NEED FOR PATIENT TEACHING WITH THE MYOCARDIAL INFARCTION PATIENT

RESEARCH STUDY ON TEACHING NEEDS

LEARNING TOOL

Creative Senior Honors Project

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1972
Mr. A. is a 72 year old man with a diagnosis of myocardial infarction who has been retired for several years and lives in a small home with his wife. He is to be released in a few days and his family has talked with the doctor and nurses about the care he will be needing. Mr. B. is a 46 year old father of three with a diagnosis of myocardial infarction who is anxious to get back to work and care for his family. He is to be released next week and wonders how many days it will be before he can work full-time again. Mrs. C. is an 82 year old woman who refuses to remain in bed and follow the doctor's directions. She says that there is nothing wrong with her heart, the pain is gone, she feels fine, and there is no reason for her to remain in the hospital.

Mr. A., Mr. B., and Mrs. C. all have needs in relation to their illness. Their medical treatment was essentially the same but the one item that differentiated their treatment was the diversity of their knowledge about the causation of a heart attack and its treatment. Each of these three patient examples have different backgrounds and different family situations thus their level of understanding differs. The question becomes how much information is given the patient who has suffered a heart attack. Does he have enough knowledge about the predisposing factors, etiology and causation of a heart attack to be an active participant in his own rehabilitation?

Barbara Redman in her book *The Process of Patient Teaching in Nursing* states several philosophies about teaching and why it is important
to the patient. One philosophy is that the patient has a role to play which includes participation in his treatment and rehabilitation and she feels that health teaching helps the patient function within this role. She believes that another teaching objective is the relief of the patient's tension. This is supported by Redman's belief that when a knowledgeable person whom the patient trusts gives him accurate information about his condition when he needs it he will be reassured.¹ Virginia Haferkorn supports the idea of anxiety reduction through teaching when she separates patient teaching during the acute phase of the illness into two categories. The first category is supportive teaching which is styled to reduce the patient's anxiety, although it should be remembered that at this time the patient may not retain the information given.²

Haferkorn has written an article called "Assessing Individual Learning Needs as a Basis for Patient Teaching" in which she states her views on the importance of patient teaching. Her philosophy is one that advocates teaching the patient about his disease and the intended therapy so he can protect himself through use of this knowledge. She believes that patient teaching is one essential factor in helping the patient adapt to an illness that may permanently alter his entire pattern of living. A patient who does not understand his disease and its treatment may unknowingly harm himself.³

Margaret Pohl in her book The Teaching Function of the Nursing Practitioner sees the fundamental purpose of nursing as the promotion of health and she sees teaching as a fundamental activity aiming toward that goal. She further states that through teaching the nurse can help her patients understand basic health principles and practices and that
the patients can subsequently apply what they have learned to themselves and their families. In another article Lois Monteiro supports this view of health promotion through teaching when she says that the nurse is involved in interpreting scientific facts to patients and their families which will aid them in maintaining and promoting their own health. Again the nurse is teaching so patients and their families can apply health principles to their own lives. Elinor Fuerst and LuVerne Wolff see the teaching role of the nurse increasing as more emphasis is placed on the self-care aspect of patient care. The nurse's role as a teacher steadily increases as the patient's physical health improves and he progresses to carrying out a portion of his own care. Fuerst and Wolff feel that while some function is lost due to the illness even more function is lost if the patient is inactive longer than necessary and not involved in his own care and recovery. General Rose Hospital in Denver, Colorado is one hospital where patient teaching has been tried on an organized basis and has been a great success. When asked for their views on patient teaching, the patients were very enthusiastic. Each patient questioned said it helped in their own adjustment to their illness. When asked what part of the teaching program they felt was most beneficial, their answers focused around the explanations given by the nurse.

