassurance, (3) the categorization of descriptors as

Table 1
Behavioral descriptors submitted to judge panel with scale items during content validity testing

Behavioral descriptor	Accepted by judges	Rejected by judges
Need for Attention		
1. Demanding	X	
2. Elicits guilt and pity*	X	
3. Clingy, hanging on	X	
4. Wants family available		Combined with No. 3
5. Being a "good patient"		X
6. Wants attention from nurses and doctors	X	
7. Fussy	X	
8. Complaining	X	
9. Does not want to go back to work*	X	
10. Overemphasizes symptoms	X	
11. Moves slowly	X	
12. Attached to staff		X
13. Brings presents to staff		X
Need for Assistance		
14. Asks many questions		X
15. Manipulates people*	X	
16. Wants help in handling minute details	X	
17. Wants relief from major decision-making		Combined with No. 16
18. Passive		X
19. Hesitant*	X	
20. "Cannot drag him/her out"*	X	
21. Wants to stay close to health care system	X	
22. Exempt from normal social roles	X	
23. Wants to be taken care of, provided for	X	
24. Seeks help with ordinary activities	X	
25. Seeks more help than is realistic		Combined with No. 24
26. Afraid to do things*	X	
Need for Reassurance		
27. Calls physician with slightest change	X	
28. Calls health care providers often		Combined with No. 27
29. Checks on all activities		Combined with No. 27
30. Talks to others who have been ill		X
31. Full of worries and uncertainties	X	
32. Submits self for repeated testing	X	
33. Asks permission	X	
34. Needs much reassurance	X	
35. "What if . . ."	X	
36. Feels unsafe	X	
37. Discouraged, emotional	X	
38. Perceived need to know		X
39. Wants familiar things from home		X
40. Worried look*	X	

*Descriptors thought to be miscategorized by one or more of the judges. All but last descriptor thought to be evidence of need for reassurance.

evidence of one of those three dimensions, and (4) the individual scale items.⁴² Scale items were judged for clarity and accuracy as an indicator of dependency. Judge panel members were experi-

enced cardiac clinical nurse specialists; two of the five were doctorally prepared and knowledgeable in scale development. One of the doctorally prepared experts was also a practicing counselor and

clinical nurse specialist. The other three were masters-prepared clinical experts. Each judge voted to indicate whether or not she agreed with the definition, operationalization, and categorization of each descriptor, and the clarity and accuracy of each item. The judges' responses were dichotomous (i.e., agree/disagree); all five experts were required to agree if an item was to be retained.⁴³

When asked whether the definition of illness dependency correctly portrayed the dependent patient with cardiac disease, all five judges agreed. All agreed also on operationalization of the phenomenon as the need for attention, assistance, and reassurance. Less agreement was evident when each descriptor and specific items were individually judged (as detailed further on); 14 behavioral descriptors and 30 scale items were eliminated by the judges. Judges were not required to give reasons for disagreement, but when noted, common reasons were potential confusion with a physiologic limitation (i.e., functional status) or normal variability in the population.

The *Attention* dimension was submitted to the judges with 13 descriptors and 27 items. Three descriptors and all six of the related items were rejected by at least one of the judges. Two descriptors were collapsed into one. Another six individual items were rejected, leaving nine descriptors and 15 items in the Attention dimension.

The *Assistance* dimension was submitted with 13 descriptors and 29 items. Two descriptors and their four items were eliminated; four descriptors were combined into two, leaving a total of nine descriptors. Five individual items were rejected, leaving 20 items in the Assistance dimension.

The *Reassurance* dimension was submitted with 14 descriptors and 30 items, but the judges rejected three descriptors and the six items related to them. Three descriptors were collapsed into one, leaving nine descriptors. Three individual items were rejected leaving 21 items in the Reassurance dimension.

Six of the behavioral descriptors were thought by at least one of the judges to be evidence of a dimension other than the one to which it was originally assigned (Table I). These descriptors were avoided for the most part when items were selected for the scale, although three such items were thought to be important and therefore were used. One of the three items subsequently loaded during factor analysis on Assistance where originally placed by the authors, one moved to Reassurance as predicted by the judge, and one item loaded on a new dimension identified during exploratory

factor analysis: *CONCERN*. Content validity testing left a total of 56 items for pilot testing.

