5-1970

Some Physiological Effects of the Bed Bath on the Cardiovascular System of Acute Myocardial Infarction Patients

Arleen Canfield

LOMA LINDA UNIVERSITY

Graduate School

SOME PHYSIOLOGICAL EFFECTS OF THE BED BATH ON THE CARDIOVASCULAR SYSTEM OF ACUTE MYOCARDIAL INFARCTION PATIENTS

by

Arleen Canfield

A Thesis in Partial Fulfillment

of the Requirements for the Degree

Master of Science in the Field of Nursing

May 1970

I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Lucile Lewis, Chairman
Lucile Lewis, Associate
Professor of Nursing

Raymond B. Crawford, M.D.
Raymond B. Crawford, M.D.,
Associate Professor of Medicine

Dorothy Martin
Dorothy Martin, Professor of
Nursing

ACKNOWLEDGMENTS

It is with deep appreciation that I extend special thanks to Miss Lucile Lewis, major advisor, for her unfailing guidance and encouragement. Sincere appreciation is also given to Dr. Raymond B. Crawford and Miss Dorothy Martin for their help rendered as members of the thesis committee.

Appreciation is given to Mrs. Rosalie Mitchell, R.N., Director of Nursing Service, for her assistance in procuring Redlands Community Hospital facilities for use in the research study.

Thanks is also rendered to all the staff nurses working in the coronary care units at both Loma Linda University Hospital and Redlands Community Hospital for their assistance and thoughtfulness.

The opportunity for advanced study, of which this is a part, was made possible by financial assistance from a traineeship grant from the Department of Health, Education, and Welfare of the United States. I am sincerely grateful for this assistance.

Arleen Canfield

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER I

INTRODUCTION

I. THE PURPOSE

The emphasis in nursing research in the past has been in demonstrating what the nurse does, but little information has been obtained describing the effect of nursing practice upon the patients' progress (34:21). The general purpose of this study was to conduct research in the clinical setting to determine the effect of one nursing procedure upon a selected sample of patients.

II. THE PROBLEM

There is apparent discrepancy in current practice as to the advisability of giving bed baths to patients diagnosed as having acute myocardial infarction. At Loma Linda University Hospital, a "Protocol for the Coronary Care Unit" (Appendix A) is in effect that specifies the kinds and amounts of activity that myocardial infarction patients may have. Six activity levels are described and numbered from 0 to 5; each successive level permitting more activity. On levels 0 and 1, the patient receives no bath whatsoever, and on level 2, a partial bed bath is first permitted. It is not until the patient has reached level 3 that he receives a complete bed bath. The protocol specifies that patients may advance to the next higher level every 24 hours, unless there is contraindication due to the patient's condition. Thus, a

patient may go for a minimum of three days without receiving a bed bath.

Los Angeles County General Hospital also has a protocol for patient care that is used in the coronary care unit. This protocol also has levels 0 to 5. Level 1 specifies that no bath is to be given. On level 3, the patient receives a partial bath given by the nurse. The patient assists the nurse with the partial bath on level 4. Finally, on level 5, the patient bathes himself (51:2314).

However, in other institutions, the myocardial infarction patients often receive bed baths on their initial day at the hospital.

The specific problem studied in this research may be summarized as follows: As the result of receiving a bed bath, what physiological effects will occur in the cardiovascular system of patients with acute myocardial infarction?

III. THE THEORETICAL FRAMEWORK

Bed Baths for Patients with Acute Myocardial Infarction

A search of the literature revealed that there have apparently been no previous studies to determine the physiological effects of a bed bath on the cardiovascular system.

Recommendations for giving bed baths. Harrison stated that excessive sweating is the rule at the onset of an acute myocardial infarction, and that it often persists for several days, causing itching, especially of the back. For this reason, he suggested that a bed bath followed by massage and daily changes of linen are often especially effective in promoting morale, muscular relaxation, and sleep (15:292).

Nite and Willis indicated that nurses place a great deal of importance on cleanliness, and especially on the daily bath. They

stated that the bath even seems to take precedence over all other activities. It was recommended that the patient's condition should dictate nursing actions rather than tradition. Therefore, in their study of nursing care for acute myocardial infarction patients, the daily bath was considered to be unnecessary and rest more important if specific conditions existed. These conditions included the following: if the patient was considered to be seriously ill by the physician or laboratory reports; or if physiological symptoms such as cardiac pain, excessive perspiration, shortness of breath, low blood pressure, irregular or deficient pulse rate, or fatigue on slight exertion were in evidence (25:169-170).

The authors of basic nursing textbooks gave different recommendations as follows:

1) Andreoli stated that the damaged heart must have no additional strain, and that the patient is initially bathed and assisted in all aspects of his care (3:93).

2) A partial bath was said to suffice for several days if special attention was given to the back and bony prominences (31:244).

3) In reference to the myocardial infarction patient, Smith and Gips stated that sometimes the patient is permitted to do nothing for himself, and that he is bathed, fed, and shaved (32:735).

4) A bath was recommended as a means to early use of passive motion to prevent joint symptoms (24:68).

5) In reference to the care of a patient with myocardial infarction on strict bed rest, the nurse was instructed that the patient should be washed, turned, and fed (5:639).

6) Meltzer left the decision to give or not to give the bath up to the nurse's own discretion, but gave no suggestions as to what criterion the nurse could use to make such a decision (23:86).

7) One author failed to make any suggestions concerning the bath, stating only that continuous bed rest is required initially (9:524).

Value of the bed bath. Bathing is now condoned for purposes besides mere cleanliness. Relaxation and relief of fatigue are frequently listed as important secondary benefits (22:137, 12:190, 14, 331).

It is generally agreed that bathing has a stimulating effect on circulation (14:327, 22:145). Fuerst and Wolff stated that friction applied to the skin will affect the peripheral nerve endings and the peripheral circulation. In addition, they advocated that firm movements used in stroking the various areas, will stimulate muscles and thereby aid in circulation (12:190).

Diaphoresis commonly occurs during the onset of a myocardial infarction (15:292). Soon after the onset of the pain, the patient perspires profusely, the skin becomes pallid, cool, and moist, and there is a moderate drop in blood pressure (16:835). Secretions from the sweat glands are controlled by the sympathetic division of the autonomic nervous system (13:824). In myocardial infarction, the diaphoresis is apparently related to the fall in blood pressure and the experience of pain.

Secretions of the skin, although physiologically clean, contain waste products such as leucine and tryosine that, on decomposition by bacterial action, have ammoniacal and fetid odors distasteful to people (14:327). In addition, bed patients suffer the necessity of living in garments and between sheets, that as the day goes on, get increasingly

permeated with body secretions. Harmer and Henderson stated that very sick persons should, in most cases, have at least one complete bath daily (14:330).

Giving a bath in bed has been attributed to saving the energy of an ill person (22:145). Other benefits attributed to bathing are: increasing the rate and depth of respirations, thus preventing congestion of lung tissue (12:191); exercising the musculoskeletal system (12:190); and preventing pressure sores (22:145). In addition, the daily bath allows the nurse time to make observations useful in planning interventive nursing care (19:85).

Not to be minimized are the psychological benefits to the patient derived from receiving a bed bath. Cleanliness has been associated with self-respect (14:329). Also, the time alloted for the bath can be well utilized to build meaningful nurse-patient interactions.

One disadvantage to routine bed-bathing of patients hospitalized for long periods of time is that it leads to dry skin and to varying degrees of primary irritation dermatitis. This is especially true in the older age group (45:106).

Trends Toward Aggressive Management of Patients with Myocardial Infarction

The present trend in care of patients with coronary disease is a liberalization of the rigid restrictions of activities previously practiced (61:1369). Prolonged bed rest has for decades been regarded as the cornerstone of treatment for myocardial infarction (38:268). Inasmuch as the heart cannot be placed at complete rest, it is generally thought that the maximum rest that can be given the heart is through

placing the patient on strict bed rest and limiting his activities (59:406). In addition, it should be kept in mind that the activities of digestion and elimination must continue, and that the patient will move in bed to eat and drink or from discomfort, boredom, or anxiety (58:78). Irvin and Burgess concluded in one study that there is no statistical evidence that bed rest or remarkedly restricted activity over a prolonged period, advantageously affects either the course or the later sequelae of myocardial infarction (52:486).

Advocates of strict bed rest have listed the following advantages: avoidance of cerebral anoxia during shock, prevention of rupture of the myocardium, and decreased basal metabolism which results in slowing the heart and decreasing the heart's work (52:486). On the other hand, advocates of early ambulation list these advantages: reduced risk of thrombosis of the leg veins leading to possible pulmonary emboli, prevention of hypostatic pneumonia, and more rapid physical and psychological recovery of the patient (39:234).

In a study conducted in Glasgow, 105 male patients diagnosed as having myocardial infarction were divided into two comparable groups to study the effect of early mobilization. One group was treated in a conservative manner and the other group was treated in a more aggressive manner (49:435). The nursing management for the first week of hospitalization in the conservative group included: total bed rest, one pillow, fed and washed by the nurse for three days. However, in the aggressive group, the following was included: assumes comfortable position in bed, feeds and washes himself, bed pan or commode. In other words, the patients in the aggresive group were not only receiving some type of bath, but they did it themselves. It was in the second week that the

conservative group was first allowed to wash themselves (49:436). The researchers stated that it was not unreasonable to conclude from their observations that more rapid mobilization of the coronary patient did not adversely affect the mortality rate in the early stages after the infarction (49:438). In addition, the investigators indicated that they felt greater freedom and early ambulation, while it did not appear to result in positive advantages to the patient, the measures were not harmful (49:439).

There has been recent suspicion that tolerated activity is a further stimulus to the development of adequate collateral circulation to the myocardium (53:339). Eckstein stated that exercise may favorably affect the course of coronary artery disease by several ways. It may actually delay the progression of the disease, or it may stimulate the growth of coronary collateral vessels during the disease, or both (47:230). In support of this concept, Irvin and Burgess stated that increasing activity during part of the healing phase would tend to produce collateral circulation more adequate for function (52:487). Kinlein indicated that there is an advantage to a small amount of exercise because it causes hypoxemia to the myocardium. This stimulates the development of collateral circulation which is helpful in containing and preventing a spread of the area of infarction (55:C-12).