The case for patient teaching is strong as can be seen by the examples cited and the nurse is in an opportune position to do this teaching. Informal, yet definitely organized and planned, patient teaching done at the bedside should be an integral part of the patient's treatment regime. This teaching based on the patient's interests
and his immediate needs yet oriented toward his future needs is a type of teaching that is unique to the nurse who cares for him at the bedside and can see the needs he expresses. To be effective she must be willing to accept teaching as an integral part of her nursing function. Pohl feels that it is the nurse who can offer much in the way of health promotion through teaching because the people who are in contact with the nurse are very conscious of their health. Haferkorn states that assessing where the patient is in his knowledge is an important function before beginning teaching and the nurse has the frequent contact and communication with the patient that permits such an assessment to be made. Florence Lockerby summarizes the observation and teaching opportunities that only the nurse can make when she says:

"Only the nurse among all members of the health team has the opportunity to observe a patient in an intimate and continuous situation. What she observes about his psychological and physical reaction to the reality of his hospitalization more validly indicates his needs and responses than intermittent or 'specialized' observations made by others."

There seems to be no question that teaching is important for the patient if he is to achieve and maintain an optimum state of health. It also seems to be an integral part of the nursing profession to provide the opportunity for learning to the patient through patient teaching. The question is then not one of the importance of teaching but rather whether teaching is carried out by health personnel in the hospital situation. The following report is a study done at Ball Memorial Hospital in January of 1972 by a senior nursing student to evaluate the knowledge of the post myocardial infarction patient and determine if patient teaching has been used to aid the patient in adjusting to his condition and accepting his treatment.
Problem Statement:

The purpose of this study is to determine the amount of knowledge ten post myocardial infarction patients have about their condition and compare this knowledge to the knowledge of ten patients who have not had myocardial infarctions or any other type of heart disease.

Design of Study:

This study was carried out at Ball Memorial Hospital in January of 1972 and consisted of a sample of twenty patients. The method of collecting data was a questionnaire formulated by the investigator with the purpose of determining the patient's knowledge of several aspects of a myocardial infarction. After consulting with several members of the health team on the post coronary unit at Ball Memorial Hospital, the investigator arrived at thirteen questions she believed were essential to a patient in understanding his condition.

As the study is stated, it is to determine the knowledge of the post myocardial infarction patient. Myocardial infarction is the medical term for the lay term of heart attack. The lay term heart attack is used throughout the questionnaire to facilitate the understanding of the persons answering the questions. Heart disease, which includes myocardial infarction, is the major health problem in the United States today so it is believed that this would be a valuable area in which to explore the lay person's knowledge.¹²

Limitations of Study:

The limitations of this study are, in part, related to the number of patients in the sample. The sample was of only ten patients who had experienced a myocardial infarction and ten who had not. Making a wide
generalization concerning patient knowledge from this small sample might be unreliable. The sample was also taken solely from Ball Memorial Hospital so the results cannot be generalized any farther than this particular hospital.

Other limitations include the fact that there was no discrimination made as to the length of admission of the myocardial infarction patient, whether he had sustained a previous myocardial infarction, and no stipulations on age, sex or educational level of the patient. Likewise, there were no stipulations on the non myocardial infarction patient other than he had had no previous heart problems. It is believed that in future studies it would be advantageous to control more of these variables to obtain a more homogeneous sample. This study was carried out in a short span of time and it is believed it would be advantageous to use a longer period of time and increase the amount of people questioned in the sample. Increasing the sample and controlling more of the variables would allow for a greater degree of reliability and validity of the results.

Formulation of Questionnaire:

The questionnaire consisted of thirteen questions designed to evaluate several areas of knowledge about a heart attack. These areas included anatomy of the heart, equipment used while in the hospital, anatomy or causation of the actual heart attack, terminology of a heart attack, predisposing factors to a heart attack and the average projected length of treatment which would include treatment in the home situation. A wide range of questions were asked to determine if there were one particular area of knowledge that the patient is consistently knowing or not knowing. It is felt that the majority of questions were basic and
necessary for knowledge of the causation and subsequent treatment of a heart attack. Following on the next two pages is the questionnaire used as the evaluation tool.

Selection of Sample:

As stated above the sample consisted of twenty patients at Ball Memorial Hospital. Ten of these twenty patients had suffered a heart attack within the previous two weeks preceding the answering of the questionnaire. They were all patients of the cardiac extended care unit of the hospital where the majority of the patients have been admitted due to cardiac problems. All of these patients had been in the coronary care unit of the hospital within the last two weeks for a stay ranging from three to six days. There was no stipulation of age, sex or educational level for the sample. The age range was from forty to seventy-two and the educational level was from an eighth grade education to a college education. It is believed that some of these variables should be controlled in future studies of this type.