Pilot testing. A pilot study was conducted with a sample of 32 patients with cardiac disease discharged within a month after a cardiac-related hospitalization (e.g., bypass surgery, myocardial infarction). The primary purpose of this pilot study was to assess clarity of the items and usefulness of the 5-point response format for each item. The goal was to reduce the set of items to 25 or less, based on a desire to minimize subject burden.

Of the 56 items evaluated, 31 items were eliminated because subjects wrote notes in the margins indicating that they found them vague or confusing, or because the individual item analysis revealed a skewed distribution of responses. For example, when the full metric of the scale (i.e., 1 to 5) was not used, this was interpreted as evidence that a demand characteristic may be influencing responses.⁴¹ That is, items that most people answered the same poorly differentiated among subjects and were not retained. Pilot testing resulted in a set of 25 items adequate for further testing.

Sampling and data collection procedure. A heterogeneous sample of patients with cardiac disease was sought to test the instrument and to maximize usefulness of the tool to future users.⁴⁴ Any patient discharged with a diagnosis of cardiac disease from one of six participating hospitals within the prior 2 weeks was eligible to participate. Subjects were identified within the first 2 weeks after hospital discharge so that another 2 weeks could be allowed for mail delivery and patient delay—and still get patient responses within the month after hospital discharge. Patients meeting these criteria were identified from computerized lists that included name, address, discharge date, and primary discharge diagnostic-related group. Only surveys returned within 30 days of hospital discharge were used.

A sample of at least 250 was sought to test the 25-item scale based on Nunnally's⁴¹ recommendation of 10 subjects per item. Surveys were mailed to 1327 people and returned by 379 patients (29% response rate). Surveys from 68 subjects had to be discarded because of missing data, or because the survey was completed more than 30 days after hospital discharge, leaving a final sample of 311. Subjects were predominately men (69%), married (67.6%), elderly ($M = 66$ years, $SD = 11.2$), and hospitalized on average 6.5 ($SD = 4.7$) days. Discharge diagnoses included coronary artery bypass surgery (26%), myocardial infarction (22%), coronary artery disease (22%), chest pain (10%), and other (20%), which included such diagnoses as

cardiomyopathy. No demographic information was available on the nonresponders.

The survey packet was mailed with a cover letter explaining the study. Potential volunteers were told that the purpose of the study was to test a scale designed to measure patients' responses to illness. Included in the packet were (1) the Illness Dependency Scale (IDS) (called "Response to Illness Scale"), (2) the Eysenck Neurosis Subscale,⁴⁵ and (3) the Marlow-Crowne Social Desirability Scale (short form).⁴⁶ The entire packet required less than 30 minutes to complete. Return of the packet was interpreted as consent to participate.

Respondents were asked to read each item and evaluate how well the statement described them within the past month on a 1-to-5 scale, with 1 indicating it was a poor descriptor, and 5 indicating a perfect description. Mean item scores ranged from 1.74 (SD = 1.18) for "I think my spouse/friends say I complain a lot," to 4.21 (SD = 1.10) for "I want to be told exactly what activities are safe for me." The range of every item was 4, as the full 1-to-5-point metric was used for every item.

The IDS is scored by adding the responses on each item in the subscale; total scores range from 25 to 125. One item from the reassurance subscale is reverse-scored: "I ask outright for help." The higher the score, the more illness dependency manifested by the subject. The mean total score in this sample was 71.59 (SD = 16.85); subscale score means were 12.58 (SD = 5.33) for Attention, 17.299 (SD = 5.95) for Reassurance, 18.62 (SD = 6.04) for Concern, and 23.87 (SD = 5.26) for Assistance. Average summary scores are best for comparing subscale scores because the number of items in each subscale differs. The mean average subscale scores were 2.096 (SD = 0.89) for Attention, 2.75 (SD = 0.76) for Reassurance, 3.10 (SD = 1.01) for Concern, and 3.4 (SD = 0.75) for Assistance.

