PHYSIOLOGICAL AND PSYCHOLOGICAL MANIFESTATIONS IN THE SUDDEN DEATH SURVIVOR

A THESIS

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We hereby recommend that the thesis prepared under our supervision by Norma Jane Richards, B.S.N. entitled Physiological and Psychological Manifestations in the Sudden Death Survivor

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To protect individuals we have covered their signatures.

DEDICATION

To my Parents:

My mother who has provided the support and encouragement, and

As a serious illness survivor, my father, who has provided the motivation.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Over 400,000 people experience cardiopulmonary arrest or sudden death in the United States every year (Sobel & Braunwald, 1977). With sudden death, the cardiopulmonary resuscitation procedure is necessary to reverse clinical death as characterized by apnea and decreased circulation. If the resuscitation procedure is initiated during the first 4 to 6 minutes after clinical death, biological death with its irreversible systematic damage can be prevented (Myerberg, 1978). With this procedure and the improved medical technology in the hospitals and community ambulance services, the number of sudden death survivors has shown a definite increase. Research has indicated a 10% (Cass, 1975) to 25% (Castagna, Shubin, & Weil, 1973) survival rate with a 2% to 20% complete recovery rate among sudden death survivors (McCall, 1978).

Research has given the sudden death survivor an opportunity to relate the near death episode and experience. There have also been increased investigative studies into the responses of family and friends after exposure to a sudden death experience (Surawicz, 1973)

and the circumstances surrounding the episode. While medical and lay people have become familiar with the "out of body" (Moody, 1975) and near death reports, the post-resuscitation period has received minimal attention. Therefore, the existence of long-term manifestations after the sudden death experience is generally unknown to the health team (Lee, 1978). Recognition of the manifestations could directly influence the formation of nursing goals, priorities of patient care, and nursing diagnoses within cardiac rehabilitation programs involving the survivor and family.

Problem of Study

The problem of this study was to determine the existence of subjective physiological and psychological manifestations as perceived by the sudden death survivor during the post-resuscitation period, and to determine if a relationship exists between the subjective physiological and psychological manifestations and the sex and age of the sudden death survivor.

Justification of Problem

For thousands of years, man has been intrigued with attempts to revive the sudden death patient since one

resuscitation technique, mouth to mouth breathing, can be traced to Biblical times (Stewart, 1979). In 1960, Kouwenhoven, Jude, and Knickerbocker (cited in Jude & Elam, 1965) introduced the external cardiac massage technique. In the following year, Kouwenhoven et al. (cited in Jude & Elam, 1965) reported a 24% long-term survival rate among 118 sudden death patients. Today, after extensive use and improvements in the technique, external cardiac massage is used by physicians, nurses, dentists, and paramedics, as well as by lay people in the resuscitation of the sudden death patient (Jude & Elam, 1965).

Successful resuscitation depneds on prompt recognition, either outside or inside the hospital, and a well organized team with competent equipment. Once the patient has reached the hospital, survival rates may range from 10% to 25% (Castagna et al., 1973). Stephenson (1977) has emphasized the importance of prompt resuscitation. Stephenson found that 94% of all successful resuscitations occurred when the procedure was initiated within 4 minutes after the onset of clinical death.

Upon surviving the sudden death experience, the patient may return home to family and friends and may

again need to resume home and job responsibilities. For the patient who has witnessed his own death and experienced his own mortality, the event may have been "an emotional experience to which a satisfactory adaptation is difficult" (Rodman, 1975, p. 204).

Nursing knowledge about the sudden death survivor during the post resuscitation period is minimal. Previous studies have primarily addressed and explored the survivor's perceptions of the intra-arrest period (Moody, 1975). The studies that have attempted a description of the survivor's manifestations during the post-resuscitation period are few in number and have been published primarily in the medical, not nursing, journals.

In a study conducted by Druss and Kornfield (1967), none of the subjects could face the full implications of the sudden death event, and therefore, utilized defense mechanisms to control anxiety. The common mechanisms used were denial, isolation, displacement, and projection. Besides the defense mechanisms and an often tranquil appearance, the sudden death survivors experienced dreams of turbulence and a violent death (Druss & Kornfield, 1967).

Modification in life habits and patterns has been documented as occurring in the post-resuscitation period. Twelve of 15 patients who smoked prior to the sudden death event did not resume smoking after the experience. Return to employment varied from 3 to 18 months. Anxiety was the primary factor in preventing return to work and resulted in retirement for some patients. In the post-resuscitation period, 50% of the survivors were frequently employed on a part-time basis (Dobson, Tattersfield, Adler, & McNicol, 1971). The frequency of sexual intercourse decreased or was terminated in the post resuscitation period (Druss & Kornfield, 1967). The decrease in sexual intercourse was attributed to apprehension by the survivor and spouse concerning possible recurrence of the sudden death experience.

The sudden death survivor may regard himself as one of various "special or unique individuals with other people and material things less important" (Hudson, 1978, p. 164). The survivor may also be quieter, more mellow, perhaps even feel older. Also, family and friends sometimes contribute to the survivor's perception of uniqueness (Druss & Kornfield, 1967).

Amnesia of the sudden death experience can exist for several hours or as long as 2 weeks post-cessation of the

resuscitation procedure (Dobson et al., 1971; Hudson, 1978). Information relating to the prevalence of retrograde amnesia or amnesia of recent events has not been documented in the research.

Permanent neurologic sequela are remarkably uncommon among surviving patients. The patients who do sustain cerebral damage during resuscitation usually fail to survive long enough to leave the hospital (Castagna et al., 1973). Norris and Chrandrasekar (1971) were able to find only 7 patients admitted during an 18-month period because of anoxic damage following cardiac resuscitation.

A persistent, long-term incidence of insomnia has been present in the sudden death survivor. Nine of the 10 survivors described sleep as brief and restless after discharge home (Druss & Kornfield, 1967).

In the Dobson et al. (1971) study, 12 of the 20 survivors has experienced chest pain since the sudden death event. Two of the survivors were considered to have true angina, with 2 other survivors having had only one episode of chest pain, and 8 survivors had occasional nonspecific pain described as "twinges" (Dobson et al., 1971).

Nursing knowledge of the sudden death survivor's manifestations during the post-resuscitation period could

be significant in several ways. In providing patient care to the survivor, the nurse could be more cognizant of problems and needs present during the post resuscitation period. With this knowledge, the nurse could establish nursing diagnoses and goals for the sudden death survivor, thus providing a greater chance of having needs met by the health team.

One aspect of the sudden death survivor's care may involve increased psychological support and further explanation of the sudden death experience or its manifestations. Information relevant to the post-resuscitation period and its manifestations could enable the nurse to provide the psychological support for the sudden death survivor and family.

Secondly, rehabilitation programs could be established specifically for the sudden death survivor and family. The rehabilitation program could be instituted in the initial post-resuscitation period and continued into the convalescence period. This rehabilitation program could affect compliance with the medical therapies and could foster a positive physiological and psychological adaptation for the survivor and family.

Theoretical Framework

For this study, two theories were used for the theoretical framework. These theories included Selye's (1974) theory on stress and Lewin's (cited in Bigge, 1976) theory of the life space.

Selye (1974) defined stress as the "nonspecific response of the body to any demand or stressor" (p. 14). Every individual experiences stress. Without stress life cannot exist. Stress, now a new concept, is definitely a component in the development of diseases. Selye's stress syndrome, or the General Adaptation Syndrome (G.A.S.) is composed of three stages. The first stage or the alarm phase can be demonstrated in the physiological stress imposed by sudden death. The sudden cardiovascular collapse may be due to dysrthymia, especially ventricular fibrillation, marked reduction in the cardiac output, sudden ventricular pump failure, and activation of the vasopressor reflexes (Guyton, 1976).

The second stage of the G.A.S. is the resistance or adaptation phase. While physiologic adaptation is necessary to maintain health and life, psychological adaptation will also occur during the resistance phase. Lewin (cited in Bigge, 1976) addressed the individual's psychological responses through a motivation and perception

theory. The basic theoretical concept in this theory was the life space which involves the psychological world and the person. The psychological world could consist of any objects or events, such as sudden death, as perceived by the individual. Lewin (cited in Bigge, 1976) also thought that all the effects of the individual's psychological world could determine psychological responses to the event.

The post resuscitation period is comparable to the adaptation phase. The patient uses the supply of finite energy as described by Selye (1974) for adaptation and thereby prevents the development of the final or exhaustion stage. If the stressor is overwhelming or the finite energy becomes diminished, the patient could develop pathological conditions as determined by the area of the body most affected by the stressor. Repeated episodes of sudden death could deplete the finite energy and produce the final, or exhaustion, stage.

The physiological and psychological responses to the stressor can be determined by conditioning factors. The factors may either be of an internal or external origin. The internal conditioning factors relate to genetic predisposition, age, and sex. External conditioning factors include treatments with hormones, drug therapies, or

dietary factors (Selye, 1974). With the influence of these factors, the physiological and psychological responses to the stressor can present unique manifestations in each sudden death survivor.

This study determined the existence of subjective physiological and psychological manifestations as perceived by the sudden death survivor during the post-resuscitation period or adaptation phase. The internal conditioning factors of age and sex were examined for any significant relationships with the physiological and psychological manifestations.

Assumptions

The following assumptions were identified:

1. All humans experience stress.

2. Man is a biopsychosocial being and can experience sudden death.

3. A sudden death survivor experiences stress.

4. A sudden death survivor experiences the sudden death event in a unique manner with individualized physiological and psychological manifestations.

Hypotheses

The following hypotheses were tested:

1. There is no significant relationship between the subjective physiological manifestations and the age of the sudden death survivors.

2. There is no significant relationship between the subjective psychological manifestations and the age of the sudden death survivors.

3. There is no significant relationship between the subjective physiological manifestations and the sex of the sudden death survivors.

4. There is no significant relationship between the subjective psychological manifestations and the sex of the sudden death survivors.

Definition of Terms

The following terms were identified:

1. Physiological manifestation--a physical sign or symptom displayed in the sudden death survivor as documented by a questionnaire.

2. Psychological manifestation--a response resulting from the patient's perception and experience with the sudden death event (Beland & Passos, 1975) as documented on a questionnaire.

3. Post-resuscitation period--time from 1 month to 6 months after the cessation of the cardiopulmonary resuscitation procedure.

4. Sudden death survivor--a patient in whom the "time and mode of death came unexpectantly" (Myerberg, 1978, p. 272) and was resuscitated with the cardiopulmonary resuscitation procedure (Cotlar, 1963).

Limitations

The following limitations were identified. There was no control over the:

1. Type of cardiopulmonary resuscitation methods, open or closed, used for the subjects.

2. Degree of certification for personnel initiating the resuscitation procedure on the subject.

3. Number of previous sudden death episodes.

4. Subjects' existing physical or psychological status.

Summary

Eacy year over 400,000 people experience a sudden death event (Sobel & Braunwald, 1977). The cardiopulmonary resuscitation procedure is necessary to reverse clinical death and prevent biological death. This procedure has produced a 10% (Cass, 1975) to 25% (Castagna et al., 1973)

survival rate in a population known as sudden death survivors. While intra-arrest experiences have been reported and documented (Moody, 1975), information available to the nurse concerning sudden death survivors is minimal.

This study endeavored to increase nursing knowledge of sudden death survivors by determining the existence of physiological and psychological manifestations and the presence of significant relationships between each manifestation and the age and sex of the survivors. Some of these physiological and psychological manifestations previously mentioned in the research include defense mechanisms, insomnia, difficulty with memory, chest pains, and anxiety.