The remaining ten patients were selected from various nursing units within the hospital with no stipulation on age, sex or educational background. The only stipulation on diagnosis was that they had never been admitted previously for a cardiac ailment. Their ages ranged from 23 to 75 and the educational level from an eighth grade education to a college graduate education.

The two samples were taken as they were so the variable of the diagnosis of a heart attack could be observed and evaluated. The major difference existing between these two samples is that all patients in the first group had been diagnosed as having a heart attack within two weeks prior to answering the questionnaire and the second group had never been previously diagnosed as having any heart problems.
Please answer the following:

Age ________
Sex ________
Last year of school completed ________
Occupation or former occupation ________________________

Answer the following questions by circling the letter before the answer you feel is correct. Respond only once.

1. A heart attack is caused by:
   a. partial or total blocking of an artery of the heart
   b. partial or total blocking of a valve of the heart
   c. leakage of blood through the valves of the heart
   d. partial or total blocking of a vein of the heart

2. Another name for a heart attack is:
   a. cerebrovascular accident
   b. myocardial infarction
   c. stroke
   d. congestive heart failure

3. The damage to the heart in a heart attack is to the
   a. valves of the heart
   b. lining of the heart
   c. muscular layer of the heart
   d. arteries of the heart

4. An electrocardiogram (EKG or ECG)
   a. measures electrical activity of the heart
   b. stimulates heart action by an electrical current
   c. measures the amount of blood going through the body

5. A cardiac monitor:
   a. measures electrical activity of the heart
   b. stimulates heart action by an electrical current
   c. measures the amount of blood going through the heart

6. The blood samples you had drawn following your heart attack will indicate to the doctor:
   a. how much damage has been done to the heart
   b. what medications are needed to aid in healing of the heart
   c. what portion of the heart has been damaged in the heart attack

7. There are ________ chambers of the heart.
   a. 1
   b. 2
   c. 3
   d. 4

8. Atherosclerosis is:
   a. building up of material inside a blood vessel causing it to become narrowed
   b. severe pain in the chest region following a heart attack
   c. loss of the function of the heart valve following a heart attack.
9. Smoking causes:
   a. enlargement of the heart vessels
   b. narrowing of the heart vessels
   c. narrowing of the heart valves
   d. enlargement of the heart valves

10. Which of the following is considered a predisposing factor to a heart attack?
    a. excess protein in the diet
    b. excess cholesterol in the diet
    c. excess Vitamin D in the diet
    d. excess carbohydrate in the diet

11. The pain following a heart attack is due to:
    a. chemicals in the blood that irritate the heart
    b. insufficient oxygen supply to the heart
    c. too great a blood supply for the heart to handle efficiently

12. The total hospital stay following a heart attack is usually around:
    a. one month
    b. two months
    c. three weeks
    d. one week

13. The damaged area to the heart usually takes ___ weeks to heal following a heart attack.
    a. 3-6
    b. 12-15
    c. 15-20
    d. 6-8
Response to Questionnaire:

