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Theoretical Development of Nursing Interventions for Sudden Cardiac Arrest Survivors Using Social Cognitive Theory

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▼ Abstract

This article discusses the theoretical development of a nursing intervention program to enhance recovery over the first year following sudden cardiac arrest. Concepts from social cognitive theory and domains of concern following sudden cardiac arrest underpin a tailored and standardized nursing intervention. The nursing intervention program is designed for delivery by means of telephone and through the mail. Testing of the nursing intervention program is underway using a clinical trial design.

Sudden cardiac arrest (SCA) claims approximately 250,000 lives in the United States per year, representing 40% of the total deaths resulting from cardiovascular disease.¹ Evidenced-based interventions designed to assist survivors of cardiac arrest with adjustment following internal cardioverter defibrillator (ICD) implantation are few in number. The two types of interventions described in the literature are imparting information (education)²⁻⁵ and providing psychological support (support groups).⁶⁻⁹ These interventions have been described in a small number of publications, most of which do not evaluate the interventions for immediate or long-term effectiveness. In addition, rather than determine the needed interventions from the perspective of the survivors, most programs deliver standardized information to everyone.

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Sudden cardiac arrest is defined as "death caused by underlying heart disease occurring without symptoms or with symptoms of less than 1 hour's duration."¹⁰ An individual, often in good health, collapses with no warning, when the effective pumping action of the heart ceases. Consciousness is lost within a matter of seconds. There may be associated seizure activity, gasping respirations, and incontinence of urine as the brain becomes deprived of oxygen. If circulation is not restored or external chest compressions and ventilations applied within 4 minutes, there will be permanent neurologic damage; in approximately 8 to 10 minutes the individual will be dead.¹¹

Although there are many causes of SCA, autopsy studies indicate that 75% have significant atherosclerotic heart disease, usually involving two or three coronary arteries.¹² Seventy-eight percent of successfully resuscitated victims of SCA have been shown to have a history of remote heart attack, chest pain, congestive heart failure, or high blood pressure, with the presenting rhythm at the time of resuscitation being ventricular fibrillation. Clinical studies ^{12,13} show that patients with ventricular electrical instability (frequent premature beats, multi-formed ventricular beats), extensive coronary artery narrowing, and abnormal left ventricular function are at higher risk for developing SCA.

Approximately 29% of persons now survive the initial cardiac arrest, with a large number undergoing automatic defibrillator implantation.¹¹ Advances in diagnostic and therapeutic options have increased survival rates for patients following SCA and those with ventricular arrhythmias, particularly in the areas of improvements in aspects of resuscitation, pharmacologic therapy, and the development of internal cardioverter defibrillators (ICDs).

Given the increasing number of individuals who will receive ICDs in the future and concomitant survival rates following SCA, theoretically based interventions for enhancing quality of adjustment are desperately needed. Lacking are well-designed interventions to assist individuals with coping efforts and psychological adjustment. Research evidence ¹⁴⁻¹⁶ on adjustment to life-threatening events points to the importance of enhancing the person's sense of control, confidence, and coping efficacy.

The potential to affect positively the quality of survival and psychological functioning following cardiac arrest in this population is high and deserves careful attention. Interventions need to be designed that are portable and available to rural as well as urban locales. Hospital stays have shortened to 24 to 48 hours for ICD implantation, leaving little time for education and support; extended follow up in outpatient settings is needed. This article discusses the development of a theory-based nursing intervention program to enhance recovery following sudden cardiac arrest over the first year. The text discusses the domains of concern following sudden cardiac arrest, followed by the application of social cognitive theory to the content of the program. Then we outline how the nursing intervention program was designed using these two frameworks. The article concludes with the theory-based model that forms the basis for testing the intervention program. The nursing intervention program is currently being tested in a clinical trial funded by the National Institute for Nursing Research, National Institutes of Health (R01NR0 4766).

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DETERMINING THE DOMAINS OF CONCERN FOLLOWING SUDDEN CARDIAC ARREST

Domains of concern formed the basis for the content developed in the nursing intervention program. Domains of concern for SCA survivors and family members were derived from the study, "Family Recovery Following Sudden Cardiac Death,"¹⁷ using a grounded theory method. This study explored individual and family experiences after sudden cardiac arrest and ICD implantation during the first year

of recovery. Fifteen SCA survivors and one intimate partner each were prospectively followed from hospitalization through the first year of recovery.¹⁷ Data were collected using semistructured interviews across five periods during the first year: hospital discharge, 1 month, 3 months, 6 months, and 12 months. Participants were asked to identify specific areas that were of most concern during the first year after SCA and to specify areas with which they would like assistance from health care providers. Audiotaped interviews were analyzed by time and by group in order to identify those areas of most concern to SCA survivors and their family members.