Internal consistency. Internal consistency is typically the first test of reliability conducted on new paper-and-pencil scales.⁴² Alpha coefficients were used to assess the internal consistency of the IDS. Alpha coefficient reliability was 0.90 for the full IDS. No item was predicted to improve the alpha coefficient by as much as 0.01 if deleted.

Exploratory factor analysis. Exploratory factor analysis with principal components was used to extract the maximum variance from the data set for each component.⁴⁷ Varimax orthogonal rotation was used so as to minimize the number of variables with high loadings on a given factor, and to maximize distribution and interpretability of factors.⁴⁸ The Kaiser-Meyer-Olkin Measure of Sampling Adequacy

was 0.902, indicating the appropriateness of using a factor-analytic approach; factor analysis is appropriate when the value approximates unity (value = 1).⁴⁷

Theoretically, three factors were expected, based on the three dimensions used to operationalize the construct (i.e., Attention, Reassurance, and Assistance). However, principal components analysis resulted in a six-factor solution when the criterion for factor extraction was an eigenvalue 1.0 or more. In situations where the sample size is at least 250, and mean communality is 0.60 or more, the Kaiser criterion (i.e., eigenvalue > 1.0) is the most useful method of deciding on factor retention.⁴⁷ In this case, the sample size was adequate, but the mean communality was only borderline (i.e., 0.574). However, further evidence for the appropriateness of the Kaiser criterion was the ratio of factors to the number of variables (6 factors/25 items = 0.24). A ratio less than 0.30 justifies the use of the eigenvalue criterion.⁴⁹

The six factors accounted for 57.4% of the variance in scores. Per convention, interpretation of the factors was based on the varimax rotated factor matrix, whereas calculation of the eigenvalues was based on the initial statistics. Interpretation of the factors was based on item factor loadings with values 0.40 or more, given the decision to maintain a standard of at least 15% of the variability shared with respect to the factor/variable relationship.⁴⁹ The rotated factor matrix is shown in Table II.

The first three factors delineated three distinct dimensions. The first factor was named *Attention*, given that four of the six items were originally conceptualized as the need for attention. The second and third factors represented predominantly items from the reassurance dimension but they did not load together. After examining the item groupings, factor two was named *Reassurance*. Factor three was named *Concern*, defined as an underlying concern or worry over health-related matters.

The eigenvalues of factors four through six approximated those of factor three. However, the relatively low number of substantive factor loadings on each of these factors brings into question the appropriateness of interpreting them as separate factors. As Stevens⁴⁹ suggests, "A factor defined by only a few loadings is not much of a factor." Hence, factors four through six were interpreted on a theoretic basis.

Factor four, *Assistance*, is consistent with the original operationalization of dependency and was retained. The four items loading only on factors five and six were submitted to the judge panel as items measuring Assistance, and none of the descriptors associated with these items was recat-

Table II
Factor loadings of IDS items (N = 311)

	Factor 1 Attention	Factor 2 Reassurance	Factor 3 Concern	Factor 4 Assistance
I want a lot of attention from family and friends.	0.62			
I think my spouse/friends say I complain a lot.	0.75			
I demand more attention than other people.	0.73			
I do not like it if my spouse or friend is gone too long when s/he goes to the store.	0.50			
I get discouraged when I do not get what I need from others.*REAS	0.64			
I am told I look worried.*REAS	0.54			
I ask outright for help.*ASST		0.75		
I call my doctor immediately when I do not feel well.		0.51		
I mention discomfort when it occurs.*ATTN		0.67		
When I feel tired I move slowly to let other people know.*ATTN		0.51		
I would not think of going out of town for more than a couple of days without my doctor's OK.		0.52		
I think it is wise to call the doctor even for little things.		0.52		
I think about all the things that could happen or go wrong.*REAS			0.75	
I think a lot about whether or not I can safely begin new activities.*REAS			0.52	
I would not feel safe traveling to a place where medical care is unavailable.*REAS			0.67	
I feel unsure about the wisdom of beginning new activities.*ASST			0.55	
I imagine the worst.*REAS			0.47	
I think about what could happen if I am not careful.*REAS			0.46	
I want help in deciding on my activity levels and when I can do more.				0.78
I want help in deciding what food I should eat.				0.83
I want to be told exactly what activities are safe for me.				0.55
Others expect little of me now.				0.72
I expect my family and friends to help me now.				0.57
My spouse/friend does almost all the shopping and errands now.				-0.64
Friends do not expect me to visit them now.				0.71
Eigenvalue	7.50	2.03	1.43	1.22
Variance explained	30%	8.1%	5.7%	4.9%