The Valsalva Maneuver

The Valsalva Maneuver has been defined as forced expiration against a closed glottis (30:3). The Valsalva Maneuver can cause syncope due to abrupt increase in intrathoracic pressure with inhibition of venous flow, and can occur during coughing or straining at the stool

(15:412). It can also occur during lifting and turning (6:194). The Valsalva Maneuver causes fluctuations in venous return and therefore causes fluctuations in cardiac output. This causes a tachycardia if the period of raised intrathoracic pressure is longer than five seconds, and a bradycardia after releasing the pressure (8:44).

The Diving Reflex

Bradycardia occurring during apneic immersion of the face in water is known as the diving reflex (74:800). It has been demonstrated that the colder the water stimulus, the greater will be the pacemaker depression in the heart. In addition, a wet cloth applied to the face during apnea will slow the heart and depress normal pacemakers (74:805). An example was given whereby a patient, while washing his face in cold water, suddenly collapsed and became unconscious (74:804).

Significance of Theoretical Framework

The restricted activities allowed patients with cardiac disease while hospitalized have been studied only to a limited extent (58:75). With the trend toward more aggressive management of myocardial infarction patients, it may be that bed baths given by the nurse may actually contribute, in a positive manner, to the patient's welfare. Exercise during the acute stage may prevent deterioration of joint function, and improve circulation, appetite, sleep, elimination, and mental attitude (56:1575). And it may be that the bed bath would provide the needed exercise to produce such results. However, the purpose of this study was to show whether bed baths are harmful to patients with acute myocardial infarction.

IV. NULL HYPOTHESIS

The null hypothesis for this study was that bed baths given to acute myocardial infarction patients will have no significant effect on the physiology of the cardiovascular system.

The null hypothesis for this study contained the following subdivisions:

1) A patient experiencing premature ventricular contractions (PVC's) will not have more in number during the bed bath.

2) There will be no measurable difference in the electrocardiogram pattern during the bed bath.

3) Respirations and heart rate will not change by more than ten per cent during the bed bath.

4) The stability of the blood pressure will not change by more than ten per cent during the bed bath.

5) No serious complications will result from the bed bath.

CHAPTER II

METHODOLOGY

I. THE PROCEDURE

Clinical Approach

Bed baths were given to patients diagnosed as having acute myocardial infarction on the first three consecutive days of their hospitalization by the nurse researcher. All of the patients were in intensive care units. During the bathing procedure, the patients were connected to the cardiac monitor at the bedside by means of chest electrodes placed so as to monitor Lead II. The bedside monitors were wired to a central receiving monitor at the nurses' station, which permitted other nursing personnel to view the patients' rhythm pattern during the bathing procedure. In addition, the bedside monitor permitted the investigator to make continuous visualization of the heart pattern on an oscilloscope. While the bedside monitor had an ECG strip read out, it was determined that the roll of paper lasted for only a period of 15 minutes. Therefore, a standard ECG machine which used ECG paper rolls that last for over 30 minutes, was attached to the bedside monitor by a cable. Thus, it was possible to obtain a continuous ECG strip during the duration of the bathing process which took approximately 25 minutes. The ECG paper was marked as it ran through the machine to indicate the specific activity occurring during the bathing procedure. Blood pressure and rate of respiration were obtained before the bath,

after the abdomen was washed, at the conclusion of the bath, and again, 15 minutes later.

Data Collection Sheets (Appendix C) were kept on each patient which included the following information: name; admission date and hour; hospital number; age; physician; type of infarction; number of previous infarctions; peak levels of the enzymes SGOT, LDH, and CPK; blood pressure; respiration rate; signs and symptoms; and any medications being given. In addition anecdotal notes were kept that might contribute to clinical significance.

Modifications in Bed Bath Procedure

The method of giving the bed bath was that which is recommended in the Loma Linda University Hospital nursing techniques manual (Appendix B). No attempt was made to regulate the exact temperature of the water, but it was warm to the touch. Also, the temperature was not controlled during the bathing procedure since it tended to cool as time lapsed. However, certain adaptations in the bathing procedure were initiated and are discussed as follows:

1) Passive participation. Kottke, et al., suggested that transient periods of high cardiac demand as the patient moves in bed, reaches to the bedside table, or sits up alone, may overtax the myocardium and result in further damage or death (58:81). Kottke also stated that he has found consistently that the energy requirement for sitting up in bed without assistance has the highest energy demand of any acute hospital activity. In addition, he found that elevation of any part of the body requires energy which should be provided by the assistant (57:131-132). Therefore, the nurse researcher did not permit the

patients receiving bed baths to initiate movement, but rather to participate passively. When necessary, additional nursing personnel were asked to assist in such activities as turning the patients.

2) Support of the extremities. Kottke states that reaching to and lifting from the bedside stand is a high-energy activity, and that elevation and support of the extremities is harder work than merely standing or sitting (56:132). There has been recent interest in the effect of isometric exercise on the heart. There is apparently increased cardiac output resulting in increased blood pressure associated with isometric work (43:175). An example of a practical consideration is the patient with coronary insufficiency in whom angina pectoris is precipitated by working with arms extended or elevated (43:175). Thus, the nurse lifted and supported the patients' extremities during the bathing procedure to minimize the cardiac work load.

3) Prevention of diving reflex. To prevent the diving reflex, only very warm water was used when washing the face of patients included in this study. In addition, the nurse researcher dried the face immediately to prevent cooling.

4) Prevention of Valsalva Maneuver. To prevent the Valsalva Maneuver, patients included in this study were instructed to breathe through their mouths when they were turned or moved about in the bed.

5) Protective positioning. The patients were kept between Fowlers and semi-Fowlers position during the bathing procedure. It appears that the orthopneic position is the position of minimal cardiac work as well as the position of greater ease of respiration (58:80). Recumbency permits maximal peripheral venous return, thereby increasing blood volume, venous pressure, and diastolic filling of the heart.

These lead to an increase in the volume of work of the heart (53:338). As soon as the legs are elevated, there is a sudden rise in the volume of the venous return which produces a rapid enlargement of the heart (8:35). The work done by the heart in the recumbent position is 30 per cent greater than that done when sitting (8:37).

II. THE SAMPLE

Facilities Used

A convenient sample of patients was selected from Loma Linda University Hospital and from Redlands Community Hospital.

Selection of Patients

The patients selected for the study met the following criteria:

1) Confirmed diagnosis of acute myocardial infarction. The patients had to have elevations above normal for the following enzymes: serum glutamic oxalacetic transaminase (SGOT) over 40 units/ml.; lactic dehyrogenase (LDH) over 165 units/ml.; and creatine phosphokinase (CPK). The normal range for CPK varied according to the method of the test used. In each case, the normal for the test at the time it was done is indicated. Typical changes in the ECG were considered: S-T segment elevation, T wave inversion, and development of Q waves (65:496, 3:44). In addition, the investigator obtained confirmation of the diagnosis from the attending physician.

2) No complications. Patients with the following complications were excluded from the study: congestive heart failure, cardiogenic shock, persistent and unrelieved chest pain, severe dyspnea, over six premature ventricular contractions (PVC's) per minute, and need for continuous vasopressors.

3) Patients must be on the cardiac monitor.

4) Permission obtained from the physician. Written permission from the Research Advisory Committee on Human Experimentation, Director of Nursing Service, and the Cardiology Committee was obtained before conducting the study at Loma Linda University Hospital. At Redlands Community Hospital, permission was obtained from the Director of Nurses and the Chief of Staff. In addition, the patients' personal physicians were consulted before giving the baths.

5) Age and Sex. No limitations were imposed on the selection of patients because of age or sex.

III. SELECTION OF CRITERION MEASURES

Criterion measures related to the patient's physiological needs are overt measures that are discernible (34:21). Criterion measures selected for this study were those that are readily accessible to the nurse in the clinical situation and which would be appropriate to use in evaluating the effects of procedures, such as the bed bath, on patients' physiological status.

Electrocardiogram

Electrocardiographic monitoring of the patient's response to activity is the most reliable method for early detection of coronary insufficiency (42:115). Cain, et al., felt that electrocardiographic monitoring of early activity is a more reliable means of ascertaining the presence of coronary insufficiency than are physical signs and symptoms (42:111).

1) Arrhythmias. The essential feature of arrhythmias after acute myocardial infarction is their rapidly changing nature (68:475). Approximately 90 per cent of patients with myocardial infarction exhibit rhythm disorders during the initial 72 hours of hospitalization (65:494). About 40 per cent of the deaths following heart attacks are the result of arrhythmias (37:144). Arrhythmias and premature beats are believed to arise from anoxic or injured myocardium, and any procedure that could increase the degree of anoxia might produce an arrhythmia (52:487).

2) Premature ventricular contractions. Some 80 per cent of myocardial infarction patients develop premature ventricular contractions (65:499). Premature ventricular contractions are considered serious, if over six per minute, because they may predispose to ventricular tachycardia and ventricular fibrillation (3:66, 36:115). It is known that, following activity, bigeminy or multifocal premature ventricular contractions can occur (42:113), indicating even further myocardial irritability.

3) Heart rate. At the transition from rest to work, the pulse frequently begins to increase very rapidly. After the first rapid increase, the pulse rate continues to rise but at a more gradual rate until the steady state level is reached (35:783-784). Kornblueh and Michels suggested that an increase in pulse rate of ten beats or more per minute is an indication of poor tolerance for exercise (56:1577). This same amount of increase, if maintained after three minutes past the completion of the activity, was considered poor (69:557). An increase by 20 beats per minute, with or without irregularity of rhythm after activity, was considered the most reliable physical sign of possible underlying coronary insufficiency (42:113).

4) S-T segment. In one study, an S-T segment shift in the ECG of 1.0 mm. or more was considered to indicate the presence of coronary insufficiency (41:179). In another study, persons were designated as having positive S-T changes, if the S-T segment depression was 1 mm. or more, and borderline if they demonstrated S-T segment depression of 0.5 to 0.9 mm. (62:452). The common causes of S-T segment depression include: ischemia, pronounced hypertrophy, tachycardia, and digitalis therapy (15:282). S-T depressions in patients with myocardial infarction are likely to be due to ischemia of noninfarcted regions according to Harrison (15:282). Most commonly, however, the S-T segment is elevated in myocardial infarction (15:281).

The duration of the S-T segment represents the duration of the depolarized state, and length varies inversely with the cardiac rate (10:108). Usually the length is difficult, if not impossible, to measure as it merges with the T wave (10:108).