Seven categories of concerns were identified from the coded data from semistructured interviews over the first year following SCA and ICD implantation. Domains of concern are those discrete areas that were worrisome to both SCA survivors and their partners during recovery and those areas that are known as potentially mutable by interventions designed by health care providers. The seven domains of concern are: preventive care, health care providers, partner relationships, activities of daily living (ADL), physical changes, emotional challenges, and dealing with ICD shocks. A detailed discussion of the methods of construction of the domains of concern is published elsewhere.¹⁷

Preventive care concerns relate to understanding the purpose and function of the ICD, maintenance and care of the ICD, follow-up care of the ICD, and safety issues related to the ICD. Health care provider concerns relate to getting accurate and up-to-date information, responding to emergency situations, making appointments, and getting questions answered in a timely manner. Partner relationship concerns reflect role changes, support needed during recovery, meeting the needs of the couple, sexual relationships, partner's physical and mental health, and difficult experiences during recovery. ADL concerns relate to driving, maintaining safe physical activity, progression of activity, work, and determining limits of activity. Physical changes relate to sleep, rest, diet, sex, memory loss, and fatigue. Emotional challenges encountered relate to fear of ICD shocks, death, social isolation and loneliness, obsessive thinking about ICD shocks, and uncertainty. Dealing with ICD shocks relate to shock sensations, fear the device would not work or would damage the heart, what to do, dealing with a shock in a public place, and how one's partner would react.

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NURSING INTERVENTIONS FOR SUDDEN CARDIAC ARREST SURVIVORS

Four previously described educational programs for survivors and families detail information regarding the function and home care of the ICD. Only one of these identified patient outcome criteria for education programs before hospital discharge.⁵ These outcomes included knowledge about the function of the device, knowledge of safety and environmental factors, compliance with long-term follow up, immediate access to local emergency medical systems, and emotional support.^{2-5,18}

Four investigations described the use of support groups in aiding adaptation to SCA.⁶⁻⁹ Few conclusions can be drawn from these investigations because sample sizes have been very small (less than 20 in most instances), nonrandom assignment has been used, follow up has been limited to 3 months or less, participants have begun the support group retrospectively and at varying times following SCA, the intervention has varied in length of time and attendance, support groups have had no theoretical underpinnings, and standardized measures for outcomes have not been used. However, common issues of concern among SCA survivors during support sessions have included lifestyle changes, family well-being, family role changes, physical symptoms related to diagnostic tests, shocks from the ICD, uncertainty produced by the arrhythmia and device, fear of shocks with intimate body contact, driving restrictions, body image changes, costs, battery and device failure, and limitations on activity. This information is consistent with the domains of concern identified previously and strongly supports the need for additional nursing intervention program development.

The goals of intervention programs for cardiac arrest survivors should focus on the provision of new information required to manage illness at home effectively, new behaviors that are required to live safely with the ICD, and methods to prevent complications. Although the technology surrounding implantation of the ICD has become simpler, the device itself has become more technologically complex. Anecdotal evidence suggests that most of these educational programs fall short of meeting these goals. Several possible reasons exist for the failure of hospital-based education programs to provide the type of information needed, including the following:

- * inappropriate timing (most educational programs occur during hospitalization when anxiety is high and short-term memory is impaired in the survivor)
- * lack of consistent reinforcement of information in outpatient settings
- * lack of comprehensiveness in educational objectives (both information and skills need to be imparted with time to practice)
- * technological complexity needed to manage the illness recovery at home
- * lack of sources of consistent psychological support for survivors (few home care programs established)
- * multiplicity of needs (health care providers alone cannot provide the only source of information and psychological support needed during recovery)

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DESIGNING A NURSING INTERVENTION PROGRAM

We developed a theoretical model for nursing interventions using social cognitive theory ¹⁹ and the domains of concern of SCA survivors from the study "Family Recovery Following Sudden Cardiac Death."¹⁷ A structural information (SI) booklet and a nursing telephone support (NTS) protocol were designed to be delivered through the mail and telephone during the first 3 months following SCA and ICD implantation. Social cognitive theory guided the development of the SI booklet and NTS protocol (Fig 1). We hypothesized that the nursing interventions would improve physical functioning and psychological adjustment in the first year following SCA and ICD implantation by affecting self-efficacy and outcome efficacy expectations as well as by enhancing self-management behavioral skills.