*ASST Originally classified as Assistance

*ATTN Originally classified as Attention

*REAS Originally classified as Reassurance

egorized by the judges (Table I). Therefore, the four items in factors five and six were theoretically categorized with factor 4, Assistance, in spite of the fact that they failed to load together when the

data from this sample were factor analyzed. These four items may need to be modified or eliminated after further testing with other samples if they continue to load separately.

Table III

Correlations among the four factors derived from exploratory factor analysis

	Attention	Reassurance	Concern	Assistance
Attention	1.0			
Reassurance	0.5968	1.0		
Concern	0.5905	0.6453	1.0	
Assistance	0.3325	0.4939	0.5242	1.0

All correlations were significant ($p < 0.001$).

Three items loaded on more than one factor. One item, "I imagine the worst," loaded on both Attention and Concern. Another item, "I think about what could happen if I am not careful," loaded on both Reassurance and Concern. Both items were left in the Concern factor because of their conceptual similarity to the other items that loaded within this dimension. One other item, "I think it is wise to call the doctor even for little things," loaded on two factors—Reassurance and Assistance. The item was left in the Reassurance factor based on its original assignment and responses from the expert panel.

The final four factors, and the items associated with each factor, are provided in Table II. Inter-factor correlations are shown in Table III. Alpha coefficients of the subscales were 0.776 for Attention, 0.753 for Reassurance, 0.814 for Concern, and 0.645 for Assistance. Internal consistency of three of the four subscales was adequate with use of the 0.70 criterion of Nunnally,⁴¹ but reliability of the Assistance subscale was low.

Discriminant validity. Adjustment after an illness event has been shown to be influenced by neuroticism.⁵⁰ However, adjustment difficulties also occur in individuals without neuroticism as a result of the stressfulness of life events. Because the IDS was designed to tap transient dependency occurring in response to an illness event, it was hypothesized that a low correlation ($r < 0.3$) would be evident between illness dependency and neuroticism. This hypothesis was tested by comparing scores from the Eysenck Neurosis Subscale with those from the IDS.

The Eysenck Personality Questionnaire (EPQ) has been used extensively to quantify personality characteristics for research purposes. The full EPQ includes 90 dichotomous items grouped to assess four major personality characteristics—psychoticism, extroversion, neurosis, and lying. In a series of studies aimed at identifying a subset of items, Eysenck^{45,51} analyzed 250 previously validated

items with use of factor analysis. A set of 12 dichotomous items measuring neuroticism and extroversion resulted. The two subscales were demonstrated to be independent ($r = -0.09$, $p = 0.102$). With use of Thurstone's procedure, two significant factors emerged from a factor analysis using simple structure rotation: extroversion and neuroticism. Validity of the EPQ has been further demonstrated by the instrument's authors through testing of criterion groups.⁵¹ The reliability of the neurosis subscale was 0.88 in a similar cardiac population.⁵² The Pearson Product Moment correlation between the IDS total score and the Eysenck short-form neurosis subscale total score was $r = 0.256$ ($p = 0.0001$).