Blood Pressure

Myocardial infarction often leads to a fall in blood pressure. The blood pressure drop occurs in approximately 80 per cent of the patients (70:485). This may be associated with a fall in cardiac output without a change in total peripheral resistance or is associated with a fall in total peripheral resistance without change in cardiac output (70:485). In one study, blood pressure was measured before and after activity. However, it was felt that this procedure did not seem to contribute additional valuable information and was later discontinued (42:112). It has been noted though, that the systolic blood pressure response to maximal exercise was higher in patients with positive S-T segment changes (62:454).

Respiration Rate

Exercise increases the rate of respirations, and even passive movements of the limbs often increases pulmonary ventilation several fold (13:599).

Limitations

One limitation was the lack of instrumentation to monitor cardiac output during the bathing procedure. Another limitation was that no attempt was made to evaluate the effect of the nurse-patient interpersonal reaction on the cardiovascular system.

CHAPTER III

ANALYSIS AND INTERPRETATION OF DATA

I. DIFFICULTIES IN OBTAINING DATA

A total of eight baths were given to five different patients. An additional eight bed baths were given to patients on their first day of hospitalization diagnosed as "Rule out myocardial infarction." However, these patients did not show the usual ECG and enzyme changes associated with infarction, but rather appeared to have varying degrees of ischemia. Since these patients were never confirmed as having myocardial infarction, they were not included in the study.

In addition, between 60 and 70 per cent of the patients diagnosed as having acute myocardial infarction were not included in the study due to complications. The complications included: congestive heart failure, serious arrhythmias, prolonged dependency on a vasopressor, severe and uncontrolled chest pain, and cardiogenic shock. Killip and Kimball in a study of 250 patients diagnosed as having myocardial infarction found that approximately a third of the patients had no evidence of heart failure, a third had mild to moderate heart failure, and the remainder had either pulmonary edema or shock (54:459). In another study, it was found that 60 per cent of patients with acute infarction had signs of overt left heart failure (26:21). Furthermore, Mounsey stated that serious arrhythmias occur in roughly 60 per cent of the myocardial infarction patients (68:475). The high incidence of complications in acute infarction patients, directly contributed to the small sample size in this study.

Data were collected between October 1, 1969 and April 15, 1970. However, between October and December, only one patient was admitted to Loma Linda University Hospital with a confirmed diagnosis of myocardial infarction, and complications developed. Therefore, to facilitate data collection, patients in Redlands Community Hospital were included in the study, beginning in January.

II. CLINICAL SIGNIFICANCE OF DATA

No attempt was made to determine the statistical significance of the data collected in this study because of the small sample size. However, the data were analyzed for clinical significance using the case study method.

Presentation of Case Studies

1) Mr. S.B. Mr. S.B., age 82, was admitted to Redlands Community Hospital on January 31, 1970 with a posterior and inferior acute myocardial infarction. The enzyme SGOT reached a peak of 270 Units/ml. The CPK and LDH enzymes were not done. A bath was not given to Mr. S.B. on the first day of admission due to severe chest pain and concern that he might go into cardiogenic shock.

A bath was given to Mr. S.B. on the second day after admission. The blood pressure taken before the bath was 120/77, and remained at 120/70 for the subsequent recordings. The systolic pressure remained stable, but the diastolic lowered by 9.48 per cent. The respirations were stable at 22/minute. The heart rate fluctuated by 6.55 per cent from the baseline of 90/minute. The ECG pattern indicated the following: normal sinus rhythm; no premature ventricular contractions; S-T segment

elevated by 2.5 mm. for a duration of approximately .10 seconds. It was difficult to measure the S-T segment as it was continuous with the T wave (Appendix D). During the bath, Mr. S.B. was quite talkative and interested in the actual research project. He had been mildly diaphoretic prior to the bath, and appeared more comfortable at its completion.

A second bed bath was given to Mr. S.B. on the third day of hospitalization. The initial blood pressure was 118/70, but was maintained at 120/70 during the rest of the bath. The systolic pressure elevated by 1.69 per cent, and the diastolic did not change. The respirations fluctuated by 10 per cent from the baseline of 20/minute. The heart rate varied by 6.66 per cent from the baseline recording of 90/minute. The ECG indicated the following: normal sinus rhythm; no premature ventricular contractions; S-T segment elevated by 2.5 mm. for approximately .12 seconds (Appendix D). Mr. S.B. remained relatively quiet during the bath and apparently fell asleep afterwards.

2) Mr. L.F. Mr. L.F., age 57, was admitted to Loma Linda University Hospital on March 2, 1970, with the diagnosis of acute anterior myocardial infarction. He showed the following peak enzyme levels: CPK of 385 Units/ml. (Normal: 5-50 Units/ml.); LDH of 444 Units/ml.; and SGOT of 330 Units/ml. Bed baths were not given on the first and second days after admission due to persistent and unrelieved chest pain.

A bed bath was given on the third day after hospitalization. The initial blood pressure was 106/70, but changed to 102/70 for the remainder of the bath. Thus, the systolic pressure lowered by 3.77 per cent, and the diastolic was unchanged. The respirations increased by 11.11 per cent

from the baseline of 18/minute. The heart rate fluctuated by 14.28 per cent from the original recording of 84/minute. The ECG showed the following: normal sinus rhythm with an inverted T wave; no premature ventricular contractions; S-T segment depressed by 1 mm. for a duration of .16 seconds (Appendix E). Mr. L.F. had never been hospitalized before and utilized the bath time to express his fears of the coronary care unit to the nurse.

3) Mrs. R.W. On February 5, 1970, Mrs. R.W., age 71, was admitted to Loma Linda University Hospital. She was diagnosed as having an acute anteroseptal myocardial infarction. She had the following peak enzyme levels: CPK of 108 Units/ml. (Normal: 0-12 Units/ml.); LDH of 425 Units/ml.; and SGOT of 253 Units/ml.

A bed bath was given to Mrs. R.W. on her first day of hospitalization. The blood pressure varied from the original recording of 120/78; the systolic changed by 3.22 per cent and diastolic by 2.43 per cent. The respirations stayed stable at 20/minute. The heart rate fluctuated by 7.54 per cent from the baseline of 106/minute. The ECG indicated the following: sinus tachycardia; no premature ventricular contractions; S-T segment isolectric for a duration of .12 seconds. One premature ventricular contraction (PVC) did occur when the abdomen was bathed (Appendix F). She was also receiving xylocaine for the control of PVC's. During the bath she was lethargic, but cooperative.

Another bed bath was given to Mrs. R.W. on her second day of hospitalization. The initial blood pressure was 94/68. The systolic pressure fluctuated by 17.02 per cent and the diastolic pressure by 2.94 per cent. Respirations varied by 8.33 per cent from the original recording of 24/minute. The heart rate fluctuated from the baseline of

114/minute by 5.26 per cent. The ECG indicated: sinus tachycardia; no premature ventricular contractions; S-T segment isolectric for .10 seconds (Appendix F). Mrs. R.W. appeared glad to see the nurse and verbally expressed appreciation for the bath.

On the third day of hospitalization, Mrs. R.W. had the following arrhythmias: atrial fibrillation, atrial tachycardia, and more than 8 PVC's/minute. Because of these arrhythmias, a bed bath was not given.

4) Mrs. J.H. Mrs. J.H., age 83, was admitted to Loma Linda University Hospital on February 22, 1970 with a diagnosis of diaphragmatic myocardial infarction. Her peak enzyme levels were: CPK of 245 Units/ml. (Normal: 5-30 Units/ml.); LDH of 250 Units/ml.; and SGOT of 130 Units/ml.

A bed bath was given on her first day of hospitalization. Her blood pressure remained stable at 118/60 and her respirations were unchanged at 20/minute. The heart rate fluctuated by 8.82 per cent from the baseline of 68/minute. The baseline ECG indicated the following: normal sinus rhythm with one premature atrial contraction (PAC); no premature ventricular contractions; S-T segment elevated by 2.5 mm. for a duration of approximately .10 seconds. The rhythm pattern changed from the beginning baseline to include the following: one PVC when the left arm was washed, 0-3 premature atrial contractions, and atrial bigeminy. Finally, Mrs. J.H. remained in atrial bigeminy (Appendix G). The night prior to the bed bath, she had been in ventricular tachycardia.

A bed bath was not given on the second day as Mrs. J.H. was experiencing rapid rhythm changes which included: atrial fibrillation, 10 PVC's/minute, bradycardia, and tachycardia.

On the third day of hospitalization, Mrs. J.H. had atrial fibrillation alternating with frequent sinus arrest. Therefore, a bed bath was not given.

5) Mr. J.M. Mr. J.M., age 68, was admitted to Loma Linda University Hospital on March 18, 1970 with a diagnosis of acute antero-septal myocardial infarction. His peak enzyme levels were: CPK of 270 Units/ml. (Normal: over 50 Units/ml.); LDH of 325 Units/ml.; and SGOT of 158 Units/ml.

Mr. J.M. received a bed bath on his first day of hospitalization. Before the bath, his blood pressure was 130/80. The systolic pressure fluctuated by 3.07 per cent and the diastolic by 2.50 per cent. The respirations fluctuated by 11.11 per cent from the original recording of 18/minute. The heart rate varied from the baseline of 58/minute by 13.79 per cent. The baseline ECG indicated the following: sinus bradycardia with an inverted T wave; first degree heart block with the PR interval of .24 seconds; one PVC; S-T segment depression of .5 mm. for a duration of approximately .10 seconds. PVC's ranged from 0-2/minute during the bathing procedure. During most of the bath, the rhythm pattern changed from sinus bradycardia to a normal sinus rhythm, with the first degree heart block remaining. When Mr. J.M. was turned from his back to his right side, the S-T segment changed from being depressed by .5 mm. to being depressed by 1.5 mm. In addition, it was noted that the R wave changed from 4 mm. to 11 mm. in amplitude. Both the S-T segment and the R wave changed in amplitude by a multiple of approximately 3, and this was probably attributed to a change in the direction of the heart axis in the body as a result of the turning (Appendix H). Mr. J.M. was slightly diaphoretic before the bath. He was cooperative and good

rapport was established between Mr. J.M. and the nurse.