The following two graphs are a representation of the response to the questionnaire. It can be seen from this data that the patient who has suffered a heart attack does know more about his condition than the person who has never had a heart attack but not to a great degree. The patient who had suffered a heart attack answered 56.2% of the questions correctly and the patient who had never had a heart attack answered 39.2% of the questions correctly. By tabulating the answers to the questions separately it can be seen which answers were most frequently missed. Those questioning terminology such as myocardial infarction and atherosclerosis were frequently missed by both groups. Also those dealing with anatomy such as the number of chambers in the heart were frequently missed by both groups. Most patients who had had an EKG knew what it was but three of the ten patients did not realize that an EKG and a cardiac monitor measure the same phenomena of heart action. It can also be seen that questions 8, 10 and 13 were missed more frequently by the patient who had sustained a heart attack than by those patients who had not. Question 8 was on the definition of atherosclerosis. It was missed by 7 MI patients and 6 non MI patients. Possible explanations for this fact may be that it is not a term used frequently in the discussion and explanation of a heart attack. When talking to patients following the answering of the questionnaire, the investigator found that most expressed that they had never heard the word before. This is a term used in explanation of the causation of a heart attack and may not be used as frequently in explaining the purpose of a patient's treatment to him. Question 10 was one that asked about excess cholesterol in the diet. The investigator was very surprised that
This is a graphical comparison of the number of MI patients and non-MI patients missing each question. The horizontal axis is the number of the question from 1 to 13. The vertical axis represents the number of persons missing each question in each of the categories, MI and non-MI. The MI answers are graphed in red and the non MI answers are in green. For example, on question number 1 (horizontal axis) two MI and six non MI patients (vertical axis) answered incorrectly.
This graph represents the total questions missed on the basis of 100%. The horizontal axis is the category of patient, red for MI and green for non MI. The vertical axis represents the per cent of questions missed. It can be seen that the MI patient missed 43.8% of the total questions and the non MI patient missed 60.8% of the total questions.
five MI patients and 4 non MI patients missed this question. It seems that this term is discussed frequently in literature talking about heart attacks written for the general public. This may be an indication that the general public does not make use of literature written. The wide diversity in educational levels may be one reason for the frequency of missing this question. Question 13 was a question asking how long it takes for the damaged area of the heart to heal. When talking to patients following the questionnaire, the investigator believes that they confused this question with the amount of time they had been told they would have to remain in the hospital. This might be an explanation for the reason it was missed more frequently by the MI than the non MI patient. There was no question missed in particular as compared to all the others but the answers give evidence that there is a general lack of knowledge about a heart attack by the patient who has had a heart attack as well as by the general public.

Major Finding of the Questionnaire:

The major finding of this investigation is that there is a lack of knowledge about the anatomy, physiology and other general considerations about a heart attack by patients in Ball Memorial Hospital who have had a heart attack. Another related finding is that the person who has had a heart attack is not an appreciable degree more knowledgeable about the heart attack than the person who has not had a heart attack. These findings point to several implications concerning patient teaching.

Discussion of Implications:

In the introduction to the paper the views of several authors and nursing personnel on their feelings about the importance of patient
teaching were discussed. From their views and the investigator's experience in the hospital and home care situation it is determined that patient teaching, resulting in patient understanding about the disease, is important to their treatment and subsequent rehabilitation. The results of this study indicate that there is a need for patient teaching with the patient who has suffered a heart attack.

After talking with several of the post myocardial infarction patients, the investigator determined that the nurse has a great deal of opportunity and responsibility in relation to patient teaching. One patient stated that the nurses tell him nothing and if he has a question he saves it for the doctor. When asking the doctor a question, the above patient stated that he sometimes received an answer and sometimes did not. Several patients asked that their questionnaires be graded while they watched and when missing a question asked what the correct answer was and why. There was a definite show of interest about the questionnaire. Several patients were apologetic that they did not know any more answers than they did and said that they had never been told these things. While spending a few moments at the bedside of each patient answering the questionnaire, it was discovered that there is a definite interest among these patients about their heart attack.

The study implies that a need for teaching exists and since the investigator is a nursing student it is in her interest to discuss what implications this lack of knowledge will have for the nurse who is working on a unit that cares for post myocardial infarction patients. It is believed that there are four ways in which teaching can be made more an integral part of nursing care, three of which are through efforts basically made by the professional nurse and one of which is by other nursing personnel.
One major consideration in integrating teaching into patient care is planning and it may be the function of the professional nurse to do this planning so that in reality teaching can be an integral part of patient care.