Social desirability. Social desirability was tested using the 10-item Marlowe Crowne Social Desirability Scale (M-C SDS).⁴⁶ Short forms of the M-C SDS were developed because several items had been shown to contribute relatively little to the overall measure. Kuder-Richardson formula 20 reliability coefficients of the 10-item M-C SDS used ranged from 0.59 to 0.70 in four separate samples.⁴⁶

Overall social desirability of the IDS was tested by examining the relationship between the total social desirability scale score and the total IDS score with use of the Pearson Product Moment Correlation Coefficient ($r = -0.126$, $p = 0.03$). Social desirability of each item was then tested. Social desirability of answers was evident in three items, all of which were in the Attention subscale:

- I think my spouse/friends say I complain a lot ($r = -0.174$).
- I demand more attention than other people ($r = -0.187$).
- I get discouraged when I do not get what I need from others ($r = -0.240$).

Although significant, the correlations were low, explaining little of the variance in the relationship, so these items were retained.

DISCUSSION

This article described the psychometric testing of a new measure of the social-emotional dependency occurring in response to a cardiac illness. Internal consistency of the IDS is adequate for a new instrument. Content and discriminant validity of the IDS have been demonstrated. Factor analysis did not fully support the three proposed dimensions. Many items thought to be evidence of the need for reassurance loaded on a separate factor, which was subsequently named Concern. The Assistance dimension was problematic and may need to be reconceptualized or revised. In spite of these problems with construct validation, the IDS has been shown to be a reliable instrument with validity. These results indicate that the IDS is ready for use in research with cardiac populations.

Exploratory factor analysis supported a four-factor solution that is consistent with the original operationalization of dependency with the addition of Concern. Although not originally proposed as a dimension of dependency, Concern is a logical addition. As noted by Bennett,⁵³ emotions after acute myocardial infarction were the result of the perception of threat, not coping ability. Concern appears to be a measure of the level of threat perceived by patients with cardiac disease in the first month after hospital discharge.

Concern is an interesting addition to the group of dimensions used to operationalize dependency. The original three dimensions, Attention, Assistance, and Reassurance, are all needs or desires that may be accentuated in someone feeling dependent. The Concern dimension includes several items reflecting worry, hesitation, and rumination that may be tapping the cause of dependency. Perhaps patients who become chronically dependent are those who demonstrate high levels of concern. If this is true, the Concern subscale of the IDS may be useful in predicting those patients who develop cardiac invalidism. This hypothesis requires testing.

The Assistance factor performed poorly in content validity testing, factor analysis, and reliability testing. Of the six descriptors recategorized by the judge panel, four were in the Assistance factor (Table I). In factor analysis, items from the Assistance subscale were distributed among three separate factors (i.e., they did not load together). Further, some of the items thought to be measures of the need for assistance loaded on Reassurance or Concern. Perhaps patients with cardiac disease seeking assistance are doing so because of concern or to be reassured. Comfort in directly seeking assistance may reflect motivations and behav-

iors that require further study. Internal consistency of the Assistance subscale was not adequate, another reflection of the fact that these items may not be measuring a single dimension.

Social desirability of responses was not evident in most IDS items, but those in which it was found were all in the Attention subscale. A potential explanation of these findings is that a bias may exist within American society that it is not socially acceptable to want attention. If this is true, attention subscale scores may not adequately reflect true needs or desires for attention. Instead, requests for assistance or reassurance, for example, may indirectly reflect the need for attention. Further testing is required to determine how the Attention subscale acts in comparison with the other subscales in various samples.

The major strength of this psychometric study is the rigorous content validity process used in instrument development. The concept of dependency was operationalized after a thorough review of the literature on adjustment to cardiac illness. It was then grounded in clinical practice through the generation of behavioral descriptors and linked items, and reviewed by knowledgeable cardiac content experts. A limitation of the instrument was the choice of anchors on the Likert-type scale. In this study, the 1 was anchored with "No," 3 was anchored with "Sometimes," and 5 was anchored with "Yes." These anchors were chosen to increase clarity to patients, but the words may have influenced the responses chosen. Researchers are encouraged to use the anchors, "1 = Not at all like me; 2 = Not much like me; 3 = Sometimes like me; 4 = Pretty much like me; 5 = Very much like me," in future research with the IDS.

Further psychometric testing of the IDS is recommended. Repeated factor analysis in another sample is needed to further test the new dimensional structure of the IDS. Ongoing internal consistency evaluation and construct validation is needed to determine how the Assistance dimension, in particular, performs in other samples. Research is also needed to establish the typical trajectory of illness dependency after a cardiac health crisis. Theoretically, illness dependency should peak after initial diagnosis or hospital discharge, and dissipate over time. The rapidity with which illness dependency subsides may be influenced by the amount of social support received, but further research is required to test this hypothesis. Further research is also needed to identify cultural differences in illness dependency. Patterns of subscale distribution may differ by patient and illness characteristics.

The IDS is recommended as a research instrument to be used with adults recently diagnosed or discharged from the hospital after a cardiac illness. After further testing, a modification of the IDS might also be used as a clinical screening tool for populations undergoing elective cardiac events such as surgery. Once data are available on the variables associated with illness dependency, the IDS might be helpful in predicting which individuals require accentuated levels of emotional protection and social support after an illness event.

Social support has been painted as both a detriment⁵⁴ and a panacea⁵² during the recovery period after a cardiac illness. This impasse will not be resolved until more is known concerning how and why patients respond as they do. Dependency is a common response after a cardiac illness, and yet we still cannot measure it. This instrument, the IDS, represents the first available method for exploring this common response. Once dependency is better understood, the natural relationship between social support and dependency can be explored. Interventions aimed at helping families and friends provide more effective support can then be tested.