Another bed bath was given on Mr. J.M.'s second day in the coronary care unit. Before his bath, the blood pressure was 118/80, and then changed to 120/80 for the remainder of the procedure. Thus, the systolic pressure changed by 1.69 per cent. Respirations increased by 10 per cent from the first recording of 20/minute. His heart rate fluctuated by 10.93 per cent from the baseline of 64/minute. The baseline ECG indicated the following: normal sinus rhythm with inverted T wave; first degree heart block with a PR interval of .22 seconds; no premature ventricular contractions; S-T segment depressed by .5 mm. for a duration of approximately .12 seconds. The only change noted during the bath was one premature atrial contraction (PAC) when the right foot was bathed. Mr. J.M. stated that the bath made him feel very relaxed. He thanked the nurse for the bath, and then apparently fell asleep for much of the afternoon.

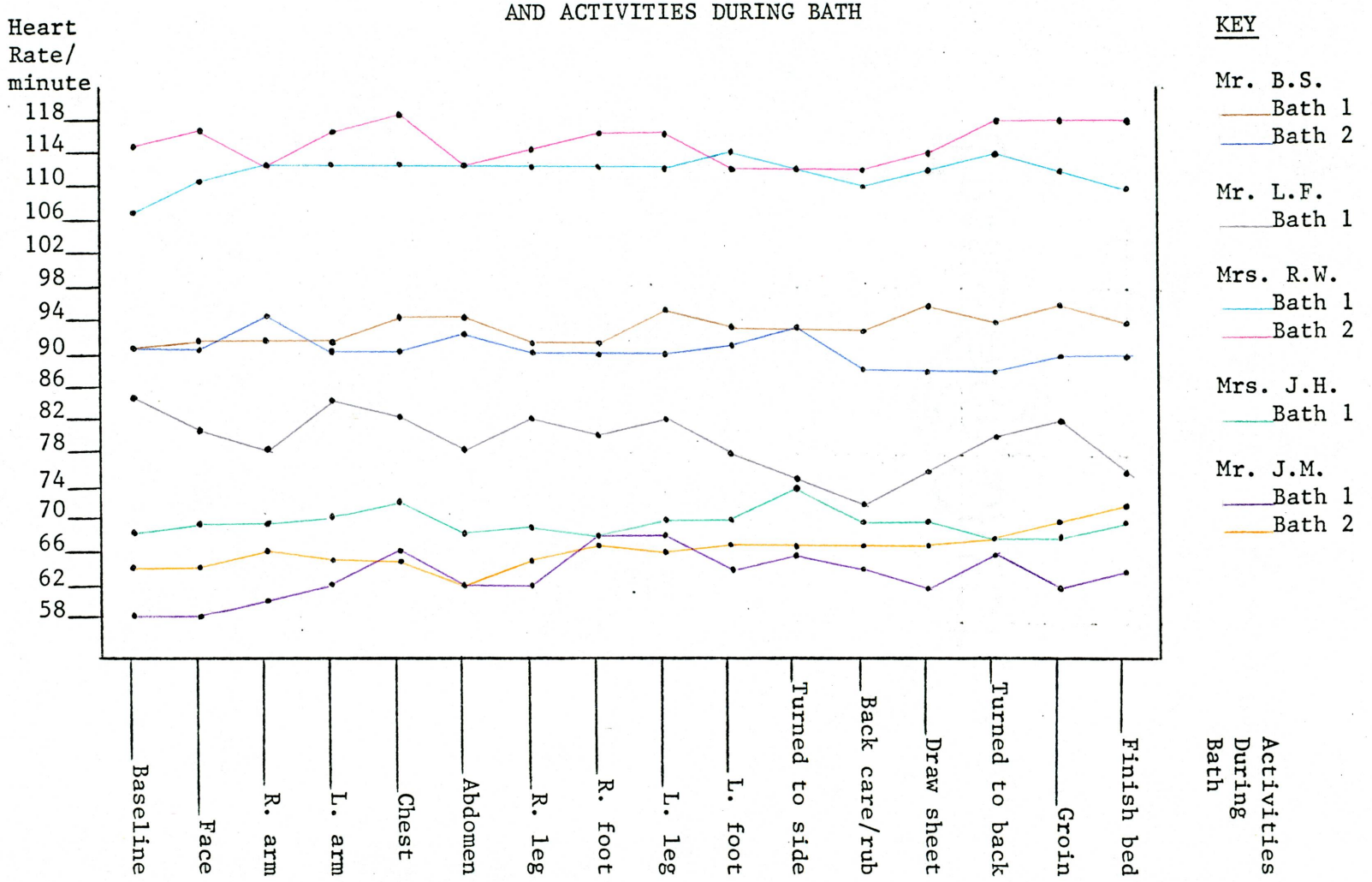
Comparison of Case Studies

All of the five patients used in the study had never had an infarction before, and all of them recovered sufficiently to be discharged to their respective homes.

None of the baths given had to be terminated due to chest pain, serious arrhythmias, or for any other signs or symptoms. In only one case was there a major change in the rhythm pattern when the patient developed atrial bigeminy. None of the patients had any measurable change in the S-T segment. For the eight total baths given, the mean percentage change in systolic blood pressure was 3.80; in respirations, 6.31; and in heart rate, 9.22.

In the graph that follows, there seems to be a tendency for the heart rate to remain the same or to decrease during the back care. In only one bath did the heart rate decrease when the face was washed, probably indicating that the diving reflex did not usually occur. In all but two baths, the heart rate was slightly elevated above the baseline at the completion of the procedure.

FIGURE 1
RELATIONSHIP BETWEEN HEART RATE
AND ACTIVITIES DURING BATH



CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. SUMMARY

This research study was concerned with physiological effects occurring in the cardiovascular system of patients with acute myocardial infarction as a result of receiving a bed bath. Patients who met the criteria for inclusion in the study were given bed baths by the nurse researcher during their initial 72 hours of hospitalization. A convenient sample was obtained from Loma Linda University Hospital and Redlands Community Hospital. The patients selected for the study met the following criteria: confirmed diagnosis of acute myocardial infarction, no complications, on a cardiac monitor, and had permission granted from the attending physician. The sample included eight bed baths given to five different patients. The sample size was small due to the small number of uncomplicated myocardial infarction admissions.

The bed bath procedure was altered to include the following adaptions: passive participation, support of the extremities, prevention of the diving reflex, prevention of the Valsalva Maneuver, and protective positioning.

Physiological criterion measures utilized in the study included: blood pressure; respirations; and ECG changes in rhythm pattern, number of premature ventricular contractions, and S-T segment position and duration. The blood pressure and respirations were taken before the bath,

after washing the abdomen, at the conclusion of the bath, and 15 minutes later. Using Lead II, a continuous ECG strip was taken during the entire bathing procedure. The ECG strips were marked to indicate the activities occurring during the bath.

Data were analyzed for clinical significance, using the case study method. Extensive statistical analysis was not done due to the small sample of data obtained. None of the baths had to be terminated because of serious signs or symptoms. In only one bath was there a significant change in rhythm pattern. This particular patient was quite prone to having arrhythmias throughout her hospitalization, and during the bed bath, developed atrial bigeminy, which is not considered a dangerous arrhythmia. There were no measurable changes in the S-T segment for any of the baths given. The mean systolic blood pressure change was 3.80 per cent; the mean change in respirations was 6.31 per cent; and the mean change in heart rate was 9.22 per cent.

II. CONCLUSIONS

Upon the evidence obtained in this study, the null hypothesis can be accepted for the data collected. However, the small sample size precludes making an acceptance or rejection of the null hypothesis for the general population of acute myocardial infarction patients.

The findings related to the subdivisions of the null hypothesis are as follows:

1) Two patients with no premature ventricular contractions at the beginning of the bath, had one at some point during the bathing procedure. Another patient with one PVC/minute at the baseline, fluctuated between 0 and 2 PVC's/minute.

2) S-T segments remained unchanged in position and duration throughout the entire bathing procedure for all the patients. One patient had alterations between normal sinus rhythm with one premature atrial contraction and atrial bigeminy. Another patient changed from a sinus bradycardia to a normal sinus rhythm. During another bath, the same patient had one premature atrial contraction.

3) Respirations fluctuated by more than 10 per cent in two of the eight baths. Heart rate changed by more than 10 per cent in three baths given.

4) The systolic blood pressure changed more than 10 per cent in one of the eight baths.

5) No serious complications resulted from the bed bath procedure.

Changes that occurred during the bed bath procedure appeared to be relatively minimal. The bed baths did not appear to be detrimental for the five patients included in the study.

III. RECOMMENDATIONS

Based upon the findings in this research study, it is recommended that:

1) More clinical facilities be utilized to increase the sample size.

2) A study be done to determine the possible relationship between lowering of the heart rate during back care.

3) A study be done to compare the effects on the cardiovascular system of the bed bath and the interpersonal relationship between the nurse and patient.

4) A similar study be done to determine the cardiovascular effects from the following nursing procedures: turning, range of motion, back care, washing the face (diving reflex), and feeding the patient.

5) A similar study be done with patients experiencing the complications of acute myocardial infarction.

APPENDIX A

PROTOCOL FOR THE CORONARY CARE UNIT

LOMA LINDA UNIVERSITY HOSPITAL

Protocol for the Coronary Care Unit

Protocol for Nurses

General Care Guidelines: These will be in effect on all patients with a presumptive diagnosis of acute myocardial infarction who are on the monitors. Any portion of this protocol may be modified for a particular patient by a physicians order.

1. Activity -- All patients will be at complete bed rest for the entire stay in the Coronary Care Unit except for the use of a bedside commode. The patients should have two attendants to lift them to the bedside commode. Activity levels will be assigned as indicated below.

   Activity Level:

   0 - No patient activity whatsoever, use bedpan, patient to be fed liquid diet by nurses. No shaving.

   1 - Absolute bedrest, no bath, obese patients begin passive exercises, liquid diet, patient fed by nurses, patient shaved by nurses.

   2 - Absolute bedrest, partial bath by the nurse, patients may begin passive exercises, liquid diet, patient fed by nurses, patient shaved by nurses, deep breathing exercises started.

   3 - Absolute bedrest, bed bath by nurse, patients begin active exercises of feet and arms, begin soft diet, self feeding and shaving, deep breathing exercises.

   4 - Absolute bed rest, bed bath, continue active exercises, continue soft diet, self feeding and shaving, deep breathing exercises.

   5 - Absolute bed rest, bed bath, active exercises, regular diet, self feeding and shaving, deep breathing exercises.

   All patients will begin at Activity Level 1 and proceed to the next higher level daily except for patients whose blood pressure is less than 80 mm. Hg systolic, whose pulse rate is greater than 120/minute or who have shock or pulmonary edema. These patients will be placed at Activity 0 until increased activity is specified by specific physician order.