Fig 1

The domains of concern of SCA survivors were initially identified from the study "Family Recovery Following Sudden Cardiac Death."¹⁷ These concerns are the content of the intervention. Social cognitive theory provided the structure for dealing with the content in the telephone and mailed materials.

An SI booklet and an NTS algorithm were designed based on social cognitive theory ¹⁹ and the domains of concern from the study "Family Recovery Following Sudden Cardiac Death."¹⁷ The SI booklet contains two components: (1) a descriptive component that includes individual verbatim statements about experiences during the first year of recovery and (2) a management component that discusses successful strategies (skills) used by survivors in dealing with issues in recovery. The SI booklet contains a description of milestones in recovery, including direct quotations from survivors. The written material is intended for use in the hospital, office, or patient's home. The SI booklet's purpose is to describe the experiences one can expect to encounter during recovery and offer suggestions for behavioral strategies to deal with these issues. It is not the intent of the booklet to impart medical knowledge related to cardiac disease pathology, its treatment, or ICD device information.

The NTS algorithm targets include: (1) teaching the knowledge and behavioral skills needed to manage aspects of the illness experience, (2) enhancing self-

confidence (self-efficacy) in one's ability to manage illness demands, and (3) reducing emotional arousal. The NTS algorithm was designed to be delivered over the telephone by an advanced practice cardiovascular nurse. Each telephone call is carefully scripted to include a check-in on domains of concern, assessment of that area of concern, review of common recovery experiences, discussion of behavioral strategies for dealing with the area of concern, positive feedback for strategies that are already working well, anxiety reduction statements, practice of new behaviors using role-playing and problem-solving techniques, summarization, and assigning a learning assignment. Individuals are given access to a nurse expert 24 hours a day, 7 days a week with a nationwide paging system. Questions related to medical care are referred to the participant's physician.

The NTS algorithm includes a listing of each of the domains of concern with specific strategies SCA survivors can use to deal with the concern. For example, Dealing with Shocks encompasses the concerns of the sensation of receiving an ICD shock, knowing what to do when shocked, when to access the 911 system, what to do in public places, and electrical safety precautions. Verbally persuasive statements to allay anxiety and stress are included in the intervention. The strategies suggested in the NTS algorithm were derived from previous research [17](#) and the team of experts who have agreed to serve as site coordinators. Each phone call is designed to last 15 to 20 minutes. The topics are sequenced in the NTS to best reflect what the survivor will be dealing with at that point in recovery. The sequence of delivery of the interventions is:

- * Week 1: Physical changes
- * Week 2: Activities of daily living
- * Week 3: Emotional reactions
- * Week 4: Dealing with shocks
- * Week 5: Preventive care and safety of ICD
- * Week 6: Partner relationships
- * Week 7: Health care providers
- * Week 8: Summary and other

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THEORETICAL FRAMEWORK FOR THE NURSING INTERVENTION: SOCIAL COGNITIVE THEORY

Bandura's social cognitive theory [19-21](#) provided the theoretical basis to structure the nursing intervention program. Social cognitive theory proposes that self-efficacy, an individual's conviction in one's ability to execute a particular behavior, is required to produce a particular outcome. Behavioral change and maintenance are functions of both expectations about the outcomes that will result from engaging in a behavior and expectations about one's ability to execute the behavior required. Self-efficacy reflects a belief in one's own capabilities, not necessarily true capabilities. This process by which personal and outcome efficacy expectations influence behavior is reflected in [Fig 2](#). Self-efficacy relates to beliefs about capabilities of performing specific behaviors in particular situations, not to a general personality trait overall. Thus, self-efficacy expectations will vary greatly depending on the particular task and the context. Self-efficacy influences aspects of behavior, including acquisition of new behaviors (weight loss), inhibition of existing behaviors (stop smoking), and resumption of behaviors (activity after heart attack). Self-efficacy interventions reduce emotional reactions such as anxiety and distress.[19,20](#) Social cognitive theory served as the structure for the nursing intervention program components.



Fig 2

Efficacy expectations are increased through four mechanisms:

1. performance accomplishments (learning by doing)
2. vicarious experiences (observing others or role models)
3. verbal persuasion from expert sources
4. minimizing emotional arousal (reducing anxiety)²²

Successful performance of difficult tasks that afford mastery result in increased self-efficacy and are the most powerful sources of efficacy expectations.²² Successive mastery facilitates the development and refinement of coping skills. Observing another person demonstrate mastery over situations that are feared or perceived as difficult also can enhance one's own efficacy expectations. Effective modeling must demonstrate mastery over difficult situations through determined effort, and the model must be similar to the observer in regard to other characteristics such as age and gender. Modeled behaviors coupled with rewarding outcomes are more effective than modeling with unclear outcomes. Verbal persuasion by health care providers viewed as "experts" have aided individuals to change their behavior. Importantly, high emotional arousal impairs performance of behavior, as people are more likely to expect failure when emotionally distressed. High anxiety with accompanying physiologic responses (increased heart rate, trembling, sweating) may cause individuals to misinterpret performance and extinguish further efforts.^{19,23} Outcome expectations are the extent to which one believes engaging in a given behavior will produce a given outcome. The motivating influence of outcome expectations is partly governed by self-efficacy beliefs. The willingness of an individual to engage in a certain behavior is related to the positive benefits expected if that behavior is performed.²¹ Outcome expectations are important to consider when changing behavior; however, efficacy expectations have been found to have greater predictive power on overall outcomes.²¹

The role of enhancing self-efficacy in health behavior and change has been studied extensively in cardiac samples. Cardiac risk factor reduction requires individuals to make a number of lifestyle changes including losing weight, changing diet, stopping smoking, controlling stress, initiating exercise, and controlling blood pressure. Self-efficacy has been shown to impact performance in cardiac related lifestyle changes,²⁴⁻²⁶ motivational level, and emotional reactions to stressful situations.^{20,27} In patients recovering from acute myocardial infarction (MI) and coronary artery bypass graft (CABG) surgery, interventions designed to enhance efficacy expectations have been shown to be associated positively with adherence to exercise programs.^{24,26,28,29} Changes in self-efficacy scores have predicted both duration and intensity of subsequent home activity and correlated with performance on treadmill tests.²⁴ With additional coaching from health care providers, efficacy for walking and running was generalizable to activities such as lifting and sexual intercourse post-MI.²⁴ Interventions enhancing self-efficacy have been shown to improve adherence to cardiac-related lifestyle changes over standard instructional interventions following cardiac surgery.³⁰ Despite prior research, there are no previous research investigations testing health outcomes with SCA survivors using a social cognitive theory model. In sum, self-efficacy theory and supporting empirical evidence from recovery following sudden cardiac arrest suggest the need for nursing intervention programs that are designed to support the development of new behaviors and skills during the first year.

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CONCLUSIONS

A theoretically driven, multicomponent educational intervention was derived from social cognitive theory and an empirical study that determined the domains of concern of SCA survivors. The program is delivered by telephone over an 8-week period using a fully scripted, monitor-cued educational script. Complementary educational materials anchor information and skills for study participants, providing ways to manage their illness-related concerns as well as to

enhance their self-efficacy. The intervention model is designed to improve physical functioning and psychological adjustment of sudden cardiac arrest survivors over the first year of recovery. Providing a systematic approach to the design of the nursing interventions as well as the ability to evaluate outcomes of the interventions provides a structure that is desperately needed for this population as well as nursing science in general. If the program is successful, it holds promise as an outreach program for distant rural and other underserved populations.

We acknowledge that this is a preliminary model that will require more exploration, refinement, and testing. We will use this model to determine how the interventions might be successful for this group, as well as partners and other family members of sudden cardiac arrest survivors. The model could be used with other populations with chronic health conditions who experience a severe life-threatening exacerbation and who are required to learn new skills in order to make a satisfactory adjustment. We encourage others to use the model for both nursing intervention development and for systematic testing of nursing interventions on patient-centered outcomes. Through this refinement and testing, other factors may be identified that should be added to the model, or reciprocal relationships among certain model variables may be discovered.

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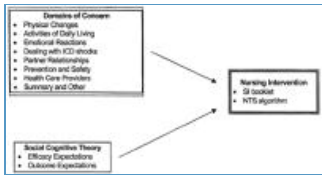


Fig 1



Fig 2

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