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Specific Instructions as a Priming Strategy on Printed Information: Its Effect on Recall of Medication Instruction in Elderly Subjects

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ABSTRACT

Specific Instructions as Priming Strategy on Printed Information: Its Effect on Recall of Medication Instruction in Elderly Subjects

Helen M. Logan

Two priming strategies, specific vs. general instructions, about congestive heart failure and digoxin, were varied on recall of information, compliance and establishment of routine. Thirty-six elderly subjects at two hospitals and a home care program, prescribed digoxin within the last seven months, were chosen.

Background information and knowledge concerning their condition and digoxin was gathered, and they were then given a pamphlet on heart failure and an information sheet on digoxin. Half the subjects were given specific instructions focusing on the principal idea units of the information sheet. Interviews 48 hours and again three weeks later determined subject's knowledge, compliance and routine. Results indicated that the specific instructions particularly enhanced knowledge of side-effects of digoxin, definition and symptoms of congestive heart failure, especially after three weeks. A surprising result regarding compliance and number of drugs was achieved, perhaps because of the special assistance nurses gave to patients on large numbers of drugs. The effect of specific instructions was discussed in terms of the development of programs and materials in the health care field.

TABLE OF CONTENTS

List of Tables

List of Figures

CHAPTER ONE

RATIONALE

As North America moves closer to the year 2000, we are seeing a gradual aging of society. The age group over 65 is proportionally growing most rapidly in numbers, as influenced by such factors as better health due to medical advance and lower birth rates.

In 1970, people over age 65 constituted approximately ten percent of the total population, in contrast to only four percent of the population being over 65 in 1900. By the year 2025 the projected size of this age group is expected to be nearly fifteen percent of the total population (Botwinick, 1978, p.2).

Due to the increasing number of aged in our population, society is more aware of the process of aging and of the problems the elderly face. A major problem within this context is the large projected increase in the number of people requiring health services. Chronic disease is more likely to affect the old than the young and a common method of treatment is medications. This age group accounts for the majority of prescription drugs sold.

The majority of people over age 65 reside in their own communities and only a small percentage live in institutions. Those at home, therefore, are generally responsible for their own health and medication therapy. Research recognizes that the elderly, living at home, tend to make more errors in self-administration of medications and this is a serious health problem (Krupka & Vener, 1979). Data indicate that the elderly are seven times more liable

to suffer the consequences of an adverse drug reaction than persons 20 to 29 years of age (Hurwitz, 1969). These adverse drug reactions result in increased use of health care facilities, and, as reported, 3-5 percent of all hospital admissions were the result of drug therapy mismanagement (Caranasos, Stewart, & Cluff, 1974).

Instruction

Health care personnel recognize the need for teaching the elderly about these medications and it is clear from the above that the elderly must be made aware of the dangers involved in mismanagement of their drugs.

It is likely that if patients do not know what is expected of them or did not understand the initial instructions concerning their medications, they are more apt to mismanage their medication regime. These patients while hospitalized or under a doctor's care appear to learn little about their medications (Ellor & Kurz, 1982). Far too often, upon discharge, they are given a prescription for 3-5 medications and told little more than time and amount to take and are then expected to become experts on self-administration of these drugs. With this inadequate information, they would also be less likely to recognize adverse reactions that could develop. They may not contact their doctor about their early symptoms which could lead to more serious consequences, requiring hospitalization.

The effect of patients' knowledge of disease and medications is unclear although the literature indicates there is a positive

relationship. The result of one study suggests that knowledge serves to stimulate compliance at the beginning of a treatment regime whereas perceptions of adverse affects are more effective stimulants once treatment has begun (Given, Given & Simoni, 1978). Neufeld, cited in Given (1978) insists that when patients are motivated and presented with accurate information regarding their medications, they are likely to take the prescribed medications that are intended to have a positive effect on their health states. Motivation is underlying premise with all theories of patient education and compliance, because if patients are not motivated to learn or to comply, there is little that can be done in regard to treatment.

Material can be presented in verbal or in written format, or in both, to increase the patient's knowledge about medications. Studies suggest that patient education can affect compliance levels when the mode of delivery is informal, involving direct personal contact between the information giver and the patient and when it is restricted to aspects of the medication and its administration (Given, Given & Simoni, 1978). Written information by itself has not been associated with improved long-term compliance, but it seems to work best when delivered in the context of the social support and verbal instructions of the health care professional (Morris & Halperin, 1979). Written instructions have demonstrated enhanced knowledge of side effects of medications (Morris & Halperin, 1979).

Within this context, the present study addressed the use of a priming or pre-instructional verbal strategy on printed information

given to the subject. The objectives of this study were to see if the instructions would:

1. lead to subjects' increased knowledge of their disease and medications.
2. influence the development of a definable routine so subjects would remember to take the medications.
3. lead to improved compliance with the medication protocol over the study period of three weeks.

Priming Strategy

In the literature on recall of medical advice, it is noted that patients are unable to recall a high proportion of what they have been told. Accurate recall of instructions is likely a necessary basis for compliance. The elderly learner has more difficulty with recall, even of meaningful material, because of inefficient application of attentional and organizational processes (Glynn & Muth, 1979). A study by Hultsch (1975) concludes that although the elderly were inefficient at developing their own organizational schemes, they were able to make good use of them when provided. Contextual features of a learning situation in the form of aids or strategies may stimulate older adults to process text information in a deeper fashion and therefore enhance recall.

One such aid is called a priming strategy in that it is implemented in advance of the material to be learned, to prepare subjects by providing them with an assimilatory set (Glynn & Muth, 1979). This directs the attentional processes of the subject to

the most important idea units in a passage and provides a more efficient organization of the material under these idea units. Based on literature in this area, I chose as a priming strategy to examine general versus specific verbal instructions to the subjects about their medication therapy (Bradshaw, Ley, & Kincey, 1975; Glynn & Muth, 1979; Taub, 1980).

Patients usually receive instructions from health care personnel in the form of general rules, e.g., "you need to watch your diet," whereas studies done by Ley, Jain & Skilbeck (1976) and Bradshaw, Ley & Kincey (1975) indicate that advice should be given as specific concrete instructions, e.g., "you must weigh yourself every day", to be more effective.

Studies done on perceived importance of a medical statement indicate a direct relationship to probability of recall (Bradshaw, Ley & Kincey, 1975) suggesting that general advice is perceived as less important and therefore less recalled than its specific counterpart. If specific instructions do enhance recall and therefore improve compliance, this in itself would be a valuable tool readily available for health care personnel to use.

In this study an attempt was made to identify whether specific instructions to patients about their prescribed medication led to increased knowledge about this drug and improved compliance with the medication regime. It will be established whether or not the subjects have developed any definable routine to help them to remember to take their medication.

In the set of specific instructions I included attentional phrases, as, for example, "note this, look here," etc., which I felt would help focus the learner's attention on the specific idea units to be learned. Thus, the learner will be asked to attend to features he/she normally could ignore therefore reducing perceptual distortion.

In studies done on attention-directing devices, such as verbal directions and visual pointers, it appears that lower-ability learners seem to benefit more from these devices (Allen, 1975; Greco & McClung, 1978). Since this population of subjects has probably not been exposed to formal education for a long time, they may have lost cognitive skills that encourage encoding, storage and retrieval. This strategy then should help these adults focus on the important elements of the material to be learned.

Aged

Laws set by government have arbitrarily defined the aged, with the establishment of a retirement age, usually at age 65. Most people see this as a general reference point in distinguishing between middle and old age. However, for research purposes, it is not wise to consider the aged as constituting a single homogeneous group as their life experiences are more varied than those of younger people. People born around the same time do share some common social and historical experiences but there are still great individual differences within the group, as for example in personality, intelligence, etc.

For research purposes Neugarten (1975) considers it best to think of the elderly in at least two groupings: as the young-old from age 55-74 and old-old from age 75 upwards. The young-old tend to be healthier and have a more equal sex ratio than the old-old. In the latter group women predominate and a large percentage of the aged require institutional care.

For the purposes of my study and due to the diversity within the population, I divided my subjects into three groupings, ages 50-64, 65-74 and 75 and upwards.

Congestive Heart Failure

The average American living to his/her life expectancy can have three or more chronic diseases and one of the three will be cardiovascular related (Potempa & Roberts, 1982). Cardiovascular disease is one of the major causes of death in North America (Potempa & Roberts, 1982). It requires frequent medical follow-up and the primary method of treatment is medications.