2. Diet -- Patients will be given a 1500 calorie, 500 mg. sodium diet for the first week. Patients will be given six feedings daily for

the first two days, four feedings daily for the next three days and then three feedings daily thereafter.

3. Fluid intake will be limited to 1500 cc/24 hours except where intravenous fluids are ordered. Distilled water will be used. Very hot or very cold foods and fluids will be avoided for the first week.

4. Intake and Output - A record will be kept every eight hours.

5. Oxygen - All patients will receive nasal oxygen at six liters/minute for the first 24 hours unless discontinued earlier by the physician. Oxygen will also be given any time there is pain, shock, dyspnea or premature ventricular contractions.

6. Indwelling catheters will be used only by order of the physician, when used routine catheter care with constant antibiotic drip will be used.

7. Digitalis will not be given without checking with the physician if there is any nausea, vomiting, ventricular premature beats or if the patient has atrial fibrillation with a rate below 60/minute.

8. Cardiac resuscitation - A cardiac resuscitation alarm will be sounded if:

    1. There is a loss of consciousness for more than 10 seconds.

    2. If the heart rate drops below 30/minute or above 180/minute.

    3. If there is a convulsive disorder.

    4. If there is sudden or severe respiratory distress requiring the use of accessory muscles or the presence of apnea for longer than 14 seconds.

    5. Ventricular fibrillation.

    Procedure for Cardiac Resuscitation:

    1. Page STAT followed by room number three times and place call for resident, intern and assistant intern on call and for the attending physician.

    2. Move the Max Cart to the bedside, transfer patient to the cart, insure adequate airway, start artificial respiration with respirator, check blood pressure and start electrocardiogram. If blood pressure unobtainable or below 40 mm. Hg systolic begin external cardiac massage, prepare lidocaine, Pronestyl, bicarbonate and epinephrine for immediate use. If ventricular fibrillation is present apply electric D.C. counter shock if physician has not arrived within 60 seconds after page. (This applies only to nurses approved to carry out this function by the cardiologist in charge of the C.C.U.

9. The physician will be notified if:

    1. The number of premature beats exceeds 5/minute.

    2. If the heart rate drops below 60/minute.

    3. If the heart rate exceeds 120/minute.

    4. If heart block develops.

10. Fixed interval observation during routine care:

    1. Blood pressure - this will be recorded every hour while the patient is awake during the first 24 hours with a minimum of every four hours. Blood pressure will be recorded every four hours for the rest of the first week.

    2. Pulse and respiration to be recorded at the same time as the blood pressure. Respiration should be recorded every hour while the patient is sleeping during the first 24 hours.

    3. P-R intervals should be checked every eight hours in patients with inferior infarctions for the first week.

    4. QRS width should be checked prior to every dose of Quinidine or Pronestyl. If the QRS is prolonged over 50% of the original or longer than .12 seconds the physician should be notified.

    5. An electrocardiogram rhythm strip will be recorded for 10 seconds every hour for the first day, every four hours the second day and every eight hours thereafter.

11. The following laboratory tests will be performed daily for the first three days:

    1. SGOT (2 x daily)
    2. CPK
    3. LDH
    4. WBC
    5. ESR
    6. Potassium, sodium, CO_2, pH, BUN
    7. Prothrombin time should be obtained daily if patient being anticoagulated.
    8. Laboratory tests after the third day will be ordered as indicated.

12. Patient visitors - These will be limited to close relatives, preferably only one or two. These relatives may visit for five minutes at a time during the first five days during the following hours: 1-4 and 6-8 and as desired thereafter.

13. Patients will be kept on the unit and on the monitor for two weeks or one week after resuscitation, whichever occurs last.

APPENDIX B

BED BATH PROCEDURE

EQUIPMENT

1. Bed linen and gown
2. Laundry bag
3. Hand towel
4. Washcloth
5. 2 turkish towels
6. 2 wash mitts
7. Bath blanket
8. Rubbing lotion
9. Soap in soap dish or bath essence
10. 2 wash basins 2/3 full of hot water (one for washing and one for rinsing)
11. Nail file and comb (supplied by patient)

Note: Work quickly to avoid chilling or tiring the patient.
Avoid unnecessary exposure by uncovering only the part of the body being bathed. Observe skin for abrasions, bruises, rashes, scratches, pressure areas, or other unusual symptoms and report to team leader.
Remove any adhesive marks with adhesive remover.
Wash feet last if patient has fungus growth.

Method	Key Points
PREPARING ROOM AND EQUIPMENT	
1. Check room for necessary items and proper temperature.	See if patient is ready for bath and tell him what you plan to do. Room should be comfortably warm and free from drafts.
2. Assemble all needed equipment and take to bedside.	
3. Screen bed for privacy and/or close door.	
4. Place straight chair near foot of bed for linen.	Clean linen arranged in order of use.
PREPARING PATIENT	
1. Establish a pleasant relationship with patient.	
2. Offer bedpan.	
3. Replace upper covers with bath blanket.	Patient is instructed to hold top of bath blanket while the nurse slides other covers down to foot of bed and removes. Soiled linen is placed in laundry bag.
4. Remove extra pillows (as comfort of patient indicates) and place on chair.	
5. Remove patient's gown and binders if present.	

GIVING BATH	Protect bed with towel.
1. Bathe, rinse and dry:	
a. face, neck and ears	Omit soap on face if patient prefers. Avoid getting soap in eyes.
b. upper extremities	Special attention should be paid to axilla. Use deodorant, if patient has supply. Patient appreciates washing hands in basin.
c. chest	Particular attention to areas under large breasts.
d. abdomen	Place dry towel across chest and fold blanket down to expose abdomen. If patient is small, chest and abdomen may be bathed together. Special attention to umbilicus.
e. lower extremities	Flex leg to bathe back part more easily. Place foot in basin. Use care not to get the bed wet. Feet should be dried thoroughly, particularly between toes. Turn patient to expose back, side, or abdomen as condition permits.
f. back and buttocks	Include back of neck to hairline and whole buttocks.
2. Rub back with lotion.	Pay particular attention to bony prominences and any reddened areas.
3. Turn on back and have patient bathe genital area.	If patient is unable, assist as needed. Male patient unable to care for self is given this service by male nurse or orderly, if available.
4. Assist patient to put on clean gown.	
5. Comb hair if it was not combed with A. M. Care.	Hair should be combed daily.
6. Care for fingernails and toenails.	Manicure tray may be obtained from Central Service.

AFTERCARE OF EQUIPMENT AND UNIT	
1. Wash basins with disinfectant, dry and put away.	Remove soap ring.
2. Replace toilet articles in bedside table.	

3. Make bed.	Change linen according to unit routine and patient's needs. Leave bedding under patient tight and free from wrinkles. Avoid pulling top covering too tightly over patient's toes.
4. Replace pillows according to patient's needs and comfort.	
5. Fasten call light within reach.	
6. Place bedside table in convenient location.	
7. Adjust light and ventilation.	
8. Leave clean washcloth and hand towel for patient's use.	
9. Check whole unit for neatness.	Remove old newspapers and dead flowers. Furniture in place.

CHARTING

1. Record "bed bath" in Treatment Column.
2. Record any unusual observations noticed in Remarks Column.

APPENDIX C

DATA COLLECTION SHEET

DATA COLLECTION SHEET

NAME:

ADMISSION DATE:

HOSPITAL NUMBER:

AGE:

PHYSICIAN:

TYPE OF INFARCTION:

NUMBER OF PREVIOUS INFARCTIONS:

ENZYMES:
Peak SGOT:
Peak LDH:
Peak CPK:

	Blood Pressure	Respirations
DAY 1 (Date:)		
Before		
During		
After		
+ 15 min.		
DAY 2 (Date:)		
Before		
During		
After		
+ 15 min.		
DAY 3 (Date:)		
Before		
During		
After		
+ 15 min.		

ANECDOTAL NOTES:

DAY 1

DAY 2

DAY 3

APPENDIX D

Data Analysis Sheets for Mr. S.B.

BLOOD PRESSURE AND RESPIRATION
DATA ANALYSIS SHEET

Patient: Mr. S.B.

Day Number: 2
Bath Number: 1

	Blood Pressure	Respirations
Before	120/77	22
During	120/70	22
After	120/70	22
+ 15 min.	120/70	22
Day Number: 3 Bath Number: 2		
Before	118/70	20
During	120/70	22
After	120/70	20
+ 15 min.	120/70	20

ECG DATA ANALYSIS SHEET

Patient: Mr. S.B.
Day Number: 2
Bath Number: 1

	Heart Rate/ min.	Number PVC's min.	Rhythm Pattern	S-T Segment	
				Position/ mm.	Duration/ sec.
Baseline	90	0	Normal Sinus Rhythm	+ 2.5 mm.	.10 sec. approx.
Face	91	0	"	"	"
R. arm	91	0	"	"	"
L. arm	91	0	"	"	"
Chest	94	0	"	"	"
Abdomen	94	0	"	"	"
R. leg	91	0	"	"	"
R. foot	91	0	"	"	"
L. leg	95	0	"	"	"
L. foot	93	0	"	"	"
Turned to side	93	0	"	"	"
Back care/ rub	93	0	"	"	"
Draw sheet	96	0	"	"	"
Turned to back	94	0	"	"	"
Groin	96	0	"	"	"
Finish bed	94	0	"	"	"

ECG DATA ANALYSIS SHEET

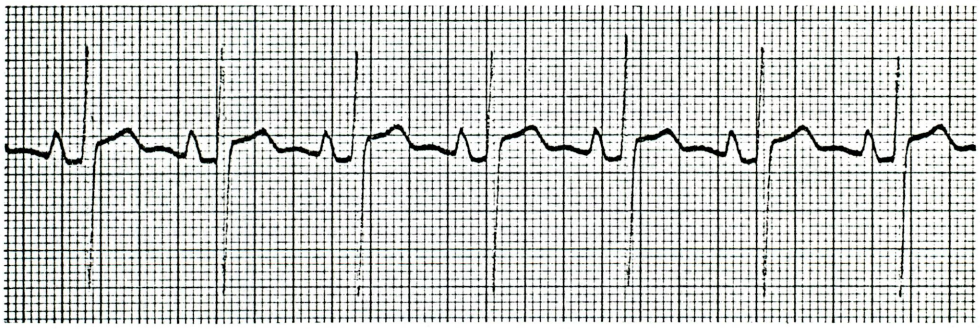
Patient: Mr. S.B.
Day Number: 3
Bath Number: 2

	Heart Rate/ min.	Number PCV's min.	Rhythm Pattern	S-T Segment	
				Position/ mm.	Duration/ sec.
Baseline	90	0	Normal Sinus Rhythm	+ 2.5 mm.	.12 sec. approx.
Face	90	0	"	"	"
R. arm	94	0	"	"	"
L. arm	90	0	"	"	"
Chest	90	0	"	"	"
Abdomen	92	0	"	"	"
R. leg	90	0	"	"	"
R. foot	90	0	"	"	"
L. leg	90	0	"	"	"
L. foot	91	0	"	"	"
Turned to side	93	0	"	"	"
Back care/ rub	88	0	"	"	"
Draw sheet	88	0	"	"	"
Turned to back	88	0	"	"	"
Groin	90	0	"	"	"
Finish bed	90	0	"	"	"

REPRESENTATIVE ECG STRIPS

Patient: Mr. S.B.