CHAPTER 2

REVIEW OF LITERATURE

Sudden death has been a mystery for centuries. The impact of the sudden death event and one's surviving to tell others of the experience must be extensive. With current and future improvements in the cardiopulmonary resuscitation technique and in emergency medical assistance, patients may survive multiple sudden death events prior to final death. Indeed, the 20th century may eventually have as many modern day Lazaruses (Hillman, 1976) as survivors of myocardial infarction. Therefore, the review of literature examines the following areas: cardiopulmonary resuscitation, sudden death, survivors of serious illnesses and disasters, and sudden death survivors.

Cardiopulmonary Resuscitation

Even though cardiopulmonary resuscitation has been utilized in hospitals for almost 2 decades, the attempt to revive the sudden death patient is rooted deeply in history. Myths from ancient Egypt suggested that sudden death could be reversed and life restored by gods breathing into the body (Stewart, 1979). During Biblical times

dating as far back as 300 B.C., the Prophet Elisha is recorded as having resuscitated a young sudden death patient (Engermeier, 1947; Holy Bible, II Kings 4: 8-37).

In 1885, Koenig, professor of surgery at Gottingen, reported the successful resuscitation of six sudden death patients with respiratory failure. One of the first successful cardiac resuscitations was observed in 1892 by Maass, who reported palpation of carotid and radial pulses during chest compressions. At this time, chest compressions were not performed in conjunction with adequate ventilations, and minimal attention was directed to complications resulting from sternal compression (cited in Jude & Elam, 1965).

In 1960, Kouwenhoven et al. (cited in Jude & Elam, 1965) described a 70% successful resuscitation rate using external cardiac massage in 20 sudden death patients. The external cardiac massage technique required a rhythmical compression of the sternum with ventilation. This research provided the foundation for extensive use of cardiopulmonary resuscitation by doctors, nurses, paramedical personnel, dentists, and lay public. In fact, the cardiopulmonary resuscitation procedure makes it possible to resuscitate the sudden

death patient both in the community and in the clinical setting.

> In 1966 the National Academy of Sciences-National Research Council sponsored a conference on cardiopulmonary resuscitation that recommended the training of medical, allied health and paramedical personnel in cardiopulmonary resuscitation according to the established standards of the American Heart Association. (Standards for cardiopulmonary resuscitation, 1974, p. 837)

These standards are used to instruct and certify health professionals and the lay public at different skill levels. The cardiopulmonary skills and goals are directed toward recognition of sudden death with the prompt and correct application of the procedure (Standards for cardiopulmonary resuscitation, 1974).

Since sudden death occurs at any age (Killip, 1975), a child could be the rescuer in a sudden death event.

> A 1973 National Conference on Standards for Cardiopulmonary Resuscitation and Emergency Care cosponsored by the American Heart Association, the National Academy of Sciences-National Research Council and the American Medical Association recommended that cardiopulmonary resuscitation be taught to the general public and that it be promptly integrated into the school systems. (Standards for cardiopulmonary resuscitation, 1974, p. 839)

A Gallup Poll of June 1977, indicated that 80% of the sample felt that cardiopulmonary resuscitation should be mandatory for school systems (cited in Britton, 1978). A recent survey of the American Heart Association

affiliates indicated that 56% of the heart affiliates have some form of cardiopulmonary resuscitation program in the schools. In addition to the instruction for the young students, the school system also provided instruction for adults through evening classes and adult education programs (Britton, 1978). One newspaper editor even advocated cardiopulmonary resuscitation as a requirement for graduation from high school (Gorkin, 1978).

Royce J. Britton, Chief of Emergency Cardiac Care Section of the American Heart Association, (cited in Finley, 1979) reported that 6,000,000 Americans are now familiar with the cardiopulmonary resuscitation procedure. "Our long-range goal is to teach cardiopulmonary resuscitation to at least one person in every five" (Finley, 1979, p. 12) and, therefore, increase the survivor rate in sudden death.

In cardiopulmonary resuscitation the primary goal is to reverse clinical death and to prevent biological death. The resuscitation measures begun within the 4 to 6 minute period have proven the most successful in preventing biological death and in increasing survival rates among the sudden death patients (Myerberg, 1978; Stephenson, 1977).

According to Rogove (1979), survival after a sudden death event is contingent on the time interval prior to the initiation of the resuscitation procedure. The cardiopulmonary-metabolic-neurologic status, age of the sudden death patient, underlying pathology, and the related skills of the cardiopulmonary resuscitation team are also dominant factors in the survival rate.

The current survival rate is 10% (Cass, 1975) to 25% (Castagna et al., 1973) with a 2% to 20% complete recovery among survivors (McCall, 1978). Higher survival rates are reported in special care areas such as the intensive care units and operating rooms (Castagna, Weil, & Shubin, 1974). In the coronary care unit, more than 80% of the sudden death patients with cardiac arrhythmias are successfully resuscitated and approximately 30% (Hill, 1973) to 50% (Sandoval, 1965) are discharged from the hospital. Nevertheless, the sudden death survival rate is directly affected by the presence of other physiological alterations such as congestive heart failure, shock, or asystole, with fewer than 4% of the complicated cases discharged from the hospital (Hill, 1973). In a follow-up of 230 sudden death survivors who were discharged from the hospital, Lemire and

Johnson (1972) found a 74% survival rate at the end of 1 year and a 51% survival rate after 3 years.

Sudden Death

Sudden death claims more than 400,000 lives annually in the United States and is considered a major health problem in the Western world (Sobel & Braunwald, 1977). Sudden death can be defined as

> natural death occurring instantaneously, or within one hour of the onset of symptoms in a patient who may or may not have known pre-existing disease, but in whom the time and mode of death came unexpectantly. (Myerberg, 1978, p. 727)

The terms that stand out in any definition of sudden death are natural, unexpected, and rapid (Myerberg, 1978). The Joint American Heart Association International Society of Cardiology Committee (cited in Sobel & Braunwald, 1977) stated that 50% of sudden death events are instantaneous.

Incidence and Etiology of Sudden Death

The exact incidence of sudden death remains unknown, although an approximation of the incidence of all natural deaths which are sudden and unexpected is 15% to 30% (Burch & DePascale, 1965; Kuller, 1966; Myerberg, 1978).

There are two peak age related incidences of sudden death: between birth and 6 months of age and between the ages of 35 and 70 years. In both age groups, there is a marked preponderance in males (Burch & DePascale, 1965; Myerberg, 1978; Sobel & Braunwald, 1977; Valdes-Dapena, 1967).

Physiological Factors in the Etiology of Sudden Death

Sudden death is caused by multiple physiological factors. More than 66% (Sobel & Braunwald, 1977) to 80%-90% (Myerberg, 1978) of the sudden death events result from cardiovascular diseases. The primary physiological factor in the etiology of sudden death is coronary atherosclerosis (Myerberg, 1978), also known as coronary heart disease (Burch & DePascale, 1965; Lewis, 1973; Luckman & Sorensen, 1980; Myerberg, 1978; Pruit, 1964; Sobel & Braunwald, 1977). One of every five men in the United States develops coronary heart disease before the age of 60 years. Three million Americans have coronary heart disease and another 2.4 million Americans have the potential for the development of the disease (Luckman & Sorensen, 1980).

According to Kuller, Perper, and Cooper (1975), 90% of the sudden death events in men is attributed to

coronary atherosclerosis. Principally a disease of the large arteries, atherosclerosis is characterized by plaque deposits in the arterial walls, and is a form of arteriosclerosis. In the arteriosclerotic process, the vessel walls lose their elastic properties and ability to distend (Guyton, 1976).

A knowledge of risk factors in coronary heart disease can aid in the identification of patients prone to sudden death (Friedman, Klatsky, & Siegelaub, 1975). Coronary heart disease is influenced by four major risk factors: the individual's age, sex, race, and environment. The manifestations of coronary heart disease appear predominantly in persons over 40 years of age, and men are 4 times more likely to have the symptoms than women (Kuller et al., 1975; Luckman & Sorensen, 1980). This immunity to coronary heart disease for women, however, is directly related to age. Post-menopausal women are as likely to be diagnosed with coronary heart disease as men. Caucasian men are affected more frequently than nonwhites. Nonwhite women, however, reflect a higher incidence of coronary heart disease than Caucasian women. In regard to environment, coronary disease is seven times more prevalent in the urban, highly industrialized areas like

the United States, Australia, Europe, and New Zealand (Luckman & Sorensen, 1980).

Another risk factor in coronary heart disease is Type A behavior (O'Flynn-Comisky, 1979). Friedman, Manwaring, Rosenman, Donlon, Ortega, and Grabe (1973) and Bruhn and Wolf (1974) described Type A behavior in a majority of the sudden death patients. This behavior pattern is characterized by a consistently high level of stress. A competitive, over-achieving, work-a-holic (O'Flynn-Comisky, 1979), the Type A individual ignores the need for rest and has an inability to relax even during vacations.

Risk factors for coronary heart disease include a genetic predisposition; occupational or professional stresses; a history of hypertension and/or obesity; lipid abnormalities; presence of diabetes mellitus or gout; and electrocardiographic abnormalities, such as myocardial infarction, conduction disturbances, or unexplained atrial fibrillation. Other adverse conditions that precipitate coronary heart disease or sudden death include: heavy cigarette smoking; a sedentary occupation; emotional problems; and a high caloric, high fat diet. Hypertension and heavy smoking are the greatest

risk factors for the development of coronary heart disease (Luckman & Sorensen, 1980). The presence of hypertension and heavy smoking

> results in a 5 fold increase in the incidence of atherosclerosis as compared to that in individuals with neither or these two risk factors. (Ratts, 1978, p. 36)

Patients with coronary heart disease can develop manifestations of myocardial infarction, angina pectoris, and sudden death. According to Myerberg (1978), 50% of the sudden death survivors with coronary heart disease experienced a myocardial infarction within 6 hours to 1 week prior to the sudden death event. Although Baum, Alvarez, and Cobb (1974) also related evidence of a myocardial infarction in approximately 50% of the sudden death survivors, only 17% of the survivors had any electrocardiographic evidence of a new transmural myocardial infarction.

Angina pectoris is characterized by transient attacks of substernal or precordial pain (Andreoli, Fowkes, Zipes, & Wallace, 1975). According to Kannel (1976), the Framingham Survey in cardiovascular epidemiology revealed that angina and sudden death occurred after the myocardial infarction and were the indicators or coronary heart disease in men. In women, however, the major indicator

of coronary heart disease is angina pectoris, and not myocardial infarction (Kannel & Feinlieb, 1972).

For 25% (Sobel & Braunwald, 1977; Weaver, Lorch, Alvarez, & Cobb, 1976) to 41% (Myerberg, 1978) of the patients, the sudden death event is the first and only manifestation of coronary heart disease. Forty percent of the coronary heart disease patients are hospitalized prior to the sudden death event. The remaining 60%, or 300,000 patients, experience sudden death outside the hospital (Kuller et al., 1975; Luckman & Sorensen, 1980; Myerberg, 1978; Sobel & Braunwald, 1977), and 25% (Andreoli et al., 1975) to 40% (Doyle, 1975) of those are seen by a physician in the week preceding the sudden death event.