The first way concerns better communication. Communication is defined as transmitting an idea from one person to another, and if the communication is effective the idea from the sender is received and correctly interpreted by the receiver. There are several ways that can be used to evaluate effectiveness of communication. The quickest and simplest way for the nurse may be verbal questioning of the person or persons with whom she communicates. She can also observe if her directions and plans for teaching are being implemented and carried out. The nurse communicates with many other members of the health team including the doctor, nurses she works with, nurses from other shifts and paramedical persons. The nurse must also remember that communication with the patient must also take place. Fuerst and Wolff believe that there is still a stereotype in nursing in which the patient feels the nurse is too busy to talk to and that anything she says is law. It is one of the professional nurses responsibilities to help eliminate this stereotype from her nursing unit. Ways in which she can do this are by taking patient assignments herself and spending time at the bedside of the patient. She can encourage patients to ask questions and find the answer to the question if she does not know it. When the stereotype exists the patient does not ask questions, feeling he will be a nuisance if he does. Fuerst and Wolff advocate a give-and-take attitude and atmosphere between the nurse and her patients. The nurse can aid in establishing this give-and-take atmosphere by encouraging questions from both the patient and his family. She can do this by explaining procedures
as she carries them out and answering questions as she makes rounds. Although she may be busy, she should be careful not to convey this feeling consistently to the patient so the patient feels that her time is too valuable to spend with him. Nurse-patient contact is a necessity if teaching is to be emphasized.

The nurse also communicates with the doctor. If this communication included what the doctor has told the patient and what information he wished withheld from the patient it could be valuable in planning teaching. The nurse should also be willing to communicate to the doctor her plans for the patient, including teaching plans. The doctor could serve as a valuable resource person in knowledge and perhaps materials related to teaching if better communication lines were established between doctors and nurses.

The nurse who is leading a team of nursing personnel must also communicate the importance of teaching to these team members. This can be done by example as she answers patient questions and institutes her own teaching plans with particular patients. Although other nursing personnel such as practical nurses or nursing aides may not be educated to teach, they can be encouraged to watch for patient teaching needs and convey questions asked by the patient to the nurse. Nursing care conferences can be used to emphasize the teaching need of particular patients of the nursing unit. If the team members realize what teaching is being done with a patient they may be able to add their observation of needs and results to those of the nurse. Redman feels that teaching is often neglected since it is not often made as an assignment to a particular member of the nursing team. There is a lack of clear allocation of responsibility about who is to do the teaching and lack of communication among members of the nursing team. 15 Marilyn Ketching advocates that teaching be made as a special assignment on the daily assignment sheet of the staff nurse.
She also suggests that teaching assignments can be included in the card file as a treatment and checked off when completed. The professional nurse on the nursing team has the responsibility to insure that teaching is emphasized.

The second way in which teaching can be integrated into patient care is closely related to communication. This method consists of the written nursing care plan. Too often, teaching is instituted on one shift but the other shifts fail to realize what is being done with or for the patient during other hours of the day. The written nursing care plan could help insure 24-hour continuity of care. By putting teaching needs and methods in the nursing care plan, all nurses who care for the patient will be enabled to know on what level of knowledge the patient is. These written care plans should be shared with all personnel who have contact with the patient and it is the responsibility of the professional nurse to make sure the plans are written and used on the nursing unit.

The third method to improve teaching is through the use of educational materials that may be available for the nurses' use in teaching. Florence Stacey states that the staff nurse needs information of the subject to be taught if she is to do effective teaching. Brochures or pamphlets may be available for use if the nurse remains aware. It is also her responsibility to remain knowledgeable of the areas in which she works so if a teaching opportunity presents itself she will be prepared. The nurse who works in one particular area consistently and observes patient needs may want to formulate her own teaching materials into a unit to make her teaching more effective. The nurse who feels teaching is important should accept the responsibility of knowing her subject and being prepared to help the patient in understanding.
Other nursing personnel accept the responsibility for the fourth suggestion to integrate teaching into the patient situation. These personnel include hospital administration, nursing supervisors and nursing educators. This view is emphasized by Monteiro's statement: "The responsibility for encouraging the staff nurse to teach patients rests in the nursing service in which she is working." Monteiro goes on to state that if a new graduate nurse is to be expected to accept teaching as a part of her responsibility she must be educated by those people who are committed to the concept that teaching is an integral part of the nursing role. The responsibility for the major portion of teaching lies with the professional nurse member of the nursing team but she must be prepared for this role by nurse educators and supported in this role by hospital administration.

This study had shown that there is a lack of knowledge of his condition on the part of the patient who has sustained a heart attack. Several implications about teaching were drawn from the study and several methods to integrate teaching into nursing care have been offered. At this point the investigator believes it becomes the responsibility of the professional nurse to organize her knowledge, support patient teaching and convey her enthusiasm to her patients as well as other members of the nursing and medical team.
FOLLOW-UP ON RESEARCH STUDY

As a follow-up on the above study done at Ball Memorial Hospital, I have decided to write a pamphlet for the post myocardial infarction patient. I went to nurses and doctors who worked on the unit that care for the majority of the post coronary patients and asked what information they thought the patient needed to understand his myocardial infarction. I also went to the American Heart Association to see what pamphlets were available to the patient. After talking with these persons and reading the available pamphlets I determined that there was a lack of understanding of the basic anatomy of a myocardial infarction.

A need for better communication with patients has long been recognized by health personnel. It is believed that the patient who knows why he is sick and why he is receiving his prescribed treatment will participate more effectively in tests, treatment and self-care. This pamphlet is designed for the post myocardial infarction patient, explaining basic anatomy and physiology of a heart attack in hopes that his understanding will aid him in understanding and participating in his treatment.
FOOTNOTES


3 Ibid., p. 199.


8 Monteiro, op. cit., p. 28.

9 Pohl, op. cit., p. 3.

10 Haferkorn, op. cit., p. 199.


13 Pohl, op. cit., p. 32.

14 Fuerst, op. cit., p. 56.

15 Redman, op cit., p. 6.


17 Ibid.


19 "Patient's Understanding of Written Health Information", Nursing Research (Spring, 1964), p. 100-108.
BIBLIOGRAPHY


Heart Attack!!!

What Happened?
WHAT YOUR HEART LOOKS LIKE

You may hear that you or a friend of yours has had a heart attack but just exactly what does that term mean? Who or what led the attack and what does it mean to me, the one I am most concerned about? To understand these answers you must first understand the basic structure of the heart.

This is your heart as viewed from the outside. It lies in the chest area a little left of the center. Make a fist and look at it. Your heart is about the size of that fist.
WHERE THE BLOOD GOES

To understand the right and left heart the course of the blood as it travels through the heart must be understood. The course of blood through the heart is as follows.

right atrium → right ventricle → lungs

Body

left ventricle

left atrium

Blood enters the right atrium

It then goes to the right ventricle

The blood then goes to the lungs to receive oxygen
This is your heart as viewed from the inside. There are four chambers or rooms in your heart. These rooms are called atria and ventricles.

This is your heart as viewed from the inside. There are four chambers or rooms in your heart. These rooms are called atria and ventricles.

Atria = a · tree · uh
Ventricles = ven · tree · cul

Imagine the atria and ventricles as rooms that store the blood as it is pumped speedily to the heart.

The right side of the heart pumps blood to the lungs where oxygen is added. The blood is sent to the left side of the heart from the lungs.

The left side of the heart pumps blood to the body where it can be used by the body.

Blood goes from the right heart to the lungs and then to the body.

Blood goes from the right heart to the lungs and then to the body.
CORONARY ARTERIES
(branches off the main artery coming from the left side of the heart)

Although there is blood flowing through the inside of the heart constantly, the cells of the heart itself can receive no oxygen from this blood. The only blood supply for the cells of the heart is provided by the coronary arteries, pictured here.

An artery is a sort of pipeline through which blood flows to various parts of the body.

artery = pipeline for blood

Blood is carried to the cells of the heart muscle by means of the two coronary arteries. Without the oxygen in this blood the cells and tissues of the heart cannot live. If the tissues are not alive the heart cannot function to pump blood through the body so that other body cells can be supplied with oxygen.
Blood flows to the left atrium from the lungs

It then goes to the left ventricle

It flows from the left ventricle to the body where it can be used by cells of the body.

Cells are the vital units or building blocks that make up all the tissues of the body. Without oxygen, cells cannot live so it is the function of the heart and lungs to provide the cells with oxygen for life. The blood carries oxygen to all the cells of the body.
THE HEART AS A MUSCLE

Much of the heart is made up of muscle cells which can be seen in the following drawing.

- pericardium
- epicardium
- myocardium (muscle)
- endocardium
THE PROBLEM IN A HEART ATTACK

The problem in a heart attack lies in the coronary arteries. One of the coronary arteries or a portion of an artery becomes blocked and no blood can flow through. If no blood goes through, the part of the heart supplied with blood by the blocked artery cannot live. The reason the artery becomes blocked will be explained a little later.

Muscle cells require a great deal of oxygen because they are active and working. The muscle of the heart requires a great deal of oxygen because the heart is constantly working to pump blood through the body. It requires a larger amount of oxygen when you are exercising or being active because the heart is beating faster when you are exercising or being active.
DAMAGE TO THE MUSCULAR LAYER

The ventricles are the largest portion of the heart and require the most muscular tissue to do their work. The right ventricle pumps blood to the lung which is a short distance requiring a relatively small amount of force. The left ventricle pumps blood to the entire body which is a farther distance, requiring a greater amount of force. The left ventricle thus has the most muscle and is the part of the heart that is usually damaged in a heart attack.

right ventricle \[\rightarrow\] lung
short distance
small force

left ventricle \[\rightarrow\] body
longer distance
larger force
The entire heart is surrounded by a layer of tissue (skin-like material) called the pericardium which serves to protect the heart. The heart itself is composed of three layers of tissue called the epicardium, myocardium and endocardium. The myocardium is the thickest layer of the heart and is the one that is damaged in the case of a heart attack. The word is broken down to mean the muscular layer of the heart and it is this muscle that enables the heart to do the work of pumping blood through the body.

myo = muscle

cardium = heart

myocardium = muscular layer of the heart

From here on when damage to the heart is spoken of it will refer to damage to the muscular layer.
THE ASTRONAUT AND THE CORONARY ARTERY

The above descriptions have shown what happens in a heart attack, and the following story reviews the sequence of events that take place as the cells of the myocardium are being damaged and death of the cells results. The cells of the myocardium are being compared to an astronaut as he walks on the moon depending on the oxygen tank on his back for survival just as the cells of the myocardium depend on the coronary arteries for their oxygen and survival.

An astronaut working on the moon depends on his lifeline to his oxygen supply for survival. He has no other source of oxygen. The muscular layer of the heart depends on the coronary arteries for blood and oxygen. The cells have no other source of oxygen.
Damage is illustrated in the following drawing. The darkened area of the drawing represents the myocardium of the left ventricle that is damaged in the heart attack.

Damage occurs in a heart attack when a portion of one of the coronary arteries is blocked. Although the reason for the blockage is not completely understood it relates to excess fatty deposits on the inside of a coronary artery. The term for the formation of these fatty deposits is atherosclerosis.

ather o • soler • o • sis

athero = fat
sclerosis = deposits

atherosclerosis = fatty deposits

Atherosclerosis is the build up of fatty deposits on the inside of a coronary artery making it difficult for blood to pass through the artery. The myocardium of the left ventricle is receiving less blood and thus less oxygen therefore the cells are damaged.
The astronaut moves around on the surface of the moon picking up rocks and as he does he breathes deeper and faster. The kinked lifeline limits his oxygen supply, he signals to his fellow astronaut in the space capsule that he is in trouble.

You run to catch a bus you simply must make and your heart is forced to beat faster, requiring more oxygen to do its work. It cannot get enough blood through the narrowed coronary artery. At this time you have a feeling of suffocation, pain and perhaps nausea. This is your heart's way of telling you it is not receiving enough oxygen and that it is in trouble.
The astronaut's lifeline has a kink in it. If he rests quietly there is still enough air for him to breathe without difficulty.

When a coronary artery becomes partially blocked and the heart is allowed to rest as quietly as possible there is still enough blood to supply the muscle adequately.
Once a portion of heart tissue dies it remains dead. The muscle of the heart is not able to repair itself. Where there is dead tissue or cells in the heart a scar will form. This scar will eventually strengthen and it will be safer for you to resume some activity. Just as when you get a cut on your finger, it takes time for a scar to form and the less you move your finger or bother the scar the faster it will heal. The less you require your heart to work the quicker the scar will form and the stronger it will be.
The astronaut's oxygen supply falls dangerously low and he slips into a coma. His oxygen supply is cut off and he dies due to a lack of oxygen which is required for all body cells for life.

Blood flow to the cells of the myocardium is completely stopped so the cells cannot live without oxygen. The damaged cells of the myocardium die and therefore a portion of the heart muscle dies.

WHAT DOES THIS MEAN TO YOU ????????????????
The heart also has the ability to send a new blood supply to the portion of myocardium that has lost its supply. This is accomplished through what is called **collateral circulation**.

Collateral circulation simply means that when one source of blood is lost other arteries send out shoots or runners to resupply the portion lost much like the branch of one strawberry plant sends out runners to other areas of the garden. The dead cells of the heart muscle remain dead but the damaged area is prevented from becoming larger through collateral circulation. This process again takes time and it is important that you rest while the circulation is being restored. This process also makes it possible for you to resume activity and as the collateral circulation develops you will begin to resume activity.
This is the very reason you must rest now that you have had a heart attack. You must rest until the heart has had time to form a scar. This formation of scar tissue takes a different amount of time in each individual person so it will be up to your doctor to decide how much activity it would be safe for you to do. Be sure to find out from your doctor just what kind of activity and how much activity he believes is safe for you.

While resting, the cells of the myocardium require less oxygen than they would if working actively. By requiring less oxygen you are requiring less blood to be pumped through the coronary arteries. Requiring less blood allows the heart to rest and form the scar that will again make the myocardium strong.
It is hoped that you now understand better what happened when you had a heart attack and what it has done to your heart. Blank pages have been provided so you can write down questions you may have now. Bring these questions to the attention of your doctor and nurses who may be able to help you further understand what has happened.

There are several pamphlets available through the American Heart Association that explain other aspects of your heart attack. The American Heart Association is located at 44 East 23 Street, New York, New York 10010 and your headquarters here in Muncie is the East Central Indiana Heart Association, 102 South Walnut Street. Ask your doctor and nurses about getting these pamphlets.
Although you may feel no pain or discomfort, rest is very important in the treatment of a heart attack while your heart forms scar tissue and collateral circulation. Each of these processes take time and a different amount of time in each person. Be sure you understand just how much activity your doctors and nurses allow. It is important for you to follow the doctors and nurses directions about the amount of activity you should do.
See if you know the answer to these questions about your heart attack. Circle the best answer.

1. Your heart lies in the chest area a little left of center and is about the size of
   a. a football
   b. your fist
   c. a ping pong ball

2. There are _____ chambers in your heart
   a. 1
   b. 2
   c. 3
   d. 4

3. The vital units or building blocks that make up all the tissues of the body are
   a. muscles
   b. bones
   c. cells
   d. organs

4. The only blood supply for the muscle of the heart is
   a. coronary arteries
   b. right ventricle
   c. left ventricle
   d. lung

5. The muscular layer of the heart is the
   a. pericardium
   b. epicardium
   c. myocardium
   d. endocardium
American Heart Association pamphlets offering information relating to a heart attack.

Dietary information:
1. The Way to a Man's Heart
2. Recipes for Fat-Controlled Low Cholesterol Meals

Information on heart and blood vessel disease
1. Questions and Answers about Heart and Blood Vessel Diseases
2. Facts about Heart and Blood Vessel Diseases

Risks related to heart attacks and how to reduce them
1. Heart Attack - How to Reduce Your Risk
2. After a Coronary

Information on all aspects of a heart attack
1. You and Your Heart
2. Your Heart Has Nine Lives
6. The damage in a heart attack is usually to the muscular layer of the
   a. right atrium  c. left atrium
   b. right ventricle d. left ventricle

7. The build up of fatty deposits on the inside of a coronary artery is called
   a. atherosclerosis  c. myocardial infarction
   b. collateral circulation

8. The cells of the heart muscle can repair themselves once they have died
   a. true   b. false

9. The ability to send a new blood supply to the portion of the myocardium that has lost its supply is called
   a. atherosclerosis  c. collateral circulation
   b. scar formation

10. Once the cells of the myocardium have died and the process of healing begins the muscle forms
    a. an infarction  c. new cells
    b. a scar

If you missed any of these questions look back and find the correct answer. Do not hesitate to ask your doctors and nurses about any part of your heart attack you do not understand or are unsure of.

Correct Answers