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REFERENCES

- Boorgaard MAK. Rehabilitation of the female patient after myocardial infarction. *Nurs Clin North Am* 1984;19:433-40.
- Brown MA, Munford A. Rehabilitation of post-MI depression and psychological invalidism: a pilot study. *Int J Psychiatr Med* 1983;13:291-8.
- Byrne DG. Psychological responses to illness and outcome after survived myocardial infarction: a long term follow-up. *J Psychosom Med* 1982;26:105-12.
- Gulledge AD. Psychological aftermaths of myocardial infarction. In: Gentry WD, Williams RB Jr, editors. *Psychological aspects of myocardial infarction and coronary care*. 4th ed. St. Louis: Mosby; 1979.
- Johnson DE. The behavioral system model for nursing. In: Riehl JP, Roy C, editors. *Conceptual models for nursing practice*. 2nd ed. New York: Appleton-Century-Crofts; 1980.p.207-16.
- Johnson JL, Morse JM. Regaining control: the process of adjustment after myocardial infarction. *Heart Lung* 1990;19:126-35.
- Monteiro LA. Social factors influencing the outcomes of heart attacks [dissertation]. Providence (RI): Brown University; 1970.
- Nagle R, Gangola R, Picton-Robinson I. Factors influencing return to work after myocardial infarction. *Lancet* 1971;2:454-6.
- Wynn A. Unwarranted emotional distress in men with ischaemic heart disease (IHD). *Med J Aust* 1967;2:847-51.
- Garrity TF. Vocational adjustment after first myocardial infarction: comparative assessment of several variables suggested in the literature. *Soc Sci Med* 1973;7:707-17.
- Goldin JG, Perry SL, Margolin RJ, Stotsky BA. *Dependency and its implications for rehabilitation*. Lexington (MA): Lexington Books; 1972.
- Benoliel JQ, McCorkle R, Young K. Development of a social dependency scale. *Res Nurs Health* 1980;3:3-10.
- Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies in illness in the aged: the index of ADL, a standardized measure of biological and psychosocial function. *JAMA* 1963;185:914-9.
- Ware JE. Development and validation of scales to measure perceived health: Volume II of the final report on contract No. HSM 110-72-299, prepared for the Research Methods Branch, U.S. Department of Health, Education, and Welfare. Carbondale (IL): School of Medicine, Southern Illinois University; 1976.
- Derdiarian AK. An analysis of dependence, independence behavior variables in surgical patients with emphasis on trait and state dependence. *Commun Nurs Res* 1977;8:224-44.
- Snyder WU. *Dependency in psychotherapy*. New York: Macmillan; 1963.
- Buros OK. *The eighth mental measurement yearbook*. Highland Park (NJ): Gryphon Press; 1978.
- Pilowsky I. Dimension of illness behavior as measured by the illness behavior questionnaire: a replication study. *J Psychosom Res* 1993;37:53-62.
- Brown JS, Rawlinson M. Relinquishing the sick role following open-heart surgery. *J Health Soc Behav* 1975;16:12-27.
- Hirschfeld RMA, Klerman GL, Gough HG, Barrett J, Korchin SJ, Chodoff P. A measure of interpersonal dependency. *J Pers Assess* 1977;41:610-8.
- Todd J, Nakamura CY. Interactive effects of informational and affective components of social and nonsocial reinforcers on independent and dependent children. *Child Development* 1970;41:365-76.
- Clough DH, Derdiarian A. A behavioral checklist to measure dependence and independence. *Nurs Res* 1980;29:55-8.
- Berg I. A self-administered dependency questionnaire (SADQ) for use with mothers of schoolchildren. *Br J Psychiatry* 1974;124:1-9.
- Berg I, McGuire R, Whelan E. The Highlands dependency questionnaire (HDQ): an administered version for use with the mothers of school children. *J Child Psychol Psychiatry* 1973;14:107-21.
- Derdiarian AK, Forsythe AB. An instrument for theory and research development using the behavioral systems model for nursing: the cancer patient. *Nurs Res* 1983;32:260-6.
- Quinless FW, Nelson MAM. Development of a measure of learned helplessness. *Nurs Res* 1988;37:11-5.
- Bowlby J. *Attachment*. 2nd ed. New York: Basic Books Inc; 1982.
- Pilowsky I. Abnormal illness behaviours and their treatments. *Med J Aust* 1990;153:346-8.
- DeVillis RF. *Scale development: theory and applications*. Newbury Park (CA): Sage Publications; 1991.
- Fontana AF, Kerns RD, Rosenberg RL, Colonese KL. Support, stress, and recovery from coronary heart disease: a longitudinal causal model. *Health Psychol* 1989;8:175-93.
- Trewlany-Ross C, Russell O. Social and psychological responses to myocardial infarction: multiple determinants of outcome at six months. *J Psychosom Res* 1987;31:125-30.
- Waltz M. Marital context and post-infarction quality of life: is it social support or something more? *Soc Sci Med* 1986;22:791-805.
- Yates BC, Booton-Hiser D. Comparison of psychologic stress responses in patients and spouses ten weeks after a cardiac illness event. *Prog Cardiovasc Nurs* 1992;7:25-33.
- Coyne JC, Smith DAF. Couples coping with a myocardial infarction: a contextual perspective on wives' distress. *J Pers Soc Psychol* 1991;61:404-12.

35. Coyne JC, Smith DAF. Couples coping with a myocardial infarction: a contextual perspective on patient self-efficacy. *J Fam Psychol* 1991;5:4-20.
36. Mayou R. The course and determinants of reactions to myocardial infarction. *Br J Psychiatry* 1979;134:588-94.
37. Fridlund B, Stener-Gengtsson A, Wannman AL. Social support and social network after acute myocardial infarction: the critically ill male patient's needs, choices and motives. *Intens Crit Care Nurs* 1993;9:88-94.
38. Ben-Sira Z, Eliezer R. The structure of readjustment after heart attack. *Soc Sci Med* 1990;30:523-36.
39. Ell K, Dunkel-Schetter C. Social support and adjustment to myocardial infarction, angioplasty and coronary artery bypass surgery. In: Shumaker SA, Czajkowski SM, editors. *Social support and cardiovascular disease*. New York: Plenum Press. In press.
40. Edwards AL. *The measurement of personality traits by scales and inventories*. New York: Holt; 1970.
41. Nunnally JC. *Psychometric theory*. 2nd ed. New York: McGraw-Hill Book Co; 1978.
42. Waltz CF, Strickland OL, Lenz ER. *Measurement in Nursing Research*. 2nd ed. Philadelphia: FA Davis Co; 1991.
43. Popham WJ. *Criterion-referenced measurement*. Englewood Cliffs (NJ): Prentice-Hall; 1978.
44. Grinnell RM. *Social work research and evaluation*. Itasca (NY): F E Peacock Publishers; 1985.
45. Eysenck HJ. A short questionnaire for the measurement of two dimensions of personality. *J Appl Psychol* 1958;42:14-7.
46. Strahan R, Gerbasi KC. Short, homogenous versions of the Marlow-Crowne Social Desirability Scale. *J Clin Psychol* 1972;28:191-3.
47. Tabachnick BG, Fidell LS. *Using multivariate statistics*. 3rd ed. New York: Harper Collins College Publishers; 1996.
48. Norusis JJ. *SPSS professional statistics 6.1*. Chicago: SPSS; 1994.
49. Stevens S. *Applied multivariate statistics for the social sciences*. 3rd ed. Mahwah (NJ): Lawrence Erlbaum; 1996.
50. Riegel BJ. Contributors to cardiac invalidism after acute myocardial infarction. *Coron Artery Dis* 1993;4:215-20.
51. Eysenck HJ, Eysenck SBG. *Eysenck Personality Questionnaire Manual (Junior & Adult)*. San Diego: Educational and Industrial Testing Service; 1975.
52. Riegel BJ, Dracup KA. Does overprotection cause cardiac invalidism? *Heart Lung* 1992;21:529-35.
53. Bennett SJ. Relationships among selected antecedent variables and coping effectiveness in postmyocardial infarction patients. *Res Nurs Health* 1993;16:131-9.
54. Wiklund I, Sanne H, Vedin A, Wilhelmsson C. Psychosocial outcome one year after a first myocardial infarction. *J Psychosom Res* 1984;28:309-21.

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Educational and support needs of patients and their families awaiting cardiac surgery

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OBJECTIVE: To identify and explore the learning and support needs of patients and families during the waiting period before cardiac surgery.

DESIGN: Prospective, cross-sectional cohort survey design.

SETTING: University-affiliated tertiary cardiovascular care center in mideastern Canada.

SUBJECTS: One hundred forty-seven patients currently on the cardiac surgery waiting list, and 125 family members of these patients.

OUTCOME MEASURES: Needs Inventory for Patients who Wait.

INTERVENTION: All patients were sent a survey for themselves and one for a family member that included: a demographic profile, subjective questionnaire, and the Needs Inventory for Patients who Wait. The survey was to be completed and returned to the investigators.

RESULTS: The return rates were 77% (113) for patients, and 70% (87) for family members. For patients and their family members, item rankings were highly correlated for areas in which they wanted information ($r = 0.84$), and for areas that caused them the most concern ($r = 0.91$). Family members were also concerned about caring for the patient before and after surgery. The number of weeks on the waiting list (< 1 month to > 6 months) did not change the concerns of patients and family.

CONCLUSIONS: This survey identifies some of the educational and support needs of patients undergoing cardiac surgery and their family members. Patients are concerned about their health and survival until the surgical procedure, as well as about the success of the procedure. Families share patients' concerns and have an additional concern regarding how to support the patient during the perioperative stage. The needs identified by patients and their families in this survey were found to be stable over time, and within the realm of nursing practice to address. (*Heart Lung*® 1997;26:458-65)

Queues for elective surgery are—and will continue to be—a health care reality. In some areas, waiting periods specific to cardiac surgery range from 2 to 6 months. The purpose of this study was to identify the concerns and educational needs of patients and their families during the waiting period before cardiac surgery.

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REVIEW OF THE LITERATURE

Cardiac surgery has been well documented as cost-effective, resulting in improved quality of life and long-term survival.¹⁻³ Waiting for cardiac surgery, however, remains as a major source of stress for patients with heart disease.⁴ Carrier et al.,³ in a retrospective study of 206 patients who waited for surgery from 1 to 17 months, found no relationship between length of wait and inhospital death rate, incidence of postoperative complications, length of stay in the intensive care unit, or total length of hospital stay.

Although waiting time may not have a measurable detrimental effect on physical outcome,