Day Number: 2
Bath Number: 1



Normal sinus rhythm; S-T segment: +2.5 mm., .10 sec.

1 mv. = 10 mm.

APPENDIX E

Data Analysis Sheets for Mr. L.F.

BLOOD PRESSURE AND RESPIRATION
DATA ANALYSIS SHEET

Patient: Mr. L.F.

Day Number: 3
Bath Number: 1

	Blood Pressure	Respirations
Before	106/70	18
During	102/70	20
After	102/70	20
+ 15 min.	102/70	20

ECG DATA ANALYSIS SHEET

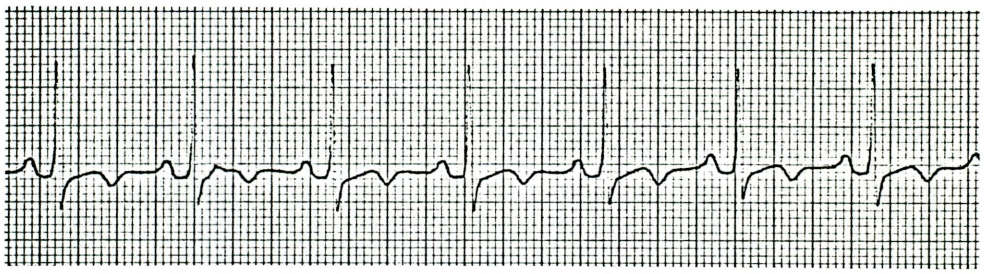
Patient: Mr. L.F.
Day Number: 3
Bath Number: 1

	Heart Rate/ min.	Number PVC's min.	Rhythm Pattern	S-T Segment	
				Position/ mm.	Duration/ sec.
Baseline	84	0	Normal Sinus Rhythm with Inverted T	-1 mm.	.16 sec.
Face	80	0	"	"	"
R. arm	78	0	"	"	"
L. arm	84	0	"	"	"
Chest	82	0	"	"	"
Abdomen	78	0	"	"	"
R. leg	82	0	"	"	"
R. foot	80	0	"	"	"
L. leg	82	0	"	"	"
L. foot	78	0	"	"	"
Turned to side	75	0	"	"	"
Back care/ rub	72	0	"	"	"
Draw sheet	76	0	"	"	"
Turned to back	80	0	"	"	"
Groin	82	0	"	"	"
Finish bed	76	0	"	"	"

REPRESENTATIVE ECG STRIPS

Patient: Mr. L.F.

Day Number: 3
Bath Number: 1



Normal sinus rhythm; inverted T wave;
S-T segment: -1 mm., .16 sec.

1 mv. = 10 mm.

APPENDIX F

Data Analysis Sheets for Mrs. R.W.

BLOOD PRESSURE AND RESPIRATION
DATA ANALYSIS SHEET

Patient: Mrs. R.W.

Day Number: 1
Bath Number: 1

	Blood Pressure	Respirations
Before	120/78	20
During	120/78	20
After	124/80	20
+ 15 min.	122/80	20
Day Number: 2 Bath Number: 2		
Before	94/68	24
During	110/70	26
After	110/70	24
+ 15 min.	108/68	24

ECG DATA ANALYSIS SHEET

Patient: Mrs. R.W.
Day Number: 1
Bath Number: 1

	Heart Rate/ min.	Number PVC's min.	Rhythm Pattern	S-T Segment	
				Position/ mm.	Duration/ sec.
Baseline	106	0	Sinus tachycardia	Isoelectric	.12 sec.
Face	110	0	"	"	"
R. arm	112	0	"	"	"
L. arm	112	0	"	"	"
Chest	112	0	"	"	"
Abdomen	112	1	"	"	"
R. leg	112	0	"	"	"
R. foot	112	0	"	"	"
L. leg	112	0	"	"	"
L. foot	114	0	"	"	"
Turned to side	112	0	"	"	"
Back care/ rub	110	0	"	"	"
Draw sheet	112	0	"	"	"
Turned to back	114	0	"	"	"
Groin	112	0	"	"	"
Finish bed	110	0	"	"	"

ECG DATA ANALYSIS SHEET

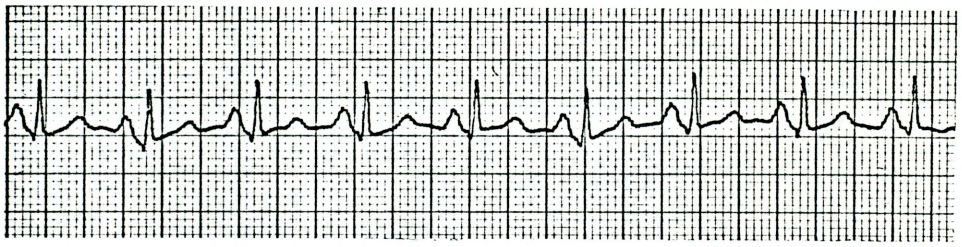
Patient: Mrs. R.W.
Day Number: 2
Bath Number: 2

	Heart Rate/ min.	Number PVC's min.	Rhythm Pattern	S-T Segment	
				Position/ mm.	Duration/ sec.
Baseline	114	0	Sinus tachycardia	Isoelectric	.10 sec.
Face	116	0	"	"	"
R. arm	116	0	"	"	"
L. arm	112	0	"	"	"
Chest	116	0	"	"	"
Abdomen	118	0	"	"	"
R. leg	114	0	"	"	"
R. foot	116	0	"	"	"
L. leg	116	0	"	"	"
L. foot	112	0	"	"	"
Turned to side	112	0	"	"	"
Back care/ rub	112	0	"	"	"
Draw sheet	114	0	"	"	"
Turned to back	118	0	"	"	"
Groin	118	0	"	"	"
Finish bed	118	0	"	"	"

REPRESENTATIVE ECG STRIPS

Patient: Mrs. R.W.

Day Number: 1
Bath Number: 1



Sinus tachycardia; S-T segment: isoelectric, .12 sec.

1 mv. = 10 mm.

APPENDIX G

Data Analysis Sheets for Mrs. H.J.

BLOOD PRESSURE AND RESPIRATION
DATA ANALYSIS SHEET

Patient: Mrs. H.J.

Day Number: 1
Bath Number: 1

	Blood Pressure	Respirations
Before	118/60	20
During	118/60	20
After	118/60	20
+ 15 min.	118/60	20

ECG DATA ANALYSIS SHEET

Patient: Mrs. J.H.
Day Number: 1
Bath Number: 1

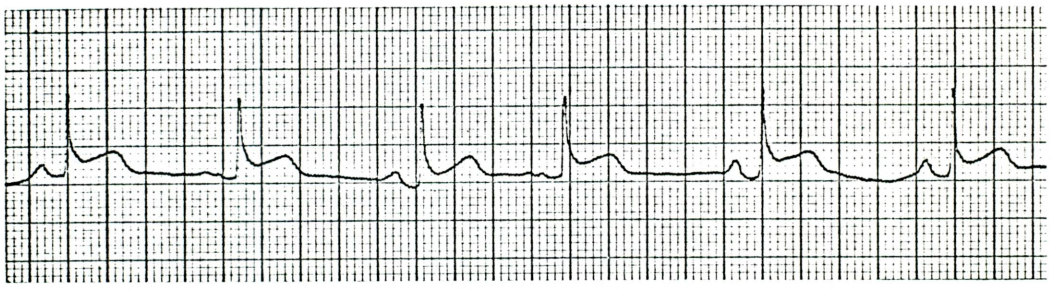
	Heart Rate/ min.	Number PVC's min.	Rhythm Pattern	S-T Segment	
				Position/ mm.	Duration/ sec.
Baseline	68	0	Normal sinus rhythm; 1 PAC	+ 2.5 mm.	.10 sec. approx.
Face	69	0	"	"	"
R. arm	69	0	Normal sinus rhythm	"	"
L. arm	70	1	Atrial bigeminy	"	"
Chest	72	0	"	"	"
Abdomen	68	0	Normal sinus rhythm; 1 PAC	"	"
R. leg	69	0	Normal sinus rhythm	"	"
R. foot	68	0	Normal sinus rhythm; 1 PAC	"	"
L. leg	70	0	"	"	"
L. foot	70	0	Normal sinus rhythm; 3 PAC'S	"	"
Turned to side	74	0	Atrial bigeminy	"	"
Back care/ rub	70	0	"	"	"
Draw sheet	70	0	"	"	"
Turned to back	68	0	Normal sinus rhythm; 1 PAC	"	"
Groin	68	0	"	"	"
Finish bed	70	0	Atrial bigeminy	"	"

PAC = premature atrial contraction

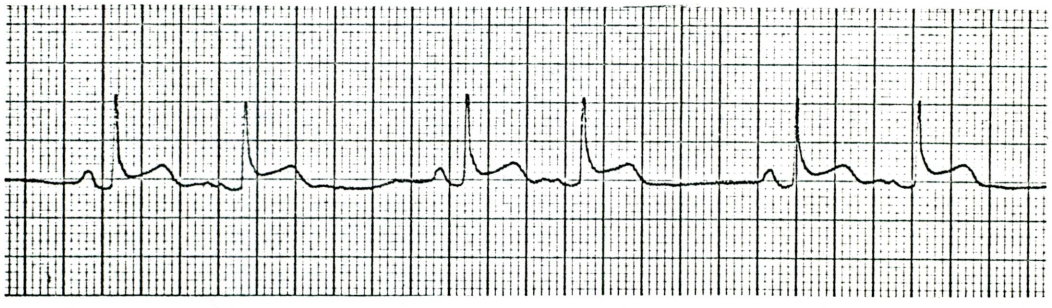
REPRESENTATIVE ECG STRIPS

Patient: Mrs. J.H.

Day Number: 1
Bath Number: 1



Normal sinus rhythm; 1 premature atrial contraction (PAC);
S-T segment: +2.5 mm., approximately .10 sec.



Atrial bigeminy

1 mv. = 10 mm.

APPENDIX H

Data Analysis Sheets for Mr. J.M.

BLOOD PRESSURE AND RESPIRATION
DATA ANALYSIS SHEET

Patient: Mr. J.M.

Day Number: 1
Bath Number: 1

	Blood Pressure	Respirations
Before	130/80	18
During	132/80	20
After	128/82	20
+ 15 min.	130/80	18
Day Number: 2 Bath Number: 2		
Before	118/80	20
During	120/80	20
After	120/80	22
+ 15 min.	120/80	20

ECG DATA ANALYSIS SHEET

Patient: Mr. J.M.
Day Number: 1
Bath Number: 1

	Heart Rate/ min.	Number PVC's min.	Rhythm Pattern	S-T Segment	
				Position/ mm.	Duration/ sec.
Baseline	58	1	Sinus bradycardia; 1st degree heart block; inverted T	-.5 mm.	.10 sec. approx.
Face	58	1	"	"	"
R. arm	60	0	Normal sinus rhythm; 1st degree block; inverted T	"	"
L. arm	62	0	"	"	"
Chest	66	2	"	"	"
Abdomen	62	0	"	"	"
R. leg	62	1	"	"	"
R. foot	58	0	Sinus bradycardia; 1st degree heart block; inverted T	"	"
L. leg	64	1	Normal sinus rhythm; 1st degree block; inverted T	"	"
L. foot	62	1	"	" (R: +4 mm.)	"
Turned to side	66	1	"	(R: +11 mm.) -1.5 mm.	"
Back care/ rub	64	0	"	"	"
Draw sheet	62	0	"	"	"
Turned to back	66	0	"	"	"
Groin	62	0	"	-2 mm.	"
Finish bed	64	0	"	-.5 mm.	"

ECG DATA ANALYSIS SHEET

Patient: Mr. J.M.
Day Number: 2
Bath Number: 2

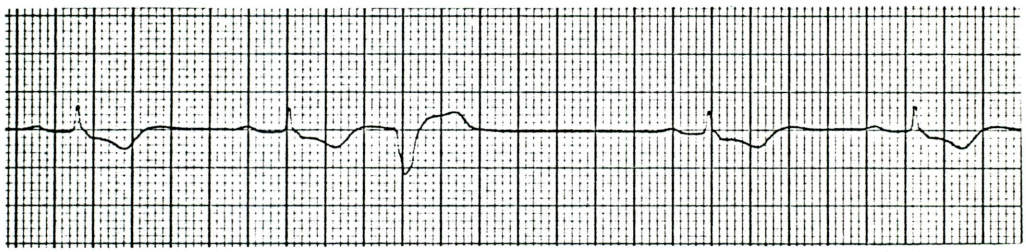
	Heart Rate/ min.	Number PVC's/ min.	Rhythm Pattern	S-T Segment	
				Position/ mm.	Duration/ sec.
Baseline	64	0	Normal sinus rhythm; 1st degree block; inverted T	-.5 mm.	.12 sec. approx.
Face	64	0	"	"	"
R. arm	66	0	"	"	"
L. arm	65	0	"	"	"
Chest	65	0	"	"	"
Abdomen	62	0	"	"	"
R. leg	65	0	"	"	"
R. foot	67	0	Normal sinus rhythm; 1st degree block; 1 PAC; inverted T	"	"
L. leg	66	0	Normal sinus rhythm; 1st degree block; inverted T	"	"
L. foot	67	0	"	"	"
Turned to side	67	0	"	"	"
Back care/ rub	67	0	"	"	"
Draw sheet	67	0	"	"	"
Turned to back	68	0	"	"	"
Groin	70	0	"	"	"
Finish bed	72	0	"	"	"

PAC = premature atrial contraction

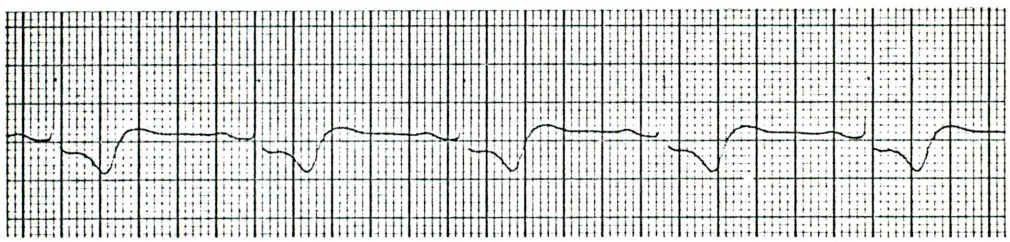
REPRESENTATIVE ECG STRIPS

Patient: Mr. J.M.

Day Number: 1
Bath Number: 1

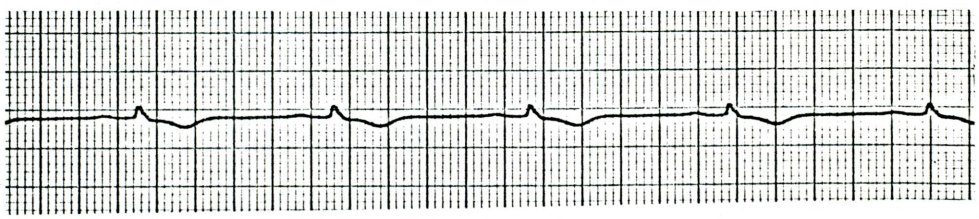


Sinus bradycardia; first degree heart block;
inverted T wave; 1 PVC
S-T segment: -.5 mm., approximately .10 sec.



Change in amplitude when patient turned to side

Day Number: 2
Bath Number: 2



Normal sinus rhythm; first degree heart block;
inverted T wave;
S-T segment: -.5 mm., approximately .12 sec.

1 mv. = 10 mm.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

1. Abbott, George Knapp, Fred B. Moore, and Kathryn L. Jensen-Nelson. Physical Therapy in Nursing Care. Takoma Park: Review and Herald Publishing Association, 1945. 494 pp.

2. Abramson, David I. Circulation in the Extremities. New York: Academic Press, 1967. 557 pp.

3. Andreoli, Kathleen G., and others. Comprehensive Cardiac Care: A Handbook for Nurses and other Paramedical Personnel. St. Louis: The C. V. Mosby Company, 1968. 153 pp.

4. Beard, Gertrude, and Elizabeth C. Wood. Massage: Principles and Techniques. Philadelphia: W. B. Saunders Company, 1964. 163 pp.

5. Beland, Irene and others. Clinical Nursing: Pathophysiological and Psychosocial Approaches. New York: The Macmillan Company, 1965. 1398 pp.

6. Berne, Robert, and Matthew N. Levy. Cardiovascular Physiology. St. Louis: C. V. Mosby Company, 1967. 254 pp.

7. Brecher, Gerhard A. Venous Return. New York: Grune & Stratton, 1956. 148 pp.

8. Browse, Norman L. The Physiology and Pathology of Bed Rest. Springfield: Charles C. Thomas, 1965. 221 pp.

9. Brunner, Lillian, and others. Textbook of Medical-Surgical Nursing. Philadelphia: J. B. Lippincott Company, 1964. 1198 pp.

10. Burch, George E., and Travis Winsor. 5th ed. A Primer of Electrocardiography. Philadelphia: Lea & Febiger, 1966. 304 pp.

11. Burton, Alan C. Physiology and Biophysics of the Circulation. Chicago: Year Book Medical Publishers, 1965. 217 pp.

12. Fuerst, Elinor V. and LuVerne Wolff. 4th ed. Fundamentals of Nursing: The Humanities and the Sciences in Nursing. Philadelphia: J. B. Lippincott Company, 1969. 446 pp.

13. Guyton, Arthur C. Textbook of Medical Physiology. 3rd ed. Philadelphia: W. B. Saunders Company, 1967. 1210 pp.

14. Harmer, Bertha, and Virginia Henderson. Textbook of the Principles and Practice of Nursing. 5th ed. New York: The Macmillan Company, 1960. 1250 pp.

15. Harrison, Tinsley Randolph, and T. Joseph Reeves. Principles and Problems of Ischemic Heart Disease. Chicago: Year Book Medical Publishers, 1968. 474 pp.

16. Harrison T. R., and others (eds.). Principles of Internal Medicine. New York: McGraw-Hill Book Company, 1966. 1874 pp.

17. Hurst, J. Willis, and R. Bruce Logue (eds.). The Heart. New York: McGraw-Hill Book Company, 1966. 1255 pp.

18. Karvonen, Martti J., and Alan J. Barry (eds.). Physical Activity and the Heart. Springfield: Charles C. Thomas, 1967. 405 pp.

19. Levine, Myra Estrin. Introduction to Clinical Nursing. Philadelphia: F. A. Davis Company, 1969. 468 pp.

20. Likoff, William, and John H. Moyer (eds.). Coronary Heart Disease. New York: Grune & Stratton, 1963. 483 pp.

21. Luisada, Aldo A. (ed.). Examination of the Cardiac Patient. New York: McGraw-Hill Book Company, 1965. 449 pp.

22. McClain, M. Esther, and Shirley Gragg. Scientific Principles in Nursing. St. Louis: The C. V. Mosby Company, 1962. 448 pp.

23. Meltzer, Lawrence E. and others. Intensive Coronary Care: A Manual for Nurses. New York: The Charles Press, 1966. 201 pp.

24. Modell, Walter, and others. Handbook of Cardiology for Nurses. 4th ed. New York: Springer Publishing Company, 1962. 310 pp.

25. Nite, Gladys, and Frank N. Willis, Jr. The Coronary Patient: Hospital Care and Rehabilitation. New York: The Macmillan Company, 1964. 418 pp.

26. Ownby, Fred D., and Norma J. Shepard. Advanced Cardiac Nursing. Philadelphia: The Charles Press, 1970. 213 pp.

27. Plotz, Milton. Coronary Heart Disease: Angina Pectoris; Myocardial Infarction. New York: A Hoeber-Harper Book, 1957. 353 pp.

28. Quiring, Daniel P. Collateral Circulation. Philadelphia: Lea & Febiger, 1949. 142 pp.

29. Rosenbaum, Francis F., and Elston L. Belknap (eds.). Work and the Heart. New York: Paul B. Hoeber, Inc., 1959. 537 pp.

30. Secor, Jane. Patient Care in Respiratory Problems. Philadelphia: W. B. Saunders Company, 1969. 229 pp.

31. Shafter, Kathleen and others. Medical-Surgical Nursing. 3rd ed. St. Louis: C. V. Mosby Company, 1964. 889 pp.

32. Smith, Dorothy W. and Claudia D. Gips. Care of the Adult Patient: Medical-Surgical Nursing. Philadelphia: J. B. Lippincott Company, 1963. 1521 pp.

33. Wright, Irving S., and Charles D. Marple, and Dorothy Fahs Beck. Myocardial Infarction: Its Clinical Manifestations and Treatment with Anticoagulants. New York: Grune & Stratton, 1954, 656 pp.

B. PERIODICALS

34. Abdellah, Faye G. "Criterion Measures in Nursing," Nursing Research, 10:21-26, Winter, 1961.

35. Asmussen, Erling, and Marius Nielsen. "Cardiac Output During Muscular Work and its Regulation," Physiological Review, 35:778-799, October, 1955.

36. Barnet, Robert. "Current Trends in the Care of the Coronary Patient," Geriatrics, 23:154-160, June, 1968.

37. Bernreiter, Michael. "Reducing Mortality in Myocardial Infarction," Geriatrics, 23:138-144, April, 1968.

38. Brummer, Pekka, Eino Linko, and Antero Kasanen. "Myocardial Infarction Treated by Early Ambulation," American Heart Journal, 52:269-272, August, 1956.

39. Brummer, Pekka, Veikko Kallio, and Eero Tala. "Early Ambulation in the Treatment of Myocardial Infarction," Acta Medica Scandinavica, 180:231-234, fasc. 2, 1966.

40. Burkart, Felix, Serge Barold, and Edgar Sowton. "Hemodynamic Effects of Repeated Exercise," American Journal of Cardiology, 20:509-515, October, 1967.

41. Cain, Harvey D., Robert Stivelman, and Wallace G. Frasher. "Electrocardiographic Monitoring of Post-Myocardial-Infarction Activity," Journal of the American Medical Association, 178:178-180, December 2, 1961.

42. Cain, Harvey D., Wallance G. Frasher, and Robert Stivelman. "Graded Activity Program for Safe Return to Self-Care After Myocardial Infarction," Journal of the American Medical Association, 177:101-115, July 15, 1961.

43. "Cardiovascular Responses to Static Exercise," Circulation, 41:173-176, February, 1970.

44. Coston, Harriet M. "Myocardial Infarction: Stages of Recovery and Nursing Care," Nursing Research, 9:178-182, Fall, 1960.

45. Crisseley, John T., and Selbert A. Chernila, and John Ihrig. "New Bed-Bathing Routine for Hospital Patients," Journal of the American Geriatrics Society, 16:106-110, January, 1968.

46. "Early Mobilisation after Myocardial Infarction," The Lancet, 1:821, April 19, 1969.

47. Eckstein, Richard W. "Effect of Exercise and Coronary Artery Narrowing on Coronary Collateral Circulation," Circulation Research, 5:230-235, May, 1957.

48. Fareeduddin, Khaja, and Walter H. Abelmann. "Impaired Orthostatic Tolerance after Bed Rest in Patients with Myocardial Infarction," The New England Journal of Medicine, 280:345-350, February 13, 1969.

49. Groden, B. M., A. Allison, and G. B. Shaw. "Management of Myocardial Infarction," Scottish Medical Journal, 12:435-440, December, 1967.

50. Harrison, Tinsley R. "Abuse of Rest as a Therapeutic Measure for Patients with Cardiovascular Disease," Journal of the American Medical Association, 125:1075-1077, August 19, 1944.

51. "Inside the Coronary Care Unit: Protocol for Patient Care," American Journal of Nursing, 67:2314-2317, November, 1967.

52. Irvin, C. Warren, and Alexander M. Burgess. "The Abuse of Bed Rest in the Treatment of Myocardial Infarction," The New England Journal of Medicine, 243:486-489, September 28, 1950.

53. January, L. E. "Early Versus Late Ambulation in the Treatment of Cardiac Patients," Journal of the Iowa State Medical Society, 46:337-340, July, 1956.

54. Killip, Thomas, and John T. Kimball. "Treatment of Myocardial Infarction in a Coronary Care Unit," American Journal of Cardiology, 20:457-464, October, 1967.

55. Kinlein, M. Lucile. "Myocardial Infarction: The Critical Hours," American Journal of Nursing, 64:C-12, November, 1964.

56. Kornblueh, Igho Hart, and Eugene Michels. "Outline of an Exercise Program for Patients with Myocardial Infarction," The Pennsylvania Medical Journal, 60:1575-1578, December, 1957.

57. Kottke, Frederic J. "Prescription of Physical Activity During Acute Stage of Cardiac Disability," Archives of Physical Medicine and Rehabilitation, 48:126-132, March, 1967.

58. Kottke, Frederic J., Jean N. Danz, and William G. Kubicek. "Study of Cardiac Output During Rehabilitation Activities," Archives of Physical Medicine and Rehabilitation, 38:75-82, February, 1957.

59. Levine, Samuel A. "The Myth of Strict Bed Rest in the Treatment of Heart Disease," American Heart Journal, 42:406-413, July-December, 1951.

60. Levine, Samuel A. "Some Harmful Effects of Recumbency in the Treatment of Heart Disease," Journal of the American Medical Association, 126:80-84, September 9, 1944.

61. Levine, Samuel A., and Bernard Lown. "Armchair Treatment of Acute Coronary Thrombosis," Journal of the American Medical Association, 148:1365-1369, April 19, 1952.

62. Li, Yeou-Bing, and others. "Electrocardiographic Response to Maximal Exercise," American Journal of Cardiology, 20:541-548, October, 1967.

63. Lown, Bernard. "Intensive Heart Care," Scientific American, 219:19-28, July, 1968.

64. Lown, Bernard, and Arthur Selzer. "The Coronary Care Unit," American Journal of Cardiology, 22:5978-5983, October, 1968.

65. Lown, Bernard, and others. "Unresolved Problems in Coronary Care," American Journal of Cardiology, 20:494-508, October, 1967.

66. MacMillan, Robert L., and others. "Changing Perspectives in Coronary Care," American Journal of Cardiology, 20:449-456, October, 1967.

67. Master, A. M., L. E. Field, and E. Donoso. "Coronary Artery Disease and the Two-Step Exercise Test," New York State Journal of Medicine, 57:1051-1061, March 5, 1957.

68. Mounsey, Patrick. "Intensive Coronary Care: Arrhythmias after Acute Myocardial Infarction," American Journal of Cardiology, 20:475-483, October, 1967.

69. Newman, Louis B., and others. "Physical Medicine and Rehabilitation in Acute Myocardial Infarction," Archives of Internal Medicine, 89:552-561, April, 1952.

70. Shillingford, John P., and Michael Thomas. "Cardiovascular and Pulmonary Changes in Patients with Myocardial Infarction Treated in an Intensive Care and Research Unit," American Journal of Cardiology, 20:484-493, October, 1967.

71. "A Sleep Regimen for Acute Myocardial Infarction," The Lancet, 294:726, April 6, 1968.

72. Thomas, Michael, Raoul Malmcrona, and John Shillingford. "Hemodynamic Changes in Patients with Acute Myocardial Infarction," Circulation, 31:811-823, June, 1965.

73. Toshima, Hironori. "The Active Exercise Treatment for Myocardial Infarction and its Evaluation on the Prognosis," Japanese Circulation Journal, 31:1608-1610, November, 1967.

74. Whayne, Thomas F., and Thomas Killip. "Simulated Diving in Man: Comparison of Facial Stimuli and Response in Arrhythmia," Journal of Applied Physiology, 22:800-807, April, 1967.

LOMA LINDA UNIVERSITY

Graduate School

SOME PHYSIOLOGICAL EFFECTS OF THE BED BATH ON THE CARDIOVASCULAR SYSTEM OF ACUTE MYOCARDIAL INFARCTION PATIENTS

by

Arleen Canfield

An Abstract of a Thesis

in Partial Fulfillment of the Requirements

for the Degree Master of Science

in the Field of Nursing

May 1970

ABSTRACT

At Loma Linda University, a protocol has been in effect that specifies the kinds and amounts of activity that acute myocardial infarction patients may have. The protocol has described six activity levels with each successive level permitting more activity. The patient must have reached the fourth level of progression before he is permitted to receive a complete bed bath. The problem studied in this research was: As the result of receiving a bed bath, what physiological effects will occur in the cardiovascular system of patients with acute myocardial infarction?

The theoretical framework for this study consisted of the following: recommendations for giving bed baths to patients with myocardial infarction; trends towards aggressive management of myocardial infarction; the Valsalva Maneuver; and the diving reflex.

The null hypothesis was: Bed baths given to acute myocardial infarction patients will have no significant effect on the physiology of the cardiovascular system.

A convenient sample was obtained from Loma Linda University Hospital and Redlands Community Hospital. The patients selected for the study met the following criteria: confirmed diagnosis of acute myocardial infarction, no complications, on a cardiac monitor, and had permission granted from the attending physician. The sample included eight baths given to five different patients. The actual sample size was small due to the small number of uncomplicated myocardial infarction admissions.

Patients who met the criteria for inclusion in the study were given bed baths by the nurse researcher during their initial 72 hours of hospitalization. The bathing procedure was modified in the following ways: passive participation, support of the extremities, prevention of the Valsalva Maneuver, and protective positioning. Physiological criterion measures included: blood pressure; respirations; and ECG changes in rhythm pattern, number of premature ventricular contractions, and S-T segment position and duration. Continuous ECG strips were taken during the bathing procedure.

Data were analyzed for clinical significance, using the case study method. The null hypothesis was accepted for the data collected, but was not generalized to include the entire population of myocardial infarction patients since the sample size was small. For the eight baths, the mean systolic blood pressure change was 3.80 per cent; the mean change in respirations was 6.31 per cent; and the mean change in heart rate was 9.22 per cent. There were no changes in the S-T segment, and no serious arrhythmias occurred. The bathing procedure, using the modifications listed above, did not appear to be detrimental for the five patients included in the study.