Mazzoleni (1973) described ventricular fibrillation as the primary etiology of sudden death outside the hospital. Mazzoleni also stated that ventricular standstill is a less common etiology with a sudden death event. Gilston and Resnekov (1976) as well as Kirby (1967), however, described the primary electrocardiographic finding after sudden death as ventricular fibrillation or ventricular standstill. These studies found that the ventricular fibrillation and ventricular standstill occur

in the sudden death event with approximately the same frequency.

Stiles, Tucker, and Meyer (1971) researched the survival rate in the sudden death event. Stiles et al. described a 50% survival rate in patients experiencing ventricular fibrillation with the sudden death event. While patients experiencing cardiac asystole or ventricular standstill with the sudden death event have a survival rate of only 10%.

In the presence or absence of coronary heart disease, dysrhythmias are physiological factors in the etiology of sudden death. Premature ventricular contractions and heart blocks or conduction disturbances (Greene, Korovitz, Shanklin, DeVito, & Taylor, 1969) are examples of dysrhythmias which serve as etiologic mechanisms for sudden death (Chiang, Perlman, Ostrander, & Epstein, 1969; Hinkle, Carver, & Stevens, 1969; Liberthson, Nagel, Hirschman, Nussenfeld, Blackbourne, & Davis, 1974). Some researchers (Weiss, Jobe, Gordon, Gange, & Frommer, 1969) described premature ventricular contractions as mechanisms for increasing the risk of sudden death only in the presence of coronary heart disease or left ventricular hypertrophy. Lown and Wolf (1971), however, stated

that the occurrence of premature ventricular contractions is quite often a warning of more lethal arrhythmias.

The relationship between the sympathetic nervous system and dysrhythmias as physiological factors in sudden death has been recognized for many years. A classic study by LeRoy and Snider (1941) described a 10% decrease in the sudden death mortality rate by severing the thoracic sympathetic outflow. Recent pharmacological research on the adrenergic blockers, such as Bretylium tosylate, has indicated that the development of ventricular fibrillation is dependent on the activation of the sympathetic nervous system (Bacaner, 1966).

In one study of 1,200 sudden death resuscitations, 25% of the sudden death events were attributed to vagal stimulation (Rogove, 1979; Stephenson, 1973). Sinus bradycardia and depression of atrioventricular conduction are produced by vagal stimulation and can initiate a sudden death event (Rogove, 1979). Anoxia (Wit & Bigger, 1975), an inferior wall myocardial infarction (Wolf, 1966), diagnostic procedures, surgical procedures, hypercapnia, and jaundice can also precipitate vagal stimulation and a sudden death event (Rogove, 1979).

Rogove (1979) described a relationship between vasovagal syncope and sudden death in patients who "psychologically have given up in the face of emotional despair" (p. 22). The physiological responses of this vasodepression state (Rogove, 1979), also known as "death's waiting room" (Nelson, 1979, p. 28), included multiple dysrhythmias and sudden death (Engel, 1978; Rogove, 1979).

There are several less prevalent physiological factors in the etiology of sudden death. Among these factors are aortic stenosis, myocarditis, and most of the cardiomyopathies (Myerberg, 1978). In these cardiac conditions, sudden death is frequently precipitated by exertion and occurs during or just after exercise (Killip, 1975).

Previously, respiratory arrest was considered a major physiological factor in sudden death. Certain neurological disorders provide primary causes of respiratory arrest; trauma is another factor; and even certain medications can initiate the process (Kravitz & Killip, 1972). Recently, pulmonary embolism has been recognized as an important physiological factor in the etiology of sudden death (Myerberg, 1978). Pregnant women with primary pulmonary hypertension have an estimated 53% incidence

of sudden death, usually at delivery or in the postpartum period (Nagel, Liberthson, Hirschman, & Nussenfeld, 1975).

Neurological diseases, or conditions affecting the central nervous system, are also physiological factors in sudden death. Cerebral and subarachnoid hemorrhage with the resulting increased intracranial pressure are two examples of neurological diseases that can lead to sudden death (Luckman & Sorensen, 1980).

Anaphylactic reactions have been implicated as an etiologic factor in sudden death events (Hudson, 1978). Anaphylaxis is a systemic form of immediate hypersensitivity usually precipitated by the injection of a drug or sting of an insect to a sensitized individual. The reaction occurs rapidly and may result in sudden death through respiratory of cardiovascular involvement (Guyton, 1976).

The time, place, and events surrounding sudden death provide valuable etiologic information. Friedman et al. (1973) were unable to document any association between sudden death and eating. The researchers did find, however, a significant association between moderate or severe exercise and sudden death with 50% of the sudden

death patients actively engaged in exercise at the time of the event. Friedman et al. (1973) and Cobb (cited in Killip, 1975) were unable to state a significant relationship between sleeping and sudden death. Kuller et al. (1975), nevertheless, related a 13% to 14% incidence of sudden death during sleep, and stated that this area warranted a closer examination.

The most common myths on the relationships between sex and sudden death regard sexual intercourse as a lethal precipitator in a sudden death event (Hackett & Cassem, 1973). Literature has also alluded to such a relationship. In Eugene O'Neill's literary work, Mourning Becomes Electra, the author described the sudden death of Ezra after sexual intercourse with a younger wife (cited in Killip, 1975). Hellerstein and Friedman (1970), however, suggested that myocardial work and oxygen cost of sexual intercourse with a spouse is no more than the amount required to climb a flight of stairs. In two other studies, Friedman et al. (1973) and Killip (1975) were unable to describe any significant relationship between sex and the sudden death event.

The significance of fatigue, chest pain, and dyspnea as physiological factors in the etiology of sudden death

remain controversial. Liberthson (cited in Oberman, Ray, Turner, Barnes, & Grooms, 1975) reported a 66% incidence of chest pain and dyspnea in the patient. Fenlieb, Simon, Gillium, and Margolis (1975) observed that the sudden death patient complains of chest pain approximately 50% less frequently than the myocardial infarction patient. With the frequency approximately the same as in the myocardial infarction patient, fatigue is considered a dominant symptom in patients approaching the event (Fenlieb et al., 1975). Liberthson (cited in Oberman et al., 1975) described fatigue in 80% of the patients prior to a sudden death event. Paul (cited in Oberman et al., 1975) described fatigue and depression as possible synonymous aspects and important etiologic factors in sudden death.

Psychological Factors in the Etiology of Sudden Death

Through the ages folklore has assumed a relationship between a sudden death event and the presence of a psychological experience. This accounts for such expressions as "scared to death" or "dying from a broken heart" (Surawicz, 1973, p. 837).

In 50% of the sudden death survivors, psychological factors are associated with the event (Engel, 1971). Research by Engel (1971) and Greene, Goldstein, and Moss (1972) described the emotional turmoil, depression, fear, anger, and anxiety as having occurred shortly before the sudden death event. According to Engel (1978) public humiliation and loss of self-esteem are present in 6% of such patients. Twenty-seven percent of the patients expire in the settings of extreme personal danger or upon threat of injury. Another 7% of the patients experience sudden death shrotly after the danger has passed. Finally, 6% of the patients experience sudden death during reunion, triumph, or a happy event.

According to Wolf (1969), professional relocation, loss of a job, and death of a loved one are psychological factors in the etiology of sudden death. Engel (1978) described a 21% incidence of sudden death after receiving news of the death or collapse of a family member of friend. Engel (1978) noted a 20% incidence of sudden death during the first 3 weeks of acute grief and a 3% incidence during the mourning or upon anniversary of a death.

Greene et al. (1972) interviewed close relatives of 54 sudden death patients. Greene et al. described a 76% incidence of sudden death in patients who had been depressed for weeks or months before the event. This depression usually centered on estrangement, separation, or disappointment involving a close family member, particularly a son or daughter.

Rahe, Romo, Bennett, and Siltanens (1974) completed research on the relationship between life changes and illnesses. Rahe et al. stated that myocardial infarction patients have an increase in life changes 6 months prior to the infarction. These researchers also suggested that increased life changes reflect a vulnerability to the sudden death event.

Survivors of Serious Illnesses and Disasters

Serious illnesses and disasters are defined as "events possessing a direct threat to the physiological and psychological survival" (Smith, 1979, p. 441). Patients who survive serious illnesses, including sudden death, and disasters, are called survivors. These survivors exhibit unique manifestations which may show similar themes after both the serious illness, including the sudden death, and disaster events (Smith, 1979).

The survival process leads to changes in values and priorities with an increased concern for other people (Smith, 1979) and a sense of guilt (Shontz, 1975). Smith (1979) stated that 66% of illness survivors speak with emotion and without hesitancy concerning the post survival changes in their values and priorities. Each survivor, who mentions the value and priority changes, links the changes to an increased awareness of death and of a limited life span. A typical response from the survivor is

> I've put so much into my work, constantly hurrying and pushing. From now on I'm going to enjoy life with my family. It never occurred to me before that I could die. (Smith, 1979, p. 442)

The remaining 34% of the illness survivors described no changes in values or priorities. These survivors did not mention death and responded with, "It never occurred to me that I wouldn't get better. I just knew I would" (Smith, 1979, p. 442).

A frequent comment from illness survivors is how much "better off" (Smith, 1979, p. 442) they are than other patients. Interestingly, this comment is made often by survivors who have been critically ill. The feeling of being "cared about and cared for by others" (Smith, 1979, p. 442) is another comment from survivors.

One survivor, a physician, described the security and good feeling fostered by patient care received after his sudden death event (Anonymous, 1969).

Lifton (1976) closely examined the survival themes and related that survivors experienced new personal growth with changes in values, priorities, and goals. Lifton also found that survivors made a greater effort to improve the quality of life, family relationships, and work within the chosen profession.

A feeling of guilt is also identified in survivors. Survivor guilt is derived from the belief that personal survival was at the expense of other nonsurvivors. Some survivors even wonder if death is secondary to former personal failings or mistakes (Lifton, 1976).

In the book, The Survivors, Des Pres (1976) described characteristics of survivors from concentration camps. Survival in the camps required a community effort, as the loss of dignity and privacy proved to be lessening factors in the will to live. After the experience, personal contact with a caring person seemed to produce positive therapeutic effects for survivors. The survivors wanted to inform others of the experience and the need to report the event became a goal.

Des Pres (1976) related that survivors' death experiences destroyed the illusions of life and death in significant others. Avoidance of the survivor by family, friends, and acquaintances is an attempt to keep life and death illusions intact.

Survival of a disaster also constitutes severe stress. Similar to the stages of death and dying as described by Kubler-Ross (1969), Horowitz (1976) described adaptation stages occurring in survivors secondary to surviving a disaster. These stages include initial recognition-outcry, denial and numbing, denial and intrusive repetition, and finally, an attempt to integrate the meaning of the disaster experience.

A disaster-survivor syndrome was originally described by Friedman and Lum (cited in Wilson, 1977) several years after the Andrea Doria shipwreck. The syndrome is apparent after a disasterous event and consists of an initial psychic shock, followed by motor retardation, flattened affect, somnolence, amnesia, and suggestibility. Survivors also suffer long term survival effects which are manifested by insomnia, panic attacks, guilt feelings, exhaustion, and numerous bodily disturbances.

The Sudden Death Survivor

Physiological Manifestations in the Sudden Death Survivor

Sudden death deprives the brain of adequate circulation which produces a rapid and severe physiological effect on the central nervous system (Stephenson, 1977). Neurological manifestations indicating cerebral trauma are considered major complications after a sudden death event. With the extensive use of cardiopulmonary resuscitation, many physicians expect that a successful restoration of heart function will be compatible with cerebral survival. The heart, however, is able to recover after considerably longer periods of anoxia and ischemia than cerebral tissue (Allen, 1977). Even after resuscitative efforts are instituted, adequate cerebral perfusion does not necessarily recommence with measurable vital signs. Continued or prolonged cerebral hypoperfusion increased with degree of neurological damage (McCall, 1978).

According to Allen (1977), Bell and Hodgson (1974), and Willoughby and Leach (1974), coma is the prominent neurological manifestation after a sudden death event. A study by Snyder, Ramirez-Lassepas, and Lippert (1977) concluded that duration of the coma is the single most

important criterion in distinguishing neurologically damaged versus neurologically functional survivors of sudden death. Bell and Hodgson (1974) stated that coma persisting for 3 days or longer is uniformly associated with severe anoxic brain damage and a poor prognosis after the sudden death event.

After a sudden death event, permanent neurologic sequela are remarkably uncommon. Survivors who do sustain cerebral damage during resuscitation usually fail to survive long enough to leave the hospital (Castagna et al., 1973). Norris and Chrandrasekar (1971) found only 7 patients admitted during an 18 month period because of anoxic brain damage. Lemire and Johnson (1972) based a study on a long term follow-up of 230 sudden death survivors. Fifty-one percent of the survivors were alive at 3 years, and only 4 survivors had irreversible cerebral damage. In another study of 284 sudden death survivors, 30% were discharged without significant neurological deficits (Bell & Hodgson, 1974). Snyder et al. (1977) also described normal cerebral functioning in 21 of 34 sudden death survivors.

Plum and Posner (1972) identified three groups, or classifications, for sudden death survivors as based on

the severity of the post resuscitation neurologic manifestations. In Group I, sudden death survivors are continuously maintained on life support equipment. The survivors in Group II are in a long-term deep coma after the sudden death event and remain in a vegetative state. With Group III, recovery occurs in varying degrees of dementia, phramidial and/or extrapyramidial deficits, cortical blindness, poor memory, and psychiatric disturbances.

Some neurological manifestations become apparent at the time of discharge or immediately after discharge home. Dobson et al. (1971) noted a slight intellectual impairment in sudden death survivors. Three months after discharge, however, the intellectual impairment was not present in the survivors. This information further supported previous findings of DuPont, Flensted-Jensen, and Sandoe (1969), and Minuck and Perkins (1970) that intellectual impairment is an infrequent problem in sudden death survivors during the post resuscitation.

Negovsky (1972) described several cases of total retrograde amnesia after the sudden death event. Negovsky noted that the amnesia gradually disappeared during the post resuscitation period. The sudden death

survivors in the study by Dobson et al. (1971) related periods of complete amnesia lasting from 2 to 14 days. The complete amnesia usually dates from the sudden death event although 2 patients had retrograde amnesia of 24 hours and 7 days respectively. The longest periods of amnesia occur in the sudden death survivors who are comatose for 2 and 3 days after the sudden death event (Dobson et al., 1971). Druss and Kornfield (1967) and Hackett, Cassem, and Wishnie (1968) reported that memory is especially poor for recent years in the sudden death survivors. In addition to memory problems, 50% of the sudden death survivors experience difficulty in concentration (Druss & Kornfield, 1967).

Dobson et al. (1971) reported chest pain in 12 of the 20 sudden death survivors. Among these 12 survivors, 2 survivors described true angina, and 2 survivors reported only 1 episode of chest pain. The remaining 8 sudden death survivors reported occasional non-specific chest pain as well as indigestion. Ten of the 20 sudden death survivors in the Dobson et al. (1971) study showed clinical and radiologic evidence of cardiac failure.

Straub, Pupello, and Harrison (1977) described the development of Prinzmetal's angina in sudden death survivors during the post resuscitation period. This study also implied Prinzmetal's angina as an etiologic factor in sudden death for the asymptomatic patient. The development of severe angina in the sudden death survivors was reported and described by Minuck and Perkins (1970). This severe angina was noted 3 months after discharge from the hospital and was observed to occur in conjunction with paroxysmal nocturnal dyspnea or cardiac failure (Minuck & Perkins, 1970).

Another physiological manifestation of sudden death is arrthythmias. Also known as dysrthythmias, arrhythmias are defined as disturbances of rate, rhythm, and conduction. Precipitated by multiple factors, the arrhythmias decrease cardiac output and coronary perfusion (Andreoli et al., 1975; Luckman & Sorensen, 1980). Minuck and Perkins (1970) described the frequent occurrence of premature ventricular beats in sudden death survivors during the first year after the sudden death event.

Weaver et al. (1976) completed a study on sudden death survivors 20.5 months after the sudden death event. Weaver et al. reported that 14 of the 64, or 22%,

of the sudden death survivors eventually experience a second episode of ventricular fibrillation terminating in sudden death. Weaver et al. (1976) also noted a high incidence of coronary atherosclerosis as the first manifestation of coronary heart disease in the sudden death survivors.

Psychological Manifestations in the Sudden Death Survivor

The psychological manifestations of the survivors to a sudden death event range from confusion and shock to feelings of desperation, uncertainty, helplessness, gratitude at still being alive, invulnerability to death, fear of abandonment, and fear of the sudden death recurrence (Dlin, Stern, & Poliakoff, 1974; Dobson et al., 1971; Hudson, 1978; Pandy, 1971). Sudden death survivors' responses also encompass feelings of being different, special, or odd; people and objects are less important; and there is a sense of being reborn (Druss & Kornfield, 1967; Hudson, 1978; Pandy, 1971). One sudden death survivor related, "God has let me come back to tell everyone not to be afraid to die. Now that I'm here again, I must show real love to everybody I meet" (Lee, 1978, p. 57).

Sudden death survivors related feelings of depression, morbidness, and anger (Dobson et al., 1971; Pandy, 1971). When positive experiences during the intra-arrest period were experienced, verbal anger was demonstrated in the survivors (Lee, 1978). In a 1975 radio interview in New Orleans, Louisiana, Dr. Elizabeth Kubler-Ross described anger in a group of sudden death survivors. Prior to the sudden death event, these patients had been paraplegics and quadriplegics. With an intra-arrest ability to move around freely, the survivors were extremely upset that a successful resuscitation again reduced mobility to a wheelchair or bed.

Dr. Zui Oster (cited in Wolf, 1969) recorded a similar experience with anger:

> On regaining consciousness the man was bitter and with great hostility stated, "I have been trying to summon up the courage to kill myself for two years, and now when I die legitimately you have to bring me back to life." (p. 74)

Negative intra-arrest experiences produced fearful or anxious manifestations in the survivor concerning recurrence of the sudden death event (Lee, 1978), and a feeling that sudden death will again soon recur (Pandy, 1971). According to Dlin et al. (1974), negative and painful intra-arrest experiences produced hallucinatory

of delusional behaviors in the post resuscitation period.

After the sudden death event, the memory of having been dead for any length of time is exhibited in the survivors' psychological manifestations. The sudden death survivors had difficulty discussing the sudden death experience and many remained silent or even refused to discuss the event (Dlin et al., 1974; Dobson et al., 1971; Lee, 1978). If the survivors believed death had already occurred, the survivors ceased to complain of pain, discomfort, and displayed no fear of dying. An example of this is seen in the survivor who, after multiple unsuccessful venipunctures and with hands clasped across the chest, stated that his recent death had ended all personal discomforts. Another survivor related that since only his body was left and the soul has already gone to Heaven, pain and discomfort was not present and was inconsequential (Dlin et al., 1974; Dobson et al., 1971; Druss & Kornfield, 1967).

Anxiety is a prominent psychological manifestation in sudden death survivors. Frequently, the anxiety centers around the survivors being left alone after his return home (Dlin et al., 1974; Dobson et al., 1971;

Hackett, 1972). In a study of 10 sudden death survivors, Druss and Kornfield (1967) noted that survivors use multiple defense mechanisms to cope with the increased anxiety levels. While denial is the prominent defense mechanism in the sudden death survivors, the survivors' use of isolation is even more common. The survivors know a sudden death event has occurred, but they relate no fear or anxiety concerning their health status.

Displacement is also a defense mechanism used by the sudden death survivors. Instead of anxiety about the sudden death event, the survivor complains of environmental of physiological discomforts (Druss & Kornfield, 1967).

Another defense mechanism identified by Druss and Kornfield (1967) is projection. Of the 10 sudden death survivors in the study, 7 survivors related minimal or no anxiety about the sudden death event but described the presence of anxiety about the event in relatives and friends (Druss & Kornfield, 1967).

Other defense mechanisms in the sudden death survivors include hallucinatory and delusional behaviors. These behaviors focus primarily on the family and home

life of the survivors. One hospitalized sudden death survivor related, "I thought my wife was lying beside me and, therefore, I was home again" (Druss & Kornfield, 1967, p. 293).

Dobson et al. (1971) also found anxiety manifestations in sudden death survivors. Intense anxiety in the survivors was discovered in patients who eventually made only a moderate or unsatisfactory adjustment in the post resuscitation period. The use of defense mechanisms was not described in this study.

In contrast to anxiety levels in sudden death survivors as reported by Druss and Kornfield (1967) and Dobson et al. (1971), Hackett et al. (1968) described a decreased level of anxiety in survivors after multiple sudden death experiences. The use of defense mechanisms by multiple sudden death survivors was not discussed in the study (Hackett et al., 1968).

Comparable to myocardial infarction and other serious illnesses, surviving a sudden death event may affect resumption of sexual relationship. Hackett and Cassem (1973) identified increased anxiety in the post-myocardial infarction patient who believes sexual intercourse and orgasm can precipitate fatal arrhythmias and

sudden death. In two studies (Dobson et al., 1971; Druss & Kornfield, 1967), a reduction or cessation in sexual intercourse was found in 60% of sudden death survivors. This decrease or cessation in sexual activity is attributed to patient and spouse anxiety concerning possible recurrence of the sudden death event (Dobson et al., 1971).

Druss and Kornfield (1967) described persistent episodes of insomnia months after the sudden death event. Sleep is described as "restless, fitful, and brief" (Druss & Kornfield, 1967, p. 294). Rodman (1975) and Hudson (1978) also described periods of insomnia initially after the sudden death event.

Besides insomnia, the sudden death survivors described dreams of violence, a violent death, or aggressive activity after discharge home. One survivor reported dreams of falling from a wheelchair and of being run over by the chair. Another survivor related dreams of using a gun to force his way out of the hospital, prior to being captured by an evil head nurse (Dobson et al., 1971; Druss & Kornfield, 1967; Hackett et al., 1968; Rodman, 1975).

A lack of familiarity with prsonal items and a definite confusion with time and the date is reported by some sudden death survivors. The survivors related a sensation that their existence was currently in another decade and actively sought clarification of the date through questions (Hudson, 1978).

Falicki and Sep-Kowalik (1969) described multiple manifestations in sudden death survivors. In several documented cases, sudden death survivors experienced a complete reversal in behaviors. Prior to the sudden death event, survivors were usually good humored, calm, even-tempered, sociable, and had close family ties. After the event, the survivors exhibited irritable, nervous, arrogant, and impulsive behaviors. Sudden death survivors seem to lose previous interests, cease to demonstrate new interests, and have a decreased recollection of recent events. In other cases, sudden death survivors exhibit some degree of psychomotor agitation, an euphoric mood, or inappropriate gaity (Falicki & Sep-Kowalik, 1969).

In contrast to the euphoric mood as described by Falicki and Sep-Kowalik (1969), some sudden death survivors reported periods of irritability, depression,

restlessness, and tenseness during the post resuscitation period. In spite of this, prolonged periods of sadness or despondency is not described in the sudden death survivors (Dobson et al., 1971; Druss & Kornfield, 1967).

Spouses of the sudden death survivors described the survivors' behaviors as more dependent and irritable. The survivors "become angry if fussed over or excessively protected" (Dobson et al., 1971, p. 211), but readily accuse the spouse of unsympathetic behavior if not given excessive attention (Druss & Kornfield, 1967).

Literary works have also sought to describe the sudden death survivors' behaviors during the post-resuscitation period. In the play, Lazarus, Leonid Andreyev (cited in Bertman, 1979) described the sudden death survivor.

> Before his sudden death experience, Lazarus had always been cheerful and carefree, fond of laughter and a merry joke . . . . But now, Lazarus had grown taciturn and grave, he never jested nor responded with laughter to other people's jokes. His contact with others was characterized by indifference and passivity. (Andreyev, cited in Bertman, 1979, p. 144)

In Lazarus Laughed, Eugene O'Neil (cited in Bertman, 1979) described the survivors' behaviors after the sudden death experience as "void of feelings" (p. 144). O'Neil

(cited in Bertman, 1979), however, also described a death scene in which Lazarus cried over his dead wife's body and said, "I'm so lonely" (p. 144).

Alterations in employment and personal habits are noted in some sudden death survivors. Druss and Kornfield (1967) found that all 10 survivors in their study modified habits and life patterns or were planning alterations. While still maintaining a decreased concern about their health, many of the sudden death survivors planned major changes in daily habits secondary to anxiety in the post-resuscitation period. The sudden death survivors who retired from previous jobs were bored, irritable, or they slipped into a "picture of childish dependency" (Druss & Kornfield, 1967, p. 295). The families of sudden death survivors supported these survivors as a "mother would [support] a helpless child" (Druss & Kornfield, 1967, p. 295).

Twenty sudden death survivors were included in the Dobson et al. (1971) study. Of the 18 sudden death survivors who worked before the event, 7 of the survivors resumed employment within 3 months, 14 returned to work within 6 months, and 16 had returned to work within 18 months. Of the 4 sudden death survivors who did not

return to work within 6 months, 2 of the survivors retired. Three of the survivors who had previously engaged in heavy manual occupations returned to different employment (Dobson et al., 1971). Minuck and Perkins (1970) noted that 70.5% of the sudden death survivors employed prior to the event returned to full employment during the post-resuscitation period.

Summary

Since 400,000 people experience sudden death each year, the sudden death event is considered a major health problem in the Western world. The cardiopulmonary resuscitation procedure strives to prevent biological death by intervening within the first 4 to 6 minutes and is used by physicians, nurses, paramedical personnel, and lay public.

A knowledge of coronary heart disease risk factors aids in the identification of patients who are prone to sudden death. Although initiated by multiple cardiac, respiratory, and neurologic physiologic factors, coronary atherosclerosis is the etiologic factor in 60% to 90% of sudden death events. For many of these patients, the sudden death event is the first manifestation of coronary heart disease and may occur in

conjunction with or after a myocardial infarction. Other physiological factors such as eating, sexual intercourse, exercise, chest pain, fatigue, and dyspnea have been researched in an effort to identify their relationship with the sudden death event.

In addition to physiological factors, psychological factors can also cause a sudden death event as evidenced in 50% of the sudden death survivors. Loss and a threatened loss or a change can be prevalent themes in the psychological etiologic factors for sudden death.

After surviving a serious illness, including sudden death or a disaster event, individuals are called survivors. The survivors display certain characteristics which include changes in values, priorities, an increased concern for other people, and a sense of guilt. An increased awareness of life and death is also expressed by the serious illness and disaster survivors.

Responses to the sudden death event by the survivor and family vary from confusion to gratitude. Whether the intra-arrest period was considered a positive or negative experience by the survivor can determine the type of responses during the post-resuscitation period.

As a survivor of the sudden death event, the patient exhibits physiological manifestations which include

neurological and cardiac alterations. Permanent neurological sequela in the sudden death survivor are uncommon. Periods of amnesia, a decreased memory for recent events and a difficulty in concentrating have been noted in sudden death survivors. Angina and arrhythmias such as premature ventricular contractions, have also been reported during the post-resuscitation period and may exist in conjunction with paraxysmal nocturnal dyspnea or cardiac failure.

Anxiety is a primary psychological manifestation in sudden death survivors. To cope with the anxiety, the sudden death survivors use denial, isolation, displacement, and projection as defense mechanisms. After the sudden death event, anxiety and concern over possible sudden death recurrence affect resumption of sexual relationships, employment, and return to routine activities. Insomnia, violent or unusual dreams, and altered behaviors, such as the presence of arrogant and impulsive behaviors, are also examples of psychological manifestations noted in the sudden death survivors.

CHAPTER 3

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

The research study was a descriptive correlational study. Polit and Hungler (1978) stated that "the aim of a descriptive correlational study is to describe the relationship among variables rather than infer cause and effect relationships" (p. 185). Dependent and independent variables were identified for this study. The dependent variables for this study were the physiological and psychological manifestations. The independent variables for this study were the sex and age of the sudden death survivors.

Setting

The setting for this study was in two adjoining cities of a state in the Southeastern section of the United States. The two cities together have approximately 200,000 residents.

The patients were initially given an explanation of the research study be telephone. At this time and with the survivor's approval, an appointment was made to visit the survivors in their homes. All survivors

who were approached for participation in this study agreed to participate and allowed a visit in their homes by the researcher. The homes were located in both urban and rural areas. The questionnaires were completed by the survivors in the homes at their convenience without the presence of the researcher.

Population and Sample

The population was composed of individuals who had experienced a sudden death event in the Southeastern section of the United States. The sample consisted of 14 sudden death survivors. The sample was selected according to the delimitations by a convenience sampling method through referral from private physicians. All sudden death survivors who were approached agreed to participate in the study.

Prior to the selection of the sample, the delimitations of the study were discussed and clarified for the physicians. Several of the physicians allowed the researcher full access to office records, while others offered verbal information concerning the physiological and psychological histories of the subjects.

The following delimitations were identified for this study. The subjects would be:

1. Able to speak, read, and write English.

2. Between 21 and 70 years of age.

3. Alert and fully oriented to time, place, and person as documented by the physician or health team.

4. Aware of the sudden death episode as informed by the physician or health team.

5. A sudden death survivor for the last 6 months, but had not experienced the sudden death event as recently as 1 month.

6. Without a presudden death history or hospitalization for mental disease or history of major physical disease.

7. Not a participant in a cardiac rehabilitation program in the community nor one in the hospital setting.

Protection of Human Subjects

The Human Rights application with a copy of the proposed questionnaire was submitted to the Texas Woman's Unviersity Research Review Committee. The committee's approval (Appendix A) was obtained prior to the written permission from the private physicians referring subjects (Appendix B).

The purpose of the study and the rights of the subject were explained by the researcher during the visit

to the survivors' homes. The purpose was explained as a means to increase nursing knowledge and to improve the patient care for the sudden death survivor during the post-resuscitation period. Any questions from the survivors and family were answered, or if needed, a re-explanation of the study was provided. The option either to defer answering questions on the instrument or to discontinue participation in the study at any time was also discussed with the survivors.

The sudden death survivors were assured of anonymity in the written copy and in the collected group data or research findings. Anonymity was also indicated in the written directions of the questionnaire with a statement requesting no patient name or other identifying information on the instrument.

After the sudden death survivor had agreed to participate in the study, a consent form was signed (Appendix C). An uncoded questionnaire with a self-addressed stamped envelope was given to the subject for completion without the presence of the researcher.

Instrument

An original questionnaire was developed based on a review of the literature and the theoretical framework

for this study. The questionnaire was composed of closed type questions requiring a "yes" or "no" answer. Each question on the instrument represented a difference in physiological or psychological manifestation.

The instrument was submitted to a panel of experts composed of three members. One member was an instructor in medical-surgical nursing with a Master's of Science degree in nursing. This panel member had worked extensively with cardiovascular patients. The second panel member was a clinical nurse specialist with a master's degree in psychiatric nursing. The third panel member was a cardiologist whose practice encompassed the two cities as designated in the study.

The panel of experts was given the questionnaire for three purposes. The first purpose of the panel was to evaluate face and content validity of the questionnaire. One question was added concerning a change of routine activities during the post-resuscitation period. The second purpose of the panel was to assess the clarity and conciseness of each question and of the subject's directions on the questionnaire.

Finally, the third purpose of the panel was to classify each manifestation into either a physiological

or psychological category (Appendix D). One hundred percent agreement had to exist between the panel members concerning the content and the classification of the manifestations in order for each manifestation question to remain on the questionnaire. All recommendations from the panel were incorporated into the questionnaire prior to the pilot study.

In addition, the pilot study subjects met the same criteria as the sample in the final research study. Treece and Treece (1977) recommended that approximately 10% of the anticipated sample, or 2 subjects, be used in the pilot study. Since 2 is not a large representative sample, 5 subjects were included in the pilot study. The increased number of subjects afforded the researcher a greater opportunity to detect problems or errors which may have occurred in the final instrument.

The pilot study questionnaire (Appendix E) was completed under the same conditions and in the same length of time as stipulated in the major research study. Anonymity of the participants in the pilot study was assured as to name and written copy. The returned questionnaires were examined for possible ambiguous questions,

the need for change in the terminology, regrouping of the questions, or the need for deletion of questions. Since the questionnaire did not require further clarification or alterations in terminology and grouping of questions, this survivor information was included in the results of the study.

Questions seeking additional manifestations, recommendations and suggestions for changes were also included in the pilot study questionnaire. Further survivor manifestations and recommendations for changes in the questionnaire were not indicated by the pilot study sample. Since additional manifestations and change did not occur in the questionnaire, it was not resubmitted to the panel or experts for further evaluation or classification of manifestations.

Data Collection

The sample was obtained through referral from private physicians on a convenience sampling method. The survivors were initially contacted by telephone at home and given a verbal explanation of the research study. At this time, an appointment was made to visit the survivors in their homes.

During the home visit the survivors were given a thorough explanation of the study's purpose, of their human rights, and of their anonymity in the collected data. A consent form was signed in the same setting with a copy given to the subject and the original copy retained by the researcher. Then an uncoded questionnaire (Appendix F) with a self-addressed, stamped envelope was given to the subject for completion without the presence of the researcher. The questionnaire was dated for return within 1 week. All subjects approached for participation in the study not only agreed to participate but returned all questionnaires to the researcher within the designated time frame.

Treatment of Data

With the return of the questionnaires, the demographic data were tabulated. Tables were constructed to indicate the employment status of the stujects.

An item analysis was initiated by recording the "Yes" or "no" responses for each manifestation. Tables were constructed to indicate the number of "yes" or "no" responses and the related percentages for each physiological and psychological manifestation.

The null hypotheses of the study were to determine significant relationships between the physiological and psychological manifestations and the sex and age of the sudden death survivors. Linear regression was used to test the four null hypotheses. Using the regression equation, analysis was performed with the intention of making predictions about the independent and dependent variables (Polit & Hungler, 1978). For the linear regression test, the "yes" responses on the questionnaire were given a +1 value; while the "no" responses were not given a value. A total numerical score was obtained for each physiological and psychological manifestation. The linear regression also required the age and sex of the survivors. This information was collected from the demographic data on the questionnaires. The results and statistical significance of the linear regression were interpreted by a statistician.

For further analysis of the relationships between each manifestation and the independent variables, two statistical tests were used. The point biserial test was applied to the data to evaluate relationships between each physiological and psychological manifestation and the age of the subject. The point biserial was employed

since the variables in the correlation were a continuous score and a true dichotomy (Borg & Gall, 1974). The second statistical test was the phi coefficient. Since the data were a true dichotomy, this test was used to evaluate relationships between each physiological and psychological manifestation and the sex of the subjects. For the purposes of this study, the level of significance was set at .05.

CHAPTER 4

ANALYSIS OF DATA

Chapter 4 presents an analysis of data obtained in this study. This analysis also includes a description of the survivor sample and their employment status in the post resuscitation period.

The existence and prevalence of the subjective physiological and psychological manifestations after the sudden death event are discussed. Relationships that were identified by the linear regression test are discussed for each hypothesis. Any additional findings as identified by the point biserial and the phi coefficient tests are also related and discussed.

Description of Sample

The sudden death sample consisted of 14 survivors, 11 men (79%) of the sample and 3 women (21%) of the sample. The age of the sudden death survivors ranged from 39 years to 70 years with a mean age of 55.7 years for the male survivors and a mean age of 55.6 years for the female survivors. The mean age of the entire survivor sample was 55.65 years of age.

The sample experienced the sudden death event in the hospital or community setting. The primary etiologic factor for this sudden death survivor sample was of cardiac origin. The time interval between the start of the sudden death event and initiation of the cardiopulmonary resuscitation procedure ranged from within 1 minute to greater than 6 minutes. Individuals initiating the cardiopulmonary resuscitation procedure for the survivors were physicians, registered nurses, emergency medical technicians and non-medical personnel, and a policeman.

Employment status in the post resuscitation period was ascertained on the questionnaire as shown in Table 1. Twenty-one percent of the sudden death survivors were employed on a full-time basis. Two of the survivors were politicians, including a mayor and a county supervisor.

None of the survivors was employed part-time after the sudden death event. Although none of the survivors had changed jobs since the sudden death event, 14% of the sample remained on sick leave for 6 months after the event. One survivor who operated heavy construction equipment prior to the sudden death event planned to resume the construction job work after his sick leave.

Twenty-nine percent of the sudden death survivors retired prior to the sudden death event, while 36% of the survivors retired after the sudden death event. Druss and Kornfield (1967) had previously noted that 22% of the sudden death survivors retired after the event. It is unknown what role the physiological condition or anxiety concerning the sudden death event or a possible second sudden death event had in the retirement status. In the sample 79% of the survivors did respond that they were not afraid or worried about the sudden death event while 64% of the sample was not worried about another sudden death event.

The survivors also provided additional information and comments at the end of their questionnaires. Two of the survivors related intra-arrest experiences of hearing music, a good feeling, floating, or sitting in a chair and watching the resuscitation procedure. Appreciative of the resuscitative efforts, the sudden death survivors did not express any negative statments or hostility toward the rescuers. Comments on the post-resuscitation patient care in the intensive care units and hospitals were also positive.

These sudden death survivors also commented on increased priorities for family and friends since the

Table 1

Current Employment Status of
Sudden Death Survivors

Employment Status	Number of Survivors	Percentage
Full-time	3	21
Part-time	0	0
Retired since the sudden death event	5	36
Retired prior to the sudden death event	4	29
Sick leave	2	14

n = 14.

event. One survivor commented, "I appreciate people more. Instead of just waving a hello to people, I stop and talk."

Sudden death survivors described an open and positive relationship with family members after the sudden death event. One survivor related that the family had not discussed the event until information was requested by the patient. Another survivor described "over protective responses from spouse" during the post-resuscitation period.

Findings

Analysis of Physiological Manifestations

A questionnaire was used to determine the existence of physiological manifestations after the sudden death event (Table 2). The panel of experts had categorized the neurologic and cardiac areas on the questionnaire as physiological manifestations.

Analysis of Psychological Manifestations

The questionnaire was also used to determine the existence of 18 psychological manifestations in the sudden death survivors as shown in Table 3.

Table 2

Physiological Manifestations in Sudden Death Survivors

Physiological Manifestations	Number Yes Responses	Percentage	Number No Responses	Percentage
Difficulty remembering recent events	8	57	6	43
Difficulty remembering childhood events	1	7	13	93
Difficulty in concentration	7	50	7	50
Chest Pains	5	36	9	64
Total Responses	21		35	

n = 14.

Table 3

Psychological Manifestations in Sudden Death Survivors

Psychological Manifestation	Number Yes Responses	Percentage	Number No Responses	Percentage
Afraid or worried about event	3	21	11	79
Worried about another sudden death event	5	36	9	64
Violent death dreams	0	0	14	100
Unusual dreams	7	50	7	50
Feeling like unique person	6	43	8	57
Existence in new period	2	15	12	86
Difficulty sleeping	7	50	7	50
Decreased sex	5	36	9	64
Increased sex	1	7	13	93
Change routine activities	6	43	8	57

Table 3 (continued)

Psychological Manifestation	Number Yes Responses	Percentage	Number No Responses	Percentage
Depression	6	43	8	57
Crying frequently	4	29	10	71
More nervous	8	57	6	43
Excessive laughter	0	0	14	100
Feelings of loneliness	3	21	11	79
More irritable	7	50	7	50
Ideas on death changed	6	43	8	57
Ideas on life changed	9	64	5	36
Total Responses	85		167	

n = 14.

Additional Findings

Further analysis of the data was obtained by using the point biserial and phi coefficient tests. These statistical tests were used to identify any significant relationship at a .05 level between each physiological or psychological manifestation and the sex and age of the sudden death survivors.

The point biserial was applied to the mean ages of the subjects responding "yes" and to the mean ages of the subjects responding "no" to the physiological and psychological manifestations on the questionnaire. The results of the correlation between the physiological manifestations and the mean age of the subjects are shown in Table 4.

One significant relationship at a .05 level was noted between the physiological manifestation, chest pain, and the subject's mean age. When compared to those subjects without chest pain, the subjects with chest pain represented a younger survivor group.

The point biserial was also used to test for the presence of any significant relationship between each psychological manifestation and the mean age of the subjects. The results of this correlation are shown in Table 5.

Table 4

Point Biserial Correlation of Physiological Manifestations to Sudden Death Survivors' Age

Physiological Manifestations	Number Yes Responses	Mean Age	Number No Responses	Mean Age	Point Biserial Correlation
Difficulty remembering recent events	8	53.13	6	59.167	.28
Difficulty remembering childhood events	1	43.00	13	56.692	.33
Difficulty in concentration	7	53.29	7	58.143	.23
Chest pains	5	48.40	9	59.778	.52 *

n = 14.

SD = 10.564.

.05 level of significance = .446

* = .05 level of significance.

Table 5

Point Biserial Correlation of Psychological Manifestations to Sudden Death Survivors' Age

Psychological Manifestation	Number Yes Responses	Mean Age	Number No Responses	Mean Age	Point Biserial Correlation
Afraid or worried about event	3	46.67	11	58.18	.45*
Worried about another event	5	49.60	9	59.11	.43
Violent death dream	0	0	14	55.17	--
Unusual dreams	7	55.14	7	56.286	.05
Feeling like a unique person	6	53.50	8	57.375	.18
Existence in new time period	2	64.50	12	54.25	-.34
Difficulty sleeping	7	52.00	7	59.431	.35
Decreased sex	5	55.00	9	56.11	.05
Increased sex	1	51.00	13	56.087	.12
Change routine activities	6	53.00	8	57.75	.22

Table 5 (Continued)

Psychological Manifestation	Number Yes Response	Mean Age	Number No Response	Mean Age	Point Biserial Correlation
Depression	6	56.68	8	55.00	-.08
Crying frequently	4	55.75	10	55.70	-.002
More nervous	8	55.13	6	59.17	.28
Excessive laughter	9	0	14	55.71	--
Feelings of loneliness	3	54.00	11	56.18	.08
More irritable	7	55.43	7	56.00	.02
Ideas on death	6	54.50	8	56.63	.10
Ideas on life	9	53.00	5	60.60	.35

n = 14.

SD = 10.564.

.05 level of significance = .446

* = correlation with .05 level of significance.

-- = unable to correlate as all survivors related a "no" response.

A significant relationship at a .05 level was noted to exist between the psychological manifestation, being afraid or worried about the event, and the mean age of the survivors. The mean age for these survivors was 46.67 years and represented the youngest group of survivors among the psychological manifestations.

Another psychological manifestation, worried about another sudden death event, came close to approaching a significant relationship with the sudden death survivor's age. With a mean age of 49.60, this sample group was the second youngest group among the psychological manifestations.

The phi coefficient was used to establish further significant relationships at a .05 level between each physiological and psychological manifestation and the sex of the sudden death survivors. Table 6 shows the results of this statistical test.

This data did not indicate a .05 level of significance or $\underline{r} = 3.481$ for any of the relationships between the physiological manifestations and the sex of the sudden death survivors. Although there were no significant relationships, other information was present in the data. Male survivors had the highest percentage of

Table 6

Phi Coefficient Correlation of Physiological Manifestations to the Sudden Death Survivors' Sex

Physiological Manifestation	Female Yes Responses	Female No Responses	Male Yes Responses	Male No Responses	Phi Coefficent
Difficulty remembering recent events	33%	67%	64%	36%	.88
Difficulty remembering childhood events	0	100%	9%	91%	.29
Difficulty in concentration	67%	33%	45%	55%	.42
Chest pains	33%	67%	36%	64%	.01

n = 14.

.05 level of significance = 3.481.

* = correlates with a .05 level of significance.

difficulty with memory of recent and childhood events. Female survivors had the highest incidence of concentration problems during the post resuscitation period.

The phi coefficient was also applied to establish significant relationships at a .05 level between each psychological manifestation and the sex of the sudden death survivors. The results are presented in Table 7.

Hypothesis 1

Hypothesis 1 stated that there was no significant relationship between the subjective physiological manifestations and the age of the sudden death survivors. In testing this hypothesis linear regression was employed to determine a significant relationship.

The linear regression test showed a significant relationship between the physiological manifestations and the age of the sudden death survivors at a .05 level ($r = -.546$, $p = .04$). The regression equation is physiological manifestations = 4.81 - .6 x age. This equation reflects that the younger the sudden death survivor, the greater the occurrence of the physiological manifestations in the post resuscitation period.

Table 7

Phi Coefficient Correlation of Psychological Manifestations to Sex of the Sudden Death Survivors

Psychological Manifestation	Female Yes Responses	Female No Responses	Male Yes Responses	Male No Responses	Phi Coefficient
Afraid or worried about events	33%	67%	18%	82%	.32
Worried about another event	67%	33%	27%	73%	1.59
Violent death dreams	0	100%	0	100%	--
Unusual dreams	33%	67%	55%	45%	.42
Feeling like unique person	33%	67%	45%	55%	.14
Existence in a new time period	33%	67%	9%	91%	1.13
Difficulty sleeping	100%	0	36%	64%	3.82
Decreased sex	0	100%	45%	55%	2.12

Table 7 (Continued)

Psychological Manifestation	Female Yes Responses	Female No Responses	Male Yes Responses	Male No Responses	Phi Coefficient
Increased sex	33%	67%	0	100%	8.56
Change in routine activities	0	100%	55%	45%	2.86
Depression	33%	67%	45%	55%	.14
Crying frequently	33%	67%	27%	73%	.04
More nervous	33%	67%	27%	73%	.88
Excessive laughter	0	100%	0	100%	--
Feelings of loneliness	33%	67%	18%	82%	.32
More irritable	33%	67%	55%	45%	.42
Ideas on death	33%	67%	45%	55%	.14
Ideas on life	67%	33%	64%	36%	.01

n = 14; .05 level of significance = 3.481.

* = correlates with a .05 level of significance.

--Unable to correlate since all survivors related a no response.

Hypothesis 2

Hypothesis 2 stated that there was no significant relationship between the subjective psychological manifestations and the age of the sudden death survivors. This hypothesis was treated by utilizing the linear regression test.

The linear regression test did not show a significant relationship between the psychological manifestations and the age of the sudden death survivors (r = .271, p = .3). The null hypothesis, therefore, was accepted.

Hypothesis 3

Hypothesis 3 stated that there was no significant relationship between the subjective physiological manifestations and the sex of the sudden death survivors. This hypothesis was tested by the linear regression test.

The linear regression test did not reflect a significant relationship between the physiological manifestations and the sex of the sudden death survivors (r = -.07, p = .7). Therefore, the null hypothesis was accepted.

Hypothesis 4

Hypothesis 4 stated that there was no significant relationship between the subjective psychological

manifestations and the sex of the sudden death survivors. This hypothesis was tested by the linear regression test.

The linear regression test did not show a significant relationship between the psychological manifestations and the sex of the survivors (r = .023, p = .937). Since no significant relationship could be established, the null hypothesis was accepted.

Summary of Findings

Eleven men and 3 women composed the 14 sudden death survivor sample. The mean age for the sudden death survivor sample was 55.65 years of age. Having experienced the event in either a hospital or community setting, a cardiac problem was the primary etiology for the survivor.

Demographic data indicated that 36% of the subjects retired following the sudden death event, while 29% retired prior to the event. The remaining subjects were employed full-time or remained on sick leave after the sudden death event.

The study identified the existence of physiological and psychological manifestations in the sudden death survivors by use of a questionnaire. Physiological manifestations which included difficulty in remembering recent events and difficulty in concentration existed

in at least 50% of the sudden death survivor sample. Multiple psychological manifestations also existed in at least 50% of the sample, and included unusual dreams, difficulty in sleeping, being more nervous, being more irritable, and a change of ideas concerning life after the sudden death event.

Linear regression was used to test the four null hypotheses in the study. One significant relationship at a .05 level of significance was identified between the physiological manifestations and the mean age of the sudden death survivors. This study revealed that the younger sudden death survivors had the greatest prevalence of physiological manifestations during the post-resuscitation period. Since the data identified a significant relationship, the related null hypothesis was rejected. The remaining three null hypotheses were accepted since no significant relationships could be established between the psychological manifestations and the mean age of the survivors, and between the physiological and psychological manifestations and the sex of the sudden death survivors.

Further analysis of the relationships between each manifestation, physiological and psychological, and the

mean age of the survivors was achieved by using the point biserial test. This statistical test identified a significant relationship at a .05 level between the physiological manifestation, chest pain, and the survivor's mean age, and between the psychological manifestation, afraid or worried about the event, and the survivor's mean age, Both of these manifestations consistently occurred in the younger sudden death survivors.

The phi coefficient test was also used to test for the relationships between the manifestations, physiological and psychological, and the sex of the sudden death survivors. Two significant relationships at a .05 level were identified. These relationships included difficulty sleeping and increased sexual activity for the female sudden death survivors.

CHAPTER 5

SUMMARY OF STUDY

Chapter 5 presents a summary of the study and discussion of the findings. Conclusions and implications are based upon the findings and recommendations for further study are offered.

Summary

The problem of the study was to determine the existence of subjective physiological and psychological manifestations, and to determine if a relationship exists between the subjective physiological and psychological manifestations and the sex and age of the sudden death survivors. Selye's (1974) theory on stress provided the theoretical framework for the study.

Four null hypotheses were identified for this descriptive, correlational study. These null hypotheses stated:

1. There is no significant relationship between the subjective physiological manifestations and the age of the sudden death survivors.

2. There is no significant relationship between the subjective psychological manifestations and the age of the sudden death survivors.

3. There is no significant relationship between the subjective physiological manifestations and the sex of the sudden death survivors.

4. There is no significant relationship between the subjective psychological manifestations and the sex of the sudden death survivors.

Eleven men and three women who had experienced a sudden death event composed the sudden death survivor sample. These survivors were obtained by a convenience sampling method through referral from private physicians in two cities in the Southeastern section of the United States. After being initially contacted by telephone and then further informed of the study in their homes, all 14 survivors agreed to participate in the study. The survivors' homes were located in both urban and rural areas.

After informing the subject of human rights, study purpose, and anonymity in the study, a consent form was signed. The sudden death survivors completed a questionnaire without the presence of the researcher and returned

the questionnaire by mail. One hundred percent of the questionnaires were returned to the researcher.

A questionnaire based on a review of literature was developed to collect data on the sudden death survivor subjects. This data included the existence of subjective physiological and psychological manifestations, sex, age, and employment status of the subjects.

Three statistical tests were used to evaluate the collected data. The first test, linear regression, tested the four null hypotheses and determined the existence of one significant relationship at a .05 level between the physiological manifestations and the mean age of the subjects. Since this was the only significant relationship, the remaining three null hypotheses were accepted. The two remaining statistical tests, the point biserial and the phi coefficient, were used for further analysis of the data. The level of significance desired in these relationships was also .05. The point biserial identified a significant relationship between the physiological manifestation, chest pain, and the mean age of the survivors, and between the psychological manifestation, afraid or worried about the event, and the mean age of the survivors. The phi coefficient identified

two significant relationships for the female survivors. These relationships included difficulty in sleeping and increased sexual activity during the post-resuscitation period.

Discussion of Findings

The theoretical framework of Selye's (1974) stress theory states that adaptive energy is used to adjust to a stressor such as sudden death. During the post resuscitation period, the sudden death survivors used the adaptative energy and responded to the sudden death event with certain physiological manifestations. In this study these physiological manifestations consisted of cardiac and neurological manifestations.

Chest pains were present in 36% of the sudden death survivors. Since 80% to 90% of sudden death is related to coronary heart disease which encompasses chest pain (Myerberg, 1978) and the primary etiology in the sample was coronary heart disease, the incidence of chest pain in the study was low. In addition to chest pain, one survivor provided additional comments on the questionnaire concerning the presence of shortness of breath, dyspnea, and a decreased ability to perform work after the sudden death event. These manifestations were

consistent with heart failure for the sudden death survivor and concurred with the findings in an earlier research study by Minuck and Perkins (1970).

In the present study, the point biserial test identified a significant relationship between the physiological manifestation, chest pain, and the mean age of the survivors. This statistical test related an increased prevalence of chest pain in the younger sudden death survivors. Previous correlations and research on this relationship were not available for inclusion into the review of literature or findings of this study.

Despite the fact that cardiovascular diseases are the primary physiological etiology of sudden death, neurological manifestations such as difficulty with concentration (Druss & Kornfield, 1967) and recent memory problems (Druss & Kornfield, 1967; Hackett et al., 1968) were the prevalent physiological manifestations found in this study. Previous research (Druss & Kornfield, 1967; Falicki & Sep-Kowalik, 1969; Hackett et al., 1968), however, did not indicate the prevalence of recent memory problems in the post-resuscitation period. Difficulty in concentration, on the other hand, occurred in the same frequency, or in 50% of the subjects, as previously

reported in the literature (Druss & Kornfield, 1967). The situations or conditions during which this difficulty in concentration existed were not known or related on the questionnaire by the subjects in this study.

Linear regression was used to test the hypotheses. This test established one relationship at a .05 level of significance between the physiological manifestations and the mean age of the subjects. This current data relate that the physiological manifestations occur with an increased prevalence in younger sudden death survivors.

Lewin's theory (cited in Bigge, 1976) related that the sudden death survivor's perception of the sudden death event also produces unique psychological manifestations during the post-resuscitation period. Each of the psychological manifestations included in this study's questionnaire received at least affirmative response with the exception of two areas: violent dreams (Dobson et al., 1971; Druss & Kornfield, 1967; Hackett et al., 1968; Rodman, 1975) and excessive laughter (Falicki & Sep-Kowalik, 1969). The current data obtained in this study support the existence of psychological manifestations in the sudden death survivors as previously reported and provide information concerning the prevalence of the manifestations during the post-resuscitation period.

When asked if they were afraid or worried about the sudden death event, 21% of the sudden death survivors said "yes." Thirty-six percent of the survivors related that they were worried about a possible second sudden death event, while 57% of the survivors also related increased nervousness since the event. Anxiety had previously been identified as a prominent psychological manifestation in sudden death survivors by Druss and Kornfield (1967) and Dobson et al. (1971). The prevalence of anxiety, however, was not related in these previous studies. The point biserial identified a significant relationship between the psychological manifestatons, afraid or worried about the sudden death event, and the mean age of the sudden death related an increased prevalence of this manifestation in the younger sudden death survivors.

None of the sudden death survivors in the sample reported dreams of a violent death, while 50% of the survivors related unusual dreams in the post-resuscitation period. The survivors in the Druss and Kornfield (1967) study had previously reported dreams of violent death, but the study did not indicate the prevalence of unusual dreams during the post-resuscitation period.

Forty-three percent of the survivors in the study stated that they had felt unique since the sudden death event. Although this manifestation was mentioned in a previous study (Hudson, 1978), the prevalence was not included in the study.

Fourteen percent of the sudden death survivors related a sensation of existing in another decade or time period. None of the survivors provided additional information or comments on this area. Hudson (1978) had previously reported this manifestation in sudden death survivors, but without indication of prevalence during the post-resuscitation period.

In the present study difficulty in sleeping was present in 50% of the survivors. This current data represents a decrease from the previously reported 90% in the Druss and Kornfield (1967) study. While Hudson (1978) and Rodman (1975) have also previously mentioned that insomnia occurred during the post-resuscitation period, the prevalence of this manifestation was not included in their studies.

Previously, a decrease and complete cessation in sexual relationships was reported in 60% of the sudden death survivors by Druss and Kornfield (1967). While anxiety concerning a possible second sudden death event

was indicated as the rationale for the altered sexual activity (Druss & Kornfield, 1967), data from this study showed that only 36% of the subjects decreased sexual activity in the post-resuscitation period. The data also showed that 64% of the subjects were not worried about a second sudden death event.

The survivors in the study related a 43% incidence of depression, 29% incidence of lability or frequent crying, and a 50% incidence of being more irritable during the post-resuscitation period. None of the survivors described periods of excessive laughter after the event. Similar changes in emotions of sudden death survivors had been noted in other research studies by Falicki and Sep-Kowalik (1969). The prevalence of these changes was not revealed in the previous study and are, therefore, unavailable for comparison with the data from this study.

Feelings of loneliness were related by 21% of the sudden death survivors in this study. These feelings existed even though all survivors lived with families and had visits with family or friends after the sudden death event. Since the prevalence of this manifestation was not related in previous studies (Dlin et al., 1974; Dobson et al., 1971; Hackett, 1972), comparison with the data from this study is not possible.

Sixty-four percent of the sudden death survivors related a change in ideas concerning life, while 43% related a change in ideas on death. Although this data are consistent with the characteristics previously noted in the survivors of serious illness or disasters (Smith, 1979), prevalence of this manifestation was not noted in the research.

The change of routine activities without permission of the physician was revealed in this study. Forty-three percent of the survivors indicated that they had altered daily or routine activities. Information from previous research was not available on this manifestation, nor were the reasons for the noncompliance among the sudden death survivors of this study.

According to Selye (1974), age and sex are internal conditioning factors. The physiological and psychological manifestations to the stressor, sudden death, can be determined by these conditioning factors. A review of the literature for this study did not provide information relevant to the prevalence of the physiological of psychological manifestations in relation to the age or sex of the sudden death survivor.

Both physiological and psychological manifestations occurred consistently in survivors with mean ages of 46

to 55 years, or the younger sudden death survivors. The psychological manifestations, such as depression, crying frequently, and a feeling of existing in a new time period occurred predominantly in the older sudden death survivors or the survivors with mean ages of 55.7 to 64 years.

Physiological manifestations were reported in both the male and female sudden death survivors. Prevalent physiological manifestations in the male sudden death survivors included difficulty remembering recent events, difficulty remembering childhood events, and incidence of chest pain. Difficulty in concentration was the prevalent physiological manifestation for the female sudden death survivor.

Anxiety was previously reported as a prevalent psychological manifestation for the sudden death survivor (Druss & Kornfield, 1967). The psychological manifestations related by the female survivors suggested increased anxiety levels during the post-resuscitation period. These female survivors were afraid or worried about the first sudden death event and worried that another event would occur. Difficulty in sleeping, crying frequently, feelings of loneliness, and alterations

in ideas concerning life also reflected an increased anxiety level during the post-resuscitation period. The phi coefficient test evaluated data for significant relationships. This test noted a relationship at a .05 level of significance between the manifestation, difficulty in sleeping, and the female survivors.

The presence of anxiety was also reported as the rationale for decreased sexual activity during the post-resuscitation period (Druss & Kornfield, 1967). The female subjects in this study reported a 33% incidence of being worried about the event and a 67% incidence of being worried about another sudden death event. Both of these manifestations were more prevalent in the female survivors than the male survivors for this study. But while the female survivors reported more anxiety than the male survivors, they also related an increase in sexual activity in the post-resuscitation period. In this study, the phi coefficient test also established a .05 level of significance between the manifestation, increased sexual activity, and the female survivors.

The male survivors also reported an increase in the change of routine activities without physician permission. While this manifestation can be classified as

non-compliance, it corresponds with the current data on decreased anxiety or concern about the sudden death event or its recurrence.

While this study has provided current data on the sudden death survivor's post-resuscitation period, further research of this area will be needed. A study using demographically varied and larger samples could provide further patient care information on the sudden death survivor.

Conclusions and Implications

Three conclusions are drawn from the findings of the study. They are the following:

1. The sudden death survivor sample size was too small for significant conclusions to be obtained from the data.

2. Physiological and psychological manifestations occur predominantly in the younger sudden death survivors.

3. The study did not have enough female survivors and significant conclusion cannot be made regarding these subjects.

The study also suggested various implications. The following is a list of the nursing implications.

1. Nurses need to be aware that definite physiological and psychological manifestations occur secondary to the sudden death event.

2. Nurses need to be aware that the sudden death survivor's age and sex may determine the patient care problems.

3. Knowledge of the post-resuscitation period and manifestations can be used in planning cardiac rehabilitation programs for sudden death survivors and family.

Recommendations for Further Study

Based upon the conclusions of this study, the following recommendations are offered:

1. A similar study be conducted utilizing a larger sample.

2. A similar study be conducted using equal number of male and female sudden death survivors.

3. A study be conducted comparing the physiological and psychological manifestations of the post-myocardial infarction and non-infraction sudden death survivors.

4. A study be conducted to test the validity and reliability of the questionnaire.

APPENDIX A

TEXAS WOMAN'S UNIVERSITY

Human Research Committee

Name of Investigator: Norma Richards Center: Dallas

Address: 844 St. Mary Boulevard, Biloxi, Mississippi 39531 Date: 9/7/79

Dear Ms. Richards:

Your study entitled Physiological and Psychological Manifestations of the Sudden Death Survivor. has been reviewed by a committee of the Human Research Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education and Welfare regulations require that written consents must be obtained from all human subjects in your studies. These forms must be kept on file by you.

Furthermore, should your project change, another review by the Committee is required, according to DHEW regulations.

Sincerely,

Estelle D. Kurtz

Chairman, Human Research
Review Committee

at_____.

APPENDIX B

PHYSICIAN CONSENT FORM

I hereby grant Norma Jane Richards, R.N. permission to gather data relevant to patients/clients who are sudden death survivors under my care. The names of the patients/clients have been supplied to the researcher.

I understand the purposes of the research study entitled "Identification of Physiological and Psychological Manifestations in the Sudden Death Survivor" and recognize that safeguards are being taken to protect the rights and well-being of the patient/client.

Physician NIEVAS

2/13/80

Date

PHYSICIAN CONSENT FORM

I hereby grant Norma Jane Richards, R.N. permission to gather data relevant to patients/clients who are sudden death survivors under my care. The names of the patients/clients have been supplied to the researcher.

I understand the purposes of the research study entitled "Identification of Physiological and Psychological Manifestations in the Sudden Death Survivor" and recognize that safeguards are being taken to protect the rights and well-being of the patient/client.

Edward H Craig

Physician

Date

APPENDIX C

Consent Form
TEXAS WOMAN'S UNIVERSITY
HUMAN SUBJECTS REVIEW COMMITTEE

(Form B)

Title of Project: Physiological and Psychological Manifestations in the Sudden Death Survivor

Consent to Act as a Subject for Research and Investigation:

I have received an oral description of this study, including a fair explanation of the procedures and their purpose, any associated discomforts or risks, and a description of the possible benefits. An offer has been made to me to answer all questions about the study. I understand that my name will not be used in any release of the data and that I am free to withdraw at any time. I further understand that no medical service or compensation is provided to subjects by the university as a result of injury from participation in research.

Signature _____ Date _____

Witness _____ Date _____

Certification by Person Explaining the Study:

This is to certify that I have fully informed and explained to the above named person a description of the listed elements of informed consent.

Signature _____ Date _____

Position _____

Witness _____ Date _____

One copy of this form, signed and witnessed, must be given to each subject. A second copy must be retained by the investigator for filing with the Chairman of the Human Subjects Review Committee.

APPENDIX D

Manifestation Categories

Physiological Manifestations	Psychological Manifestations
Recent memory	Worried about arrest
Memory of childhood events	Worried about another arrest
Concentration	Dreams of violent death
Chest pain	Odd or unusual dreams
	Felt unique or different
	Existence in new decade
	Difficulty sleeping
	Decreased sex
	Increased sex
	Changed daily activities
	Depression
	Crying frequently
	More nervous
	Excessive laughter
	Feelings of loneliness
	More irritable
	Changed ideas on death
	Changed ideas on life

APPENDIX E

Questionnaire

Physiological and Psychological Manifestations of the Sudden Death Patient

Please indicate the following information:

Age: _____

Sex: ____

Current employment: (Circle answer)

Full-time
Part-time
Retired since the arrest
Retired prior to arrest
Changed jobs since arrest

The following questions concern only the period of time since your arrest. Please circle the correct answer for each question.

Your information is confidential and no names or other identifying information will be used in any written report.

After answering the questionnaire, please return in the enclosed, stamped envelope by _____.

Thank you,

Norma Jane Richards, R.N.

---

1. Since the arrest have you been afraid or worried about the arrest? yes no

2. Since the arrest have you been worried about the possibility of having another arrest? yes no

3. Since the arrest have you had any dreams of a violent death? yes no

4. Since the arrest have you had any odd or unusual dreams? yes no

5. Since the arrest have you felt like a unique or different person? yes no

6. Since the arrest have you had the feeling that a long period of time had passed during the arrest, and you were now living in a new decade or year? yes no

7. Since the arrest have you had any difficulty sleeping at night? yes no

8. Since the arrest have you had any trouble remembering recent events? yes no

9. Since the arrest have you had any trouble remembering events from your childhood? yes no

10. Since the arrest have you had any difficulty in concentrating? yes no

11. Since the arrest have you had increased pains in your chest? yes no

12. Since the arrest have you had any decrease in your sex life or relationships? yes no

13. Since the arrest have you had any increase in your sex life relationships? yes no

14. Since the arrest have you changed daily or routine activities without asking your doctor? yes no

15. Since the arrest have you noticed any changed in your emotions, such as:

--periods of depression yes no
--crying frequently yes no
--more nervous yes no

--excessive laughter	yes	no
--feelings of loneliness	yes	no
--more irritable	yes	no

16. Since the arrest have you changed your ideas on death? yes no

17. Since the arrest have you changed your ideas on life? yes no

---

Please write other areas present since the arrest that were not covered by the questionnaire.

Would you recommend any changes in the questionnaire:
_____ Yes _____ No

If yes, please indicate any suggestions or recommendations in this questionnaire you feel would increase the gathering of information? Thank you.

Thank you for answering the questionnaire. All information is confidential and will be evaluated for the purpose of improving patient care. Please return this questionnaire in the enclosed self-addressed, stamped envelope by _____.

APPENDIX F

Questionnaire

Physiological and Psychological Manifestations of the Sudden Death Patient

Please indicate the following information:

Age:_____

Sex: ____

Current employment: (Circle answer)

Full-time
Part-time
Retired since the arrest
Retired prior to arrest
Changed jobs since arrest

The following questions concern only the period of time since your arrest. Please circle the correct answer for each question.

Your information is confidential and no names or other identifying information will be used in any written report.

After answering the questionnaire, please return in the enclosed, stamped envelope by _____.

Thank you,

Norma Jane Richards, R.N.

---

1. Since the arrest have you been afraid or worried about the arrest? yes no

2. Since the arrest have you been worried about the possibility of having another arrest? yes no

3. Since the arrest have you had any dreams of a violent death? yes no

4. Since the arrest have you had any odd or unusual dreams? yes no

5. Since the arrest have you felt like a unique or different person? yes no

6. Since the arrest have you had the feeling that a long period of time had passed during the arrest, and you were now living in a new decade or year? yes no

7. Since the arrest have you had any difficulty sleeping at night? yes no

8. Since the arrest have you had any trouble remembering recent events? yes no

9. Since the arrest have you had any trouble remembering events from your childhood? yes no

10. Since the arrest have you had any difficulty in concentrating? yes no

11. Since the arrest have you had increased pains in your chest? yes no

12. Since the arrest have you had any decrease in your sex life or relationships? yes no

13. Since the arrest have you had any increase in your sex life relationships? yes no

14. Since the arrest have you changed daily or routine activities without asking your doctor? yes no

15. Since the arrest have you noticed any changed in your emotions, such as:

--periods of depression yes no
--crying frequently yes no
--more nervous yes no

--excessive laughter	yes	no
--feelings of loneliness	yes	no
--more irritable	yes	no

16. Since the arrest have you changed your ideas on death? yes no

17. Since the arrest have you changed your ideas on life? yes no

---

Please write other areas present since the arrest that were not covered by the questionnaire.

Thank you for answering the questionnaire. All information is confidential and will be evaluated for the purpose of improving patient care. Please return this questionnaire in the enclosed self-addressed, stamped envelope by _____.

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