Congestive heart failure is present when the heart is unable to supply the body with sufficient blood to meet its needs and becomes an inadequate pump. The result is an increased pressure in vessels entering the heart which is reflected in the tissues and organs of the body. Many conditions can affect the work of the heart and lead to congestive heart failure, myocardial infarction being a major one. Common symptoms are: fatigue, increased pulse rate, dyspnea, cough, anorexia, significant weight gain and signs of edema.

Once diagnosed, the underlying cause should be treated, if

possible. Therapy is directed to increase the heart's ability to meet the needs of the body. However the chief means of increasing the heart's strength is through administration of a digitalis preparation.

Digoxin

Digoxin increases the force of contraction and slows the heart rate but should be used cautiously especially with the elderly. In this age group there are certain physiological changes which affect absorption, metabolism and excretion of drugs. Digoxin is primarily excreted by the kidney, but with decreased renal perfusion due to age related changes, dosages of digoxin should be carefully regulated to avoid toxicity. Adverse effects can also develop as a consequence of concurrent disease and drug interactions.

The drug itself has a narrow dosage range between toxic and therapeutic effects. One study that examined hospitalization caused by adverse drug reactions identified eight drugs as causing one-third of the admissions, digoxin being one of them. (Caranasos, Stewart, & Cluff, 1974). Adverse reactions, typical of digoxin include: gastrointestinal symptoms, visual disturbances and cardiac arrhythmias. Among these the last is life-threatening.

Inadequate instruction in preparation for long-term self-medication is serious but especially so when the drug is a digitalis glycoside. Because of this, I chose to concentrate on the drug digoxin for this study. My aim is to help patients become knowledgeable about its action and potential side-effects and about

its interactions with other drugs, so that they can better manage their own digoxin therapy. It is hoped that this will be accomplished through the use of a priming strategy (specific instructions) on printed information about digoxin which the patient will receive.

Material Development

Format

Information has been presented to patients about their long term drug therapy in a number of ways and has varied in format from enhanced typed labelling of medication containers to multiple page brochures. Studies suggest that brochures and one-page sheets do improve knowledge about drug therapy and are positively evaluated by patients (Deberry, Jeffries & Light, 1975).

Based on the literature and what I felt would be convenient for easier reading and reference by patients, I selected the one-page sheet format. I felt that patients should not be overwhelmed by excess information about the drug digoxin, but certain information would be critical to help them manage their drug therapy successfully. This content would fit well into the one-page format design of approximately 8 x 11 inches.

For written instructions to be effective, they must be read understood and remembered by patients. Patient information then should be attractive, easy-to-read and directive to possibly change patient behaviour. Large type size seems to be a necessary criteria for the elderly due to visual changes that can occur with

age. The lens of the eye thickens leading to slowed accommodation and therefore decreased visual acuity. Due to this there could also be a problem with focusing on near objects so large clear print is a necessity.

Evidence suggests that contrast sensitivity also decreases with age making it difficult to discern various brightnesses (Knox, 1977). To enhance contrast I used black type on white paper with 1½ spacing between lines.

In regard to organization of the information on the one-page sheet my aim was to set out the principal headings clearly through spacing and indentation to facilitate the subjects' organization and integration of the material to be learned. Glynn (1978) describes this approach as orienting devices which provide cues that emphasize salient features in the material. They are means to counter perceptual deficits and ineffective decision criteria about what is to be learned, seen to an increased extent in the elderly. The appropriately segmented format, based on meaningful units of information and spatial cues, such as indentation should enhance learning and recall (Frase & Schwartz, 1979).

Readability

Readability is also important as material too difficult to read will certainly not be understood. A number of studies have shown that passages of high reading ease as assessed by the Flesch formula are better remembered than those of low reading ease (Bradshaw, Ley and Kincey, 1975). It is important then to present medical advice in simplified language and I attempted to achieve a Grade 6 level

with the material. This also applied to the specific and general instructions given to the subjects.

Time

Due to the special requirements of this age group, I felt it was important to give the subjects adequate time with the material to be learned in a setting as non-threatening as possible.

Canestrari (1963) contends that the nervous systems of older adults require more time to channel perceptual information and therefore their time in verbal learning situations should not be limited. In this study the subjects were permitted to keep the material and 48 hours from the initial interview they were contacted to complete a post-questionnaire. The subjects could then choose a suitable time and place to read the material and not feel rushed nor in a test situation. It is felt that this approach coupled with calling the questions questionnaires instead of tests would be less anxiety provoking and provide more reliable results.

As well as the information sheet on digoxin the subjects received a pamphlet designed by the American Heart Association, entitled "Facts About Congestive Heart Failure". It is available in Quebec to patients, at the Quebec Heart Foundation. This gave the subject background information about their condition and emphasized the drug therapy prescribed, i.e. digoxin.

Feedback was requested from the subjects concerning the design and content of the information sheet on digoxin and the pamphlet on congestive heart failure. For example, questions were asked about the readability of the information, appropriateness of print size and

layout and suitability of the content.

In summary I feel there is an expressed need in this population for more effective medication instruction. Through the priming strategy of specific verbal instructions on the information sheet I hoped these subjects would become more aware of the characteristics of this drug and would be better able to maintain their health and manage their own therapy. With increased knowledge about their condition and medication I hoped to see improved compliance with their doctor's orders concerning this drug and perhaps the establishment of a definable routine in order to remember to take their daily digoxin dose.

CHAPTER 2

Literature Review

Instruction

The elderly have a high potential for misusing their medications, if for no other reason than that they are the largest consumers of prescription drugs (Levy & Glanz, 1981). Declining vision, hearing and memory which often occur with age also interfere with their ability to perceive instructions. To further complicate matters, the elderly are especially susceptible to unanticipated reactions to their medications, due to physiological aspects of aging.

Research about drug compliance indicates that many patients (not just the elderly) misinterpret even very precise instructions about their medications (Levy & Glanz, 1981; Marston, 1970; Weibert & Dee, 1980). The majority of people over age 65 reside in their own communities, monitoring their own health care, which includes medication-taking regimes. Research has confirmed that this group, at home, tends to make more errors in self-administration of medications (Basen, 1977; Klein, German & Levine, 1981; Lamy & Kitler, 1971; Raffoul, Cooper & Love, 1981). Basen (1977) asserts that drug misuse by the elderly results from a lack of information or instruction on appropriate use. Health care professionals recognize that effective instruction is central to the proper use of medications, but the degree of compliance with prescription instructions also depends on many other factors. Of the studies that indicate a significant proportion of patients (up to 50%)

fail to comply (Caranasos, Stewart & Cluff, 1974 . MacDonald, MacDonald & Phoenix, 1977; Raffoul, Cooper & Love, 1981), most focus on the effects of patient education while in the hospital, personal feelings about medication, environmental influences and follow-up practices of health care professionals.

Unfortunately the relationship between a patient's knowledge of disease and/or medications on his or her co-operation with a medical regime at home is unclear. Several controlled studies done by Sackett, Gibson, Haynes, Hackett, Roberts, Taylor and Johnson (1975) indicate no association between these variables. In experiments, lectures, printed materials and audio-visual aids were used to give information on disease and on the benefits of medications as well as on necessary precautions. Although knowledge increased as a result, compliance did not (Sackett et al. 1975).

Knowledge of the purpose of a drug has not been shown to increase adherence to a medication regime but knowledge of the disease and of specific aspects of a regime has resulted in better compliance (Given, Given & Simoni, 1978; Hulka, Kupper, Cassel & Burdette, 1976). In the study by Given et al. (1978) the results suggested that knowledge served to stimulate compliance at the beginning of a five month follow-up period. Perception of side-effects and benefits of medications appeared to be more effective stimulants to compliance once therapy was underway. This study also suggested that patient education can affect compliance levels presented in an informal manner with direct personal contact between the health professional and the patient (Given et al., 1978). Sackett et al. (1975) noted increased adherence

to a medication regime for hypertensive subjects when extra, personal attention was given to the patient by face-to-face instruction from a health professional. It was asserted that the success of knowledge in fostering compliance is derived from the motivation that is the product of the interpersonal relationships and contact found in the educational setting. Neufeld, cited in Given (1978) agreed that subjects who are motivated and possess accurate information about their medications are likely to take the prescribed medication. This is also supported by other studies in this area (Clinite & Kabat, 1976; Marsh & Perlman, 1972).

These studies also suggest that instruction can affect compliance when it is restricted to attributes of a medication and its administration protocol. Knowledge of drug function, as opposed to no knowledge or incorrect knowledge, was associated with decreased errors of commission and scheduling misconceptions in a study of patients with congestive heart failure and diabetes (Hulka, Cassel, Kupper & Burdette, 1976). Error rates were reduced when knowledge of all drugs being taken was reasonable. Patients in this study received their drug information initially from the prescribing physician; these instructions were reinforced by the pharmacist when the prescription was filled. In the study just mentioned and one other by Wandless and Davie (1977), the findings indicate that drug compliance in the elderly can be improved by giving each patient written and verbal instructions. The written instructions acted as a memory aid to assist recall of the initial advice.

For drugs used on a long-term basis, as per this study, written information as a sole intervention has not been shown to be sufficient for improving patient compliance (MacDonald, MacDonald & Phoenix, 1977; Morris & Halperin, 1979; Wandless & Davie, 1977). In a study by Clinite and Kabat (1976) sixty-two subjects taking long-term medication were given either verbal instructions, a one-page sheet or both the instructions and the sheet. There appeared to be no significant differences in compliance among the groups, although medication errors were fewest with both the verbal review and written sheet given together and greatest when only the sheet was provided.

Based on the literature cited previously, the instructions given to the subjects for this study were both verbal and written. A priming or pre-instructional strategy on printed material relating to their heart condition and medication was used.

Priming Strategy

In learning one must not only perceive information but must organize it in some way for later recall. In doing this we must impose an organizational structure on the material to be learned to ensure encoding, long-term storage and retrieval. Evidence exists which suggests that older adults are not adept at encoding and retrieving verbal information (Hultsch, 1975).

Craik and Lockhart (1972), in their model of memory involving levels of processing, emphasize encoding operations to ensure strong, long-lasting memory traces. The number and quality of the encoding activities in the areas of perception and organization determine how deeply this information is processed. More meaningful material is

processed more deeply then less meaningful material. As older adults do not appear as efficient in their organization of material for encoding, providing them with a strategy to stimulate them to process information in a deeper fashion may enhance recall. It is felt that inefficient application of attentional and organizational processes leads elderly learners to have more difficulty with recall, even of meaningful material (Arenberg & Robertson-Tchabo in Birren & Schaie, 1977; Glynn, 1978).

Hultsch (1971) discovered that subjects given instructions on how to organize specific material recalled more as a result than subjects who received only free-recall instructions. This suggests that recall deficiencies can be decreased in older adults by the encouragement of the development of organizational schemes. A later study by Hultsch (1975), shows that although the elderly were inefficient at developing their own organizational schemes, they were able to make good use of them when provided.

One such aid, used in this study, is called a priming strategy. It is implemented in advance of the material to be learned to provide the subject with an assimilatory set (Glynn & Muth, 1979). It can influence the subject's decision about what is important information to be learned and functions as an orienting stimulus. Frase (1969) calls this an "orienting direction" and describes it as "a class of goal-inducing stimuli which disposes the reader to respond to certain aspects of the text," i.e., the key ideas to which the reader should give his/her attention for purposes of later recall. It can direct the subject's attention to the most important idea units of the text and

may provide the learner with an efficient means to organize new text information. Important items of information can be organized into conceptual units which could be stored and retrived more easily. The priming strategy may also help older people retrieve related knowledge from their cognitive structure (by virtue of their age, they may have rich stores of related world knowledge (Glynn & Muth, 1979)).

There are two types of orienting directions, examples of which were both used in this study. The verbal type includes objectives, verbal commands, advance organizers and questions placed in various parts of the text. This type has been more extensively studied than the non-verbal or typographical cueing systems which use physical aspects of text design to highlight critical material, e.g., underlining, spacing and increased contrast (Glynn, 1978). The non-verbal type of orienting device is discussed later in the materials section.

Variables such as advance organizers and use of adjunct questions have been shown to produce significant effects with prose materials in studies, mostly concerning young adults (Faw & Waller, 1976; Hartley & Davies, 1976). Frase and Kreitzberg (1975) and Kaplan and Simmons (1974) indicate that if instruction is provided in advance of text study, material related to the objectives is recalled much better than information not related to the objectives. Okun, Glynn and Elias, cited in Glynn and Muth (1979) extended instructional objective research to an older population and the findings were consistent with that of the younger population. Therefore such techniques do appear to function as effective orienting stimuli for the elderly in

retaining critical information.

The use of adjunct questions does improve performance on immediate and delayed tests and also shapes the type of material that is learned and remembered (Rickards, 1976; Rickards & DiVesta, 1974). Questions lead to a focusing on text segments containing the information that answers the questions. Readers selectively allocate a longer attention span to question-relevant information (Reynolds & Anderson, 1982). This could be a valuable text-learning device for older subjects, yet there are no studies in this area.

An advance organizer's function, as explained by Ausubel (1977), is to "bridge the gap between what the learner already knows and what he needs to know," before he can successfully learn the task at hand (p. 168). It is intended to provide a framework which can be used to categorize, store and recall the new information extracted from the text. Several educational gerontologists recommend that elderly learners be provided with these mechanisms to help them conceptualize the material to be learned (Bolton, 1978; Knox, 1977). A series of studies with an older adult population needs to be done to verify this as an appropriate pre-instructional strategy.

The priming strategy chosen by the author involves the use of specific as opposed to general instructions, and although they do not fall into any of the above three categories exactly, they do correspond in the following ways. The instructions given to the subjects were verbal, and related in number and content to the five main idea units of the information. They were given to the subjects prior to their reading this information, and were designed to function in a manner

similar to objectives or advance organizers in that they help the learners to anticipate the content, purpose and objectives of the learning events to follow. They prepare the subjects for learning by providing them with an assimilatory set, which should aid their retention of important information.

Elderly learners are especially susceptible to interference generated by irrelevant information (Glynn, Okun, Muth & Britton, 1983; Rabbitt, in Birren & Schaie, 1977). Through the use of the priming strategy, the critical idea units were emphasized. Each idea-unit had a corresponding statement given as an orienting device to what would follow.

Studies done by Ley, Bradshaw and Kincey (1976) found that the perceived importance of a medical statement was directly related to the probability of its recall. Medical advice can be formulated in terms of general rules or in a more specific way. General rules are perceived as being less important and therefore less recalled. Three experiments were conducted by Bradshaw, Ley and Kincey (1975), one being a real-life situation with women attending an obesity research clinic. All patients received ten specific or general advice statements, presented orally by the experimenter. The recall of specific instructions was significantly higher in these studies than the recall of general advice. As there have been no recent studies done using this approach, and none at all in regards to the elderly or for medication teaching, this method was used in the present study.

Ley, Bradshaw, Eaves and Walker (1973) describe a method of organizing the content of material to be given to patients into

categories to facilitate recall of medical advice. In their study this approach led to a significant increase in the recall of the material to be learned.

As mentioned earlier, older people are not adept at encoding and retrieving verbal information in higher order conceptual chunks (Glynn & Muth, 1979) but are able to make good use of organizational cues when provided with them (Hultsch, 1975). These findings suggest that recall deficiencies can be reduced by activities that foster the development of organizational schemes. In this study, by organizing the content into five principal idea units, it was hoped they would function as information retrieval cues at the time of recall.

Attentional phrases were included in the set of specific instructions, such as "note that it will make your heart stronger," "watch for side-effects," etc. Through such devices the learner was aided to focus on the principal idea units to be learned and reduce interference of non-critical information. Here, certain contextual features of a learning situation were used to direct the subject's attention to the relevant message. This was not done in the general instructions.

Allen (1975) reviewed a body of literature and drew the conclusion that, attention directing which accented crucial cues, facilitated learning. Salomon (1972) suggested that treatments that force subjects to pay attention to and differentiate among details especially benefit low general ability subjects. Other studies also support this conclusion (Allen, 1975; DiVesta, 1975; Lumsdaine, Sulzer & Kopstein, 1961). Greco and McClung (1978) found that incorporating attention-

directing techniques into an audio lesson significantly enhanced learning for analytic individuals.

The summaries used by Reder and Anderson (1982) were viewed as an extreme version of how to focus attention. These summaries were devised to retain the main points of the text. In this aspect they functioned much like the specific instructions given to the subjects in this study. As orienting directions, these summaries were shown to be effective for recall (Reder & Anderson, 1980; Reder & Anderson, 1982).

The majority of older adults have long been away from school and are considered to be poorly educated by today's standards. The use of cues to focus attention has been found to be effective in aiding retrieval from memory. These cues could augment the cognitive skills that the elderly may have lost, thus encouraging more effective encoding, storage and retrieval.

Aged

For this study, subjects were divided into three age groups: 51 to 64, 65 to 74 and 75 to 94. Neugarten (1975) suggests that the old are best thought of in at least two groupings: the young-old, who range from an approximate age of 55 to 75, and the old-old, comprising those people aged over 75 years. The reason for this division is that there are important differences over this age span. The young-old tend, among other things, to be healthier than the old-old. At present, about fifteen per cent of the group aged 45 to 64 need to limit their major activities because of health, while for all those 65 and oyer, it is about forty per cent (Neugarten, 1975).

From age 55 and up, women outnumber men by a sizable proportion, but less so in the 55 to 64 and 65 to 74 age groups than in the 75 and over. The young-old are already much better educated than the old-old. The gains in educational level in successive cohorts has been so substantial that by 1990 the young-old group will be, on the average, high school graduates (Neugarten, 1975).

For this study then, it was felt that three age groupings would be more appropriate to see if there would be any age-related differences.

Digoxin

Many elderly people are on digitalis, which is known to cause toxicity in ten per cent of subjects (Klein, German & Levine, 1981). The principal factors contributing to digoxin toxicity in older adults are their generally decreased body mass and diminished renal function (Chisholm, Lundin & Wood, 1983). These age-related changes contribute to associated changes in drug absorption, excretion and metabolism. Equal amounts of administered digoxin produce higher blood levels in old, as compared to younger subjects (Caranasos, Stewart & Cluff, 1974).

Multiple pathology, a common occurence among the elderly, fosters the practice of over-prescribing in attempts to treat several disorders together. The number of drugs prescribed for people rises with the age of the subject (Hurwitz, 1969) and adverse drug reactions accelerate with increased drug exposure (Williamson, 1980). In a study with 1998 geriatric subjects, there was a highly significant increase in adverse reactions from patients taking a single drug (10.8%) to those

taking six drugs (27%) (Williamson, 1980).

Many drugs interact with digoxin, which is of importance since these interactions could precipitate over or under digitalization and resultant lapse into congestive heart failure. Calcium, potassium, quinidine, laxatives and antacids are examples of drugs which require an adjustment of the subject's digoxin dosage.

Given the increased incidence of chronic health problems in elderly people, reliance on over-the-counter (OTC) analgesics, gastro-intestinal preparations, and cough and cold medications also increases. Studies show that OTC drug use can closely parallel that of prescription drugs (Lamy, 1982; Lamy & Kitler, 1971). Drug interactions present a problem that can be overlooked when OTC drugs are used without the advice or knowledge of the prescribing physician. Many OTC cough and cold preparations contain sympathomimetics which when combined with digitalis can lead to cardiac arrhythmias (Lamy, 1982). To avoid toxicity, the major recommendation for doctors prescribing for the elderly is to start at a very low dosage and to check plasma digoxin levels (Williamson, 1980).

In a recent study of subjects taking medication at home, over 53% of those patients were found to be in danger because they knew so little about the drugs. The study established that the greatest lack of knowledge was of side-effects (Caranasos et al. 1974). Patient knowledge of special precautions and side-effects is frequently improved by written information (Morris & Olins, 1984; Morris & Halperin, 1979; Weibert & Dee, 1980). In the Clinite and Kabat (1976) study, patients receiving a one page sheet on a drug were more

knowledgeable of the drug's side-effects than those subjects given only a verbal review. As mentioned earlier, this study indicated that the one page sheet given together with the verbal review led to fewer medication errors. It was then considered essential that information about side-effects be included in the content of the information sheet on digoxin.

Material Development

Format

The form of written information studied has varied from stickers to multiple page brochures. The format chosen for this study, was the one page sheet. Because of the diversity of the forms, it is difficult to tabulate results, although one page sheets were shown to improve knowledge about drug therapy and were positively evaluated by cardiac subjects (Deberry, Jeffries & Light, 1975; Hladik & White, 1976). Dwyer, cited in Morris and Halperin (1979) printed drug information in three different formats, one being a one-page sheet. The other two formats were onion skin paper and a six-panel brochure. There was no difference in knowledge or compliance among the groups, due perhaps to his small sample size of three to six subjects per group. Clinite and Kabat's (1976) study also gave positive results in regards to subject's learning about the side-effects of a drug on a one page sheet.

Large clear print is a necessity for the elderly, due to the decline in visual acuity after the fourth decade of life (Shore, 1976; Tinker, 1963). For this study, the type size, 10 point, was chosen as the largest possible for the amount of required information on one page. Hartley (1978) described 10 point type-size as a good all-purpose size

and suggested that line spacing should be greater than the specified type-size, e.g., 1.25 of the type-size. Larger line spacing of 1.50 was used in this study.

The ability of the eye to adjust to changing amounts of light diminishes with age, and glare becomes one of the most difficult problems the older person faces (Shore, 1976). Contrast sensitivity also decreases with age, making it difficult to discern various brightnesses (Weiss, cited in Botwinick, 1978). Because of the two previous conditions which lead to a decreased ability to discriminate between similar stimuli, reading material should be provided with large clear print, adequate spacing and good visual boundaries (Knox, 1977; Shore, 1976).

In a study done by Bell and Sullivan (1981) among 245 university students, there was a slight preference for the more conventional Roman type over the Universal (Roman type has clean straight lines). An experiment by Vanderplas and Vanderplas (1980) focused on older adults over 60 years of age. They found the subjects were more comfortable with Roman type as compared to Gothic styles in sizes of 12 points or greater, which led to an increase in reading speed. Roman type was therefore chosen.

Organization of content

Processing strategies operate during text study and help learners to encode information in a deeper, more elaborative fashion (Glynn & Muth, 1979). One type of processing strategy is a typographical cueing system, or a non-verbal orienting device which guides the learner's implementation of decision criteria (Glynn, 1978). Cues

emphasize salient features and are described as an excellent means to counter perceptual deficits and ineffective decision criteria which are present to an increased extent in the elderly (Glynn & DiVesta, 1979; Rabbitt, in Birren & Schaie, 1977). When certain events are set apart perceptually from other events (i.e., the Von Restorff or isolation effect), it is felt that the isolated events have a greater probability of being recalled at a later time (Glynn, 1978). The cueing used in this study included the use of headings, indentation and segmentation.

Indentation and segmentation

Organization of input determines the reader's ability to integrate information and recall (Frase, 1973). Appropriately segmented formats based on meaningful ideas (units of information) and use of spatial cues (such as indentation) to separate these units of information would be favorable to learning and recall (Frase & Schwartz, 1979). Their five experiments suggest that both indenting and segmenting the content into meaningful units resulted in a 14 to 18% faster response time over standard text by the subjects. Segmentation of the material, as opposed to indentation, appeared to be the more powerful factor of the two, providing effective cues. Indentation may provide cues to the approximate location of relevant information.

Pyatte and Wright (1983) describe their organized content technique (OCT) as a rational method to organize information into segments on a page to provide efficient learning materials. All available material is condensed until the essential message is extracted, a process they call distilling. The information is then

organized into meaningful segments, or format, which makes for easier retrieval by the reader. Careful attention is paid to proportion, spacing, balance and the use of blank space on each page. Research to substantiate this technique is only in its early stages. One study by Pyatte (1969) found that students who were able to distill course content into a brief synthesis usually performed better academically. This eventually led to the development of OCT.

Based on the research described, this method of selecting and arranging content was used for the information sheet on digoxin. Material on the page was proportioned and condensed into five meaningful units, each separated from the other by increased spacing. Material of critical importance to the subject, i.e., side-effects of digoxin, was indented from the rest of the material.

Headings

Headings are words or phrases highlighted to clearly identify specific sections of content (Pyatte & Wright, 1983). They are usually the main concepts followed by text material which consists of related subordinate concepts or facts. The information sheet on digoxin was designed using five separate headings (acting as main concepts) under a definitive title and followed by the related material.

In the literature on headings as processing aids, one study found that students provided with intact and embedded headings significantly outperformed those whose text did not contain them (Holley, Dansereau, Evans, Collins, Brooks & Larsen, 1981). The major benefits were observed in delayed testing performed five days later. The students recalled 44% more information than students in the without

headings group. The results of this study lend support to the theory that these devices may be useful as retrieval aids, particularly when students have limited prior knowledge of the subject matter. Another research article by Brooks, Dansereau, Spurlin and Holley (1983) supports the previous result in regard to headings.

In using sentence headings as processing aids in text material, Rickards (1976) found positive evidence of the effectiveness of superordinate prestatements. He described them as advance organizers. Hartley and Burnhill (1976) state that headings and sub-headings (placed in the left-hand margin), together with systematic use of space, can help the reader scan and select relevant text. The headings used on the information sheet were further set apart from the other material by being underlined.

Readability

In the use of health services, the elderly are often faced with formidable reading tasks. The understanding of medical terminology can be difficult enough, but often pamphlets, letters or other literature related to their health condition are written at a higher reading level than their abilities. A study by Walmsley and Allington (1982) looked at how elderly people cope with the reading demands of service agencies. Two-thirds of their 90-subject sample had reading abilities below eighth grade level, whereas 98% of the documents had a readability level above ninth grade level. Walmsley, Scott and Lehrer (1981) assert that documents should be simplified to at least a sixth grade level to make them accessible to a larger number of clients.

Simplification of material does not necessarily ensure comprehensibility as other factors may intervene, e.g., graphic layout. It has been shown that different formulas give widely different levels of readability on the same document (Morris, Myers & Thilman, 1980). For the design of the information sheet and the priming strategy instructions, the Flesch formula was used to achieve a sixth grade reading level (Harrison, 1980). Support for the use of this formula is demonstrated in a study by Bradshaw, Ley and Kincey (1975). Recall of medical advice was increased for material of high reading ease.

Time

Literature supports the view that older people may need more time than younger ones to complete a learning task (Canestrari, 1963; Kinsbourne & Berryhill, 1972). In fact they appeared to be particularly disadvantaged by a paced task. As the pace increased, older people made fewer correct responses than younger ones. It appears that the older person was more reluctant to venture a response (Arenberg, 1965; Taub, 1980). The faster pace seemed to increase their anxiety level. Botwinick (1978) interprets this as a reluctance to make decisions and a tendency to prefer predictable over an uncertain outcome.

Recommendations made by gerontologists in regard to teaching the elderly always mention the necessity of giving the older person time with the material to be learned (Arenberg & Robertson-Tchabo in Birren & Schaie, 1977; Botwinick, 1978; Knox, 1977). In this study the subjects were given forty-eight hours to read the material before they were questioned.

CHAPTER THREE

METHOD

Subjects and Design

Subjects consisted of English speaking older adults from 51 to 94 years of age. Approximately half were clients of the CLSC Metro (Local Community Service Center) Home Care Program. The others had recently been admitted to two active treatment hospitals; the Queen Elizabeth and the Royal Victoria for management of heart problems, i.e., congestive heart failure and/or myocardial infarction leading to failure.

The home care and hospital subjects were initially analyzed as two different populations. The hospital subjects were typified as more acute, severe cases requiring close supervision. The clinic patients were less severe, but had an extended history of cardiac problems requiring regular check-ups at the clinic and/or by the home care nurse.

The clinic subjects lived in downtown Montreal and had accommodation ranging from one room dwellings to two bedroom apartments. The hospital subjects lived throughout greater Montreal, though primarily in what is thought as English speaking areas. Their accommodation varied from apartments to houses.

The focal point for both these groups is that they had been prescribed a digitalis glycoside by their attending physician. The time frame for which they were prescribed and started on this medication ranged up to seven months. Approximately half of the

subjects had been recently prescribed this medication, i.e., within a two month period. The remainder had taken this medication from five to seven months. Duration on medication was evenly distributed in a random fashion over the experimental groups.

The two independent variables in this design were age and instruction. Thus subjects were divided into three groups according to an age continuum; ages 51-64, 65-74 and 75-94 to see if any age related effects might surface. For the second variable, subjects were randomly divided into two groups, and given one of two types of instructions. The instructions, general or specific, were related to the content of an information sheet digoxin. The design was thus a 3 Age (51-64, 65-74, 74-94) X 2 Instructions (general versus specific) mixed design. (See Figure 1.)

The dependent variables were measured with a pre-treatment information questionnaire and a post-treatment questionnaire given 48 hours and again three weeks after the initial introduction of the information sheet on digoxin. The dependent variables were:

1. the subjects' level of knowledge concerning congestive heart failure and digitalis.
2. the establishment of a definable routine by the subject, in order to remember his/her daily pill requirement.
3. the degree of compliance in taking of his/her medication over the three week period.

The subjects' knowledge was thought to directly influence the routine and compliance variables. For example, with increased

Figure 1

Research Design

Age Groupings	Priming Strategy: General Instructions	Priming Strategy: Specific Instructions
51-64	n = 4 pre-questionnaire (A) 48 hour post-questionnaire (B) 3 week post-questionnaire (C)	n = 6 Same
65-74	n = 5 Same	n = 6 Same
75-94	n = 8 Same	n = 7 Same

knowledge concerning the importance of the medication to their health state, patients would be more likely to develop a method or routine for remembering their medication, as prescribed. This routine would decrease the chances of them forgetting or omitting the required doses of medication.

Compliance may imply that due to increased knowledge of their health state and of the medication, digoxin, the subject would better perceive the importance of following the doctor's instructions. Therefore there would be increased co-operativeness to the prescribed regime on the subject's part.

Materials

The subjects were given the following materials in verbal or in written form:

1. specific or general instructions.
2. an information sheet on the cardiac glycoside, digitalis.
3. an American Heart Association pamphlet called "Facts About Congestive Heart Failure".
4. Two questionnaires, the second one twice.

The above are discussed in more detail, in sequence.

General instructions were formulated as general rules and are much like instruction presently given to the majority of hospital and clinic patients in regard to self medication. (See Appendix A.)

The specific instructions took the form of concrete statements, concerning the content of the information sheet. These statements also include some attentional phrases to assist the subject to focus

on the important idea units to be learned on the information sheet. These specific statements were included to increase the probability of recall of material to be learned. (See Appendix A.)

An information sheet on digoxin, a cardiac glycoside, was given to each subject. It was designed by the author based on principles of learning for the elderly in regard to content and format. Nurses at the CLSC Metro evaluated it for content, based on their experience with patient teaching. Content included the name of the drug, its purpose, dosage schedule, indications for need to contact the doctor (i.e., side-effects), precautions about potential interactions with other medications, and symptoms of impending congestive heart failure which the subject should recognize. Its format was the setting out clearly of principal headings and the use of bold, black 10 point type with 1 1/2 spacing on white paper (Knox, 1977). (See Appendix B.)

The pamphlet "Facts About Congestive Heart Failure" from the American Heart Association, No. 51-007B, was given to each subject. Due to resource shortages, a carefully prepared xerox copy was used. This pamphlet defines congestive heart failure after describing the normal functioning of the heart. It also lists causes and signs and symptoms of failure plus gives an outline for treatment of this condition. There was a small area of overlap between the information sheet and pamphlet regarding the listing of symptoms of heart failure. This information was considered of critical importance to the subject in his/her self medication program. (See Appendix C.)

Two questionnaires were designed by the author. The pre-treatment questionnaire (A), used the same design principles as the information sheet. Background information such as age, marital status, income, educational profile and general health status were asked. Data were gathered about any previous heart conditions and medications they were taking at that moment. Questions were asked to determine their present level of knowledge about congestive heart failure and digoxin. (See Appendix D.)

The post-treatment questionnaire (B & C), was designed for the interviewer to use in a structured interview of the subject. Cohen and Manion (1980) describe an interview as structured when the "content and sequence of the questions are organized in advance and this is followed by the interviewer"(p.243). Some leeway occurred in the sequence of questions so as not to inhibit the subject if they wished to elaborate on their responses to the questions. Questions were constructed in such a way so as to avoid leading questions which would bias the response.

Questions were asked concerning the information (written or verbal) they were given on congestive heart failure and digoxin to determine what they had learned. Information was also gathered concerning any definable routines they had developed and their degree of compliance over the time period. Questions fell into these three main categories and by the end of the interview all were answered. Finally subjects were asked questions concerning their reactions to the design of the materials, and if they had any

recommendations or suggestions for improvement. (See Appendix D.)

Procedure

The author introduced her project initially to the nursing staff of two Montreal hospitals, the Queen Elizabeth and the Royal Victoria. A meeting was arranged at the Queen Elizabeth with the Director of Nursing, where the project was explained. It was accepted at this level and then I was introduced to the Head Nurses of the Cardiac Care areas. Once explained to them, the project was accepted with enthusiasm and their co-operation secured in obtaining subjects.

At the Royal Victoria Hospital the experimenter met with the Medical Nursing Director and from there met with the Medical Head Nurses. The nursing staff was in agreement with the study. At both hospitals, they consulted with the medical staff to make them aware of the study. No objections were raised by the doctors to their patients receiving this information.

The project was also introduced to the co-ordinator of the CLSC Metro Home Care Program who agreed to participate. She met with her home care nurses and explained the study. Following this the nurses submitted names of suitable patients when they became available to their secretary.

The experimenter contacted the hospital areas and clinic staff twice per week to see if there were potential candidates. This process was time consuming, with the number of subjects being available varying widely from week to week. Once names were obtained,

the subjects were visited by the experimenter. She first introduced herself and explained her health care background as a nursing teacher. Permission to interview was requested and all subjects who were approached stated they were willing to participate. The experimenter wore a white lab coat with appropriate name tag for all contacts.

Information concerning the patient's medical condition and potential date of discharge from the hospital center was obtained from the nursing staff so the experimenter could make the initial contact with the subject close to the date of discharge. This was done to ensure that the patient was not in an acute stage of his/her illness and was beginning to consider the implications of managing his/her medication regime at home. With the majority of hospital subjects this worked well but three of these subjects subsequently developed complications following the initial interview which delayed discharge due to the following. Three were in need of an extra day in the hospital for recuperation and two waited on a change in the home situation before they could go home.

The nurses at the Queen Elizabeth Hospital were very helpful in keeping the experimenter informed of potential subjects, their progress and their potential date of discharge. This was more of a problem at the Royal Victoria Hospital where staff did not seem as aware of this kind of patient information. Consequently the experimenter was not often able to see patients close to their discharge date.

The Home Care Program nurses checked their patient population and asked suitable subjects if they were willing to participate in this study. The patients' names and telephone numbers were then given to the secretary. These patients had all been managing their medication regime at home, varying from a period of two months up to several years, not including digoxin. The length of time patients had been prescribed digoxin varied from two to seven months.

During the first meeting, questionnaire (A) was completed to obtain autobiographical data plus information about their health state and the number and type of medications they were on. Confirmation of their medical protocol was obtained by consulting the health team and/or the patient's chart. In the home care situation the experimenter saw all the subject's medications herself. General knowledge of their heart condition, congestive heart failure and the drug digoxin was also determined. If any information obtained from the subject was in doubt, the experimenter was given permission to check the subject's file or contact their nurse whenever necessary.

It was originally planned that the subjects would fill out the questionnaire on their own. The experimenter found that the hospital patients were not able to do this, due to their weakened state, poor lighting for reading and lack of a suitable chair and desk. Consequently the experimenter filled out all the questionnaires, asking them the questions. To be consistent, this was also done with the home care patients.

The subjects were then given the pamphlet prepared by the American Heart Association on congestive heart failure. Since the Quebec Heart Foundation had insufficient copies of these pamphlets and could not confirm arrival in time from the U.S.A., a Xerox copy of this pamphlet was given to all the subjects. They were also given the information sheet on digoxin to read over the next forty-eight hours.

Half of the subjects then orally received specific instructions concerning the content of the information sheet. The other half orally received general instructions in regard to their medication regime. Subjects were organized into these two groups by random selection method. Prior to seeing the subjects, the experimenter readied envelopes, half with general and the other half with specific instructions. For the home care and for the hospital subjects, these envelopes were then alternated once nurses alerted the experimenter of potential subjects.

One problem in the hospital setting with the giving of instructions was that interruptions occasionally occurred. These were all momentary and the instructions were always completed in one sitting. Another problem in this setting was the distractions that occurred with other patients in the same room during the instructions. This could not be avoided, although the experimenter made every effort to see the patient at a time convenient to the medical and nursing staff. These problems did not occur in the home care setting.

Occasionally the subjects themselves interrupted the experimenter by asking a question, (not always relevant), or by making observations of the relevance of the material to their own situation, i.e., their heart condition and medications.

In the home care program, in each case where the subject had a significant other to help with his/her medication regime, the researcher made sure this person was also available during the interview. This did not occur with the hospital patients as their significant others could not be available, at this time.

After a forty-eight hour time period, subjects were contacted again and asked to answer a number of questions concerning the content of the pamphlet and the information sheet. In the home care program this occurred without any difficulty except for four occasions when the weekend intervened. For the subjects in the hospital program the forty-eight hour time period was extended for a number of reasons. Often the exact date of discharge was unknown and based on the doctor's daily assessment of his/her patient's progress. Three patients developed complications which delayed their discharge, three, four and seven days respectively, from when they had received the material. Five others had a delayed discharge of one to two days. The experimenter felt it was better to contact the subject once they had been home for a period of time, i.e., over twenty-four hours; in order to give them opportunity to develop their medication routine. Almost forty percent of the hospital subjects experienced a delayed discharge of one to seven

days.

If the subjects had not read the material by the time they were contacted, they were given another opportunity to do so. They were then contacted forty-eight hours later. Of thirty six subjects, four had not read the material by the next forty-eight hour time period. The other two had read the material by the third call. One of these two had only read the material then because his condition had deteriorated and he became concerned. After reading the material he contacted his home care nurse. Once assessed, he was admitted as an emergency to the hospital in congestive heart failure.

Information which was gathered during the forty-eight hour interview determined if the subjects had established any definable routines for remembering to take their medications and if they had taken them all, at correct times over the time period. They were also asked if they had experienced any side-effects for which they may have contacted their doctor. On two occasions, the experimenter advised the subject to call their doctor due to the information given to her about their health state. Lastly feedback was obtained from them concerning any recommendations they had to improve on the design or content of the material given to them.

A delayed interview was done three weeks after the above interview, using the same questionnaire. In this situation no problems occurred with reaching subjects and all were willing to answer the questions.

Upon completion of the final questionnaire subjects were thanked for their participation in the study.

Nursing staff were notified that adequate subject numbers had been obtained and were thanked for their assistance. Both hospitals and the home care program have requested a follow-up session on problems encountered by the subjects in managing their medical regime at home. This will be done by the experimenter.

CHAPTER FOUR

RESULTS

The first questionnaire (A) contained the pre-treatment scores, while questionnaire number two was given approximately forty-eight hours after the patient received the information (B), and then again three weeks later (C).

A subject's composite knowledge score was generated by combining a number of questions. The first questionnaire, (A), used items 11c (2 points), 17(3 points), 20(3 points), 24(5 points), 25a(2 points) and 25b(2 points). The total number of correct items was then divided by 17, creating a percentage score. The post-questionnaires' (B & C) composite scores for knowledge came from items 1(3 points), 2(5 points), 4(3 points), 5(5 points), 7a(2 points), 7b(2 points), 24(3 points) and 29(3 points). The total number of correct items was then divided by 26, creating a percentage score.

A subject's compliance score was generated by combining items 12(2 points), and 25c(3 points) on questionnaire A, for a total score of five. A percentage score was then created. For questionnaires B & C the compliance scores were generated from item 6(2 points), 7c(3 points), 17a(2 points) and 17b(3 points). The total number of correct items was divided by 10, creating a percentage score.

There was no score for routine on questionnaire A, but a subject's routine score was generated from item 8a(2 points), 8b (3 points), 10(3 points) and item 12(2 points) on questionnaires B & C. The total number of correct items was then divided by 15,

creating a percentage score. For answers selected by subjects to the previous knowledge, compliance and routine items (scoring procedure). (See Appendix E.)

Knowledge

Table 1 represents the means and standard deviations of knowledge scores on all three questionnaires for the type of instructions given to the subjects. A multiple analysis of variance was performed on the composite knowledge scores and a statistically significant main effect for specific versus general instructions was produced, Hotellings $T^2(3, 32) = 3.96$, $p < .017$. On the univariate F-tests, a main effect on the three week delay questionnaire (C) was produced: $F(1, 34) = 6.70$, $p < .014$, favoring specific instructions. To ensure group equivalence, a separate multivariate test was conducted with a knowledge score on the pre-questionnaire as a co-variate. A significant effect was again produced, $T^2(2, 32) = 4.97$, $p < .013$, with univariates statistically significant, $F(1, 33) = 9.93$, $p < .003$ on questionnaire B, and $F(1, 33) = 4.92$, $p < .034$ on questionnaire C. A third analysis involving composite knowledge scores was conducted along with the composite compliance and routine scores. This multivariate analysis inspected all three measures to test for an interaction between scores and the time (48 hour and three-week delay) variable. A statistically significant interaction was found, $T^2(3, 32) = 4.78$, $p < .007$, and significant univariate on the knowledge factor, $F(1, 34) = 9.79$, $p < .004$. (See Figure 2.) A post hoc Tukey test on

Table 1

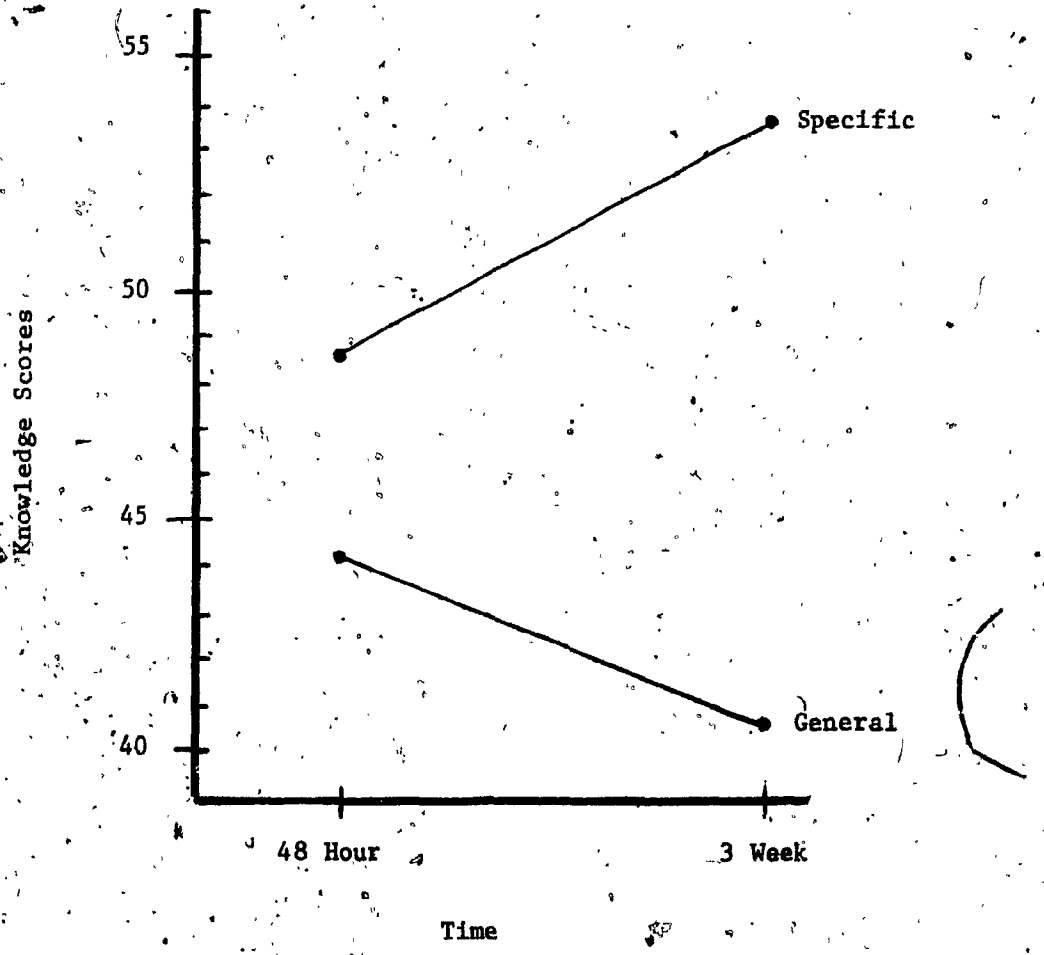
Instruction and Composite Knowledge Scores

Instruction	n	Questionnaire A	B	C
General	17			
M		22.5	44.2	40.6
SD		11.1	13.3	15.6
Specific	19			
M		25.2	48.5	54.2
SD		15.2	16.7	15.9

Note: The values represent mean percentages of knowledge scores.

Figure 2

Interaction Between Specific and General Instructions on the Time Variable for Composite Knowledge Scores



the interaction showed that the two instructions groups differed on both occasions, $q(1, 35) = 2.95$, $p < .05$, and $q(1, 35) = 9.24$, $p < .01$, respectively, and that while the general groups suffered no significant loss, there was a statistically significant improvement of recall for the specific group over time, $q(1, 35) = 3.97$, $p < .01$. Thus the first hypothesis that specific instructions, as opposed to general, would increase subject's knowledge was supported.

Significant results were also noted on individual items that made up the total knowledge scores. Of particular importance was knowledge of toxic effects of digoxin (see Table 2 for means and standard deviations). The pretest was excluded due to the extreme number of subjects who scored zero. The analysis done on these scores produced a multivariate effect, $T^2(2, 33) = 3.43$, $p < .044$, using the pretest as a co-variate and univariate effect for the three week delay test only, $F(1, 34) = 7.04$, $p < .012$.

For knowledge scores of symptoms of congestive heart failure, another key bit of information, the multivariate test was statistically significant, $T^2(2, 33) = 3.39$, $p < .046$, and the univariate effect statistically favored specific instructions for the three week delay questionnaire $F(1, 34) = 6.43$, $p < .016$ (See Table 3 for means and standard deviations).

A significant effect for specific instructions was found also for the knowledge score on the definition of congestive heart failure. Using their pretest definition as a co-variate, a statistically significant multivariate T^2 was obtained

Table 2

Instruction and Knowledge of Toxic Effects: Digoxin

		Questionnaire		
Instruction	n	A	B	C
General	17			
M		3.5	26.8	24.1
SD		10.6	24.6	18.9
Specific	19			
M		7.9	38.7	41.6
SD		16.2	21.5	20.3

Note: The values represent mean percentages of knowledge scores.

Note: Pretest results are due to the extreme number of subjects who scored zero.

Table 3

Instruction and Knowledge of Congestive Heart Failure: Symptoms

		Questionnaire	
Instruction	n	B	C
General	17		
M		43.2	41.5
SD		25.1	19.2
Specific	19		
M		51.1	57.9
SD		26.0	19.6

Note: The values represent mean percentages of knowledge scores.

($T^2(2, 32) = 3.44$, $p < .044$) and the univariate on the three week delay response was $F(1, 33) = p < .035$ (See Table 4 for means and standard deviations).

In regard to other knowledge questions, i.e., knowledge of digoxin: action and precautions and treatment of congestive heart failure, no significant effects were obtained. There was also no significant interaction between knowledge and sex, income, health state, cost of drugs or length of time on digoxin. See Table 5 for means and standard deviations of knowledge scores in relation to age groups. Again there was no significant effect produced.

Compliance

Table 6 contains the means and standard deviations of compliance scores, in relation to the type of instructions given to the subjects. The hypothesis that specific instructions would effect compliance was rejected here as their was no significant effect seen on the multiple analysis of variance.

A surprising effect seemed to occur between the number of drugs, 1-3, 4-6 and 7-10 drugs, and the total compliance score. It appeared that the more drugs the patient was taking contributed to a higher compliance score (See Table 7), a contradiction to the research literature.

The multivariate effect was $T^2(6, 60) = 2.46$, $p < .034$. The univariate tests showed that subjects differed with respect to compliance both before and after treatment, with significant statistical effects on all three measures, the pretest $F(2, 33) = 4.07$, $p < .026$, post-questionnaire (B), $F(2, 33) = 3.66$, $p < .037$, and

Table 4

Instruction and knowledge of Congestive Heart Failure: Definition

		Questionnaire		
Instruction	n	A	B	C
General	19			
M		.18	.76	.47
SD		.53	.97	.87
Specific	19			
M		.53	.95	1.32
SD		.84	.85	1.00

Note: The values represent the means from a total score of three.

Table 5

Age and Composite Knowledge Scores

Age	n	Questionnaire A	B	C
51-64	10			
M		29.2	50.7	52.3
SD		14.8	14.9	16.3
65-74	11			
M		24.1	44.6	47.9
SD		13.3	16.8	18.3
75-94	15			
M		20.3	45.0	44.7
SD		11.8	14.4	17.0

Note: The values represent mean percentages of knowledge scores.

Table 6

Instruction and Composite Compliance Scores

		Questionnaire		
Instruction	n	A	B	C
General	17			
M		47.6	61.5	62.1
SD		25.8	20.1	16.8
Specific				
M		56.2	66.8	66.7
SD		19.8	20.6	20.3

Note: The values represent mean percentages of compliance scores.

Table 7

Number of Drugs Subject is Taking and Composite Compliance Score

		Questionnaire		
Drug Number	n	A	B	C
1-3	7			
M		40.0	47.1	47.1
SD		16.3	20.4	18.7
4-6	15			
M		46.4	67.3	68.8
SD		24.8	20.6	17.0
7-10	14			
M		64.4	69.6	68.6
SD		18.9	15.9	15.9

Note: The values represent mean percentages of compliance scores.

the three week delay questionnaire (C), $F(2, 33) = 4.56$, $p < .018$. Post hoc Tukey tests showed that the low and high groups differed on the pretest ($q(36) = 3.53$, $p < .05$), and again on the 48 hour questionnaire ($q(36) = 3.67$, $p < .05$). After three weeks, both of the upper groups differed from the low group, 4-6 ($q(36) = 3.98$, $p < .05$) and 7-10 ($q(36) = 3.89$, $p < .05$). No interaction occurred with the treatment however.

There was no significant effect produced by subject's age on the compliance scores. See Table 8 for means and standard deviations of subjects' compliance scores and age. No significant results were obtained between the compliance scores and time on digoxin, income or living arrangement i.e., whether the subject lived alone or not. There was also no difference between the health care agencies i.e., home care program and hospital subjects in relation to their compliance scores.

In order to further interpret the compliance factor, one item that partially made up the compliance score was examined, and is described in Table 9. It asked whether patients checked with their doctor prior to taking a non-prescription medication. Most patients were taking these drugs, some of which could potentially interact with the medication digoxin. There was an increase from the first interview to the last in the number of patients who checked with their doctor before taking a non-prescription drug. Prior to the initial interview 44% had consulted with their doctors, and the consultation rate increased to 81% with questionnaire B and 86% with

Table 8

Age and Composite Compliance Scores

		Questionnaire		
Age	n	A	B	C
51-64	10			
M		49.0	68.0	68.5
SD		29.5	19.5	17.3
65-74	11			
M		49.5	59.1	57.9
SD		22.8	25.3	19.2
75-94	15			
M		56.5	65.7	66.7
SD		18.8	16.9	18.9

Note: The values represent mean percentages of compliance scores.

Table 9

Confirmation by the Doctor of Non-prescription Medication

Behaviour N = 36	Questionnaire A	B	C
Did check with doctor	44%	81%	86%
Did not need to check with doctor	36%	5%	3%
Did not check with doctor	20%	14%	11%

Note: Values represent mean percentages of subjects.

questionnaire C. Subjects who did not check with their doctor before taking a non-prescription medication decreased from 20% to 14% to 11% for questionnaires A to C, respectively. A difference is seen then in the subjects' behaviour over the study period in regard to being more cautious about taking non-prescription medications. Information about potential interactions with digoxin and these drugs was given to the subjects, both in the priming strategy and in the information sheet. Receiving this information seems to have been effective in promoting more compliant behaviour on the subjects' part. They did become more careful about non-prescription drugs.

Routine

The third hypothesis was that specific instructions would effect the development of a routine to ensure the taking of the medication as prescribed. See Table 10 for the means and standard deviations in regard to the total routine scores and effects of instruction and age. In both cases, no significant results occurred on a multiple analysis of variance. Of interest, however, was the marginally statistically significant interaction involving time and routine. In the multivariate test cited earlier with knowledge, compliance and routine, routine produced an $F(1, 34)$ of 3.16 $p < .08$. While not significant, the means were nevertheless inspected to identify possible trends, the specific instructions group scored 8% higher than the general groups, though the higher groups' scores dropped 3% over the 3 week delay, while the general groups experienced no change.

Table 10

Instruction/Age and Composite Routine Scores

		Questionnaire	
Instruction	n	B	C
General	17		
M		58.4	58.6
SD		18.7	18.2
Specific	19		
M		66.1	63.6
SD		13.8	12.8
Age	n	B	C
51-64	10		
M		57.9	56.2
SD		13.2	12.4
65-74	11		
M		60.9	61.5
SD		17.0	16.4
75-94	15		
M		66.6	64.4
SD		18.1	16.9

Note: The values represent mean percentages of routine scores.

A significant effect was produced between the number of drugs the subjects were taking and the routine score. The multivariate test yielded a $T^2(4, 62) = 2.51$, $p < .05$. The univariate test was $F(2, 33) = 4.23$, $p < .023$ for questionnaire C. See Table 11 for the means and standard deviations of routine scores for number of drugs subjects were taking.

No other significant effects were produced between the routine scores and other variables such as: time on digoxin, living alone, or feelings (positive or negative) about having to take digoxin.

Evaluation of the Printed Material

In regard to the evaluation of the information sheet and pamphlet by the subjects, Table 12 illustrates the results. All subjects read the material, except four required extra time over the 48 hours allotted to do so. The majority found the material easy to read: two needed to have it read to them and four required a special magnifying lens. Two found the readibility of the pamphlet more difficult due to its extra length. The print size was described as adequate by the majority of the subjects. Five felt the information sheet could have been in larger print and six felt the same for the pamphlet. Three subjects found difficult words in the material: two because English was not their first language.

Most of the subjects felt that the information sheet was complete but a few suggested the following improvements. Three subjects felt both names of the drugs, i.e., lanoxin and digoxin should be on the sheet to avoid potential confusion. The doctor had written

Table 11

Number of Drugs Subject is Taking and Composite Routine Scores

		Questionnaire	
Drug Number	n	B	C
1-3	7		
M		55.3	52.3
SD		18.5	11.6
4-6	15		
M		58.5	57.6
SD		14.4	13.8
7-10	14		
M		70.2	69.6
SD		15.6	15.9

Note: The values represent mean percentages of routine scores.

Table 12

Subject Evaluation of the Printed Material

N = 36	Material	
Evaluation	Information Sheet	Pamphlet
Readibility		
easy	30	28
visual problem	6	8
Print Size		
adequate	31	30
not adequate	5	6
Difficult Words		
yes	2	3
no	34	33

the prescription as digoxin, the name the patient knew but the pharmacist labelled the pill container, lanoxin, and did not tell the patients it was the same medication. Four patients felt extra information should be provided as to when to take the drug, in relation to meals and to their other medications. This would have to be worked out with patients individually as some subjects in this study were taking as many as 30 pills per day. Two wished more information about potential interactions with other drugs they were taking, both for prescription and non-prescription drugs. Another subject wanted to know more about digoxin's interaction with quinidine, which, studies suggest, may lead to serious cardiac toxicity (Stultz, 1982).

Eighty-three percent of the subjects wished they could have this information for all of their drugs, while 47% had requests for information on other specific drugs. Seventy-five percent felt the most important information they learned from the sheet was on digoxin's side-effects. A few felt it was important to learn about the drug's action and to be careful with non-prescription drugs. Twelve mentioned that the sheet was a handy reference to have so they would know when to call the doctor. On the second interview 58% of the subjects said they kept the information sheet with their medications or close by for quick reference. On the three week delay questionnaire 55% of the subjects kept this sheet nearby.

Six patients complained about the illegible print on the prescription labels. The print was either too small and/or too

light in contrast, for easy viewing.

In regard to the pamphlet on congestive heart failure, 27 of the 36 subjects (75%) felt it had helped them to understand their condition. Five of the others felt it was not appropriate as another problem was more serious i.e., coronary artery disease or high blood pressure. Four others had problems understanding it: two perhaps because English was not their first language.

An improvement was suggested on the pamphlet by two subjects. Both suggested more information be included about the type, frequency and scheduling of exercise and activity for patients with this condition particularly when newly discharged from the hospital. Sixty-one percent found the most important information they learned from the pamphlet was on the symptoms of congestive heart failure. Four (11%) found it useful to learn about the anatomy and physiology of the heart and the treatment for this condition. Sixteen percent found it encouraging to have this information in regard to the severity of their health problems. Since receiving the material, a total of seven subjects had read other literature in relation to their cardiac problems.

Biographical Information

For this study, fifteen home care subjects participated and twenty-one from the acute care hospitals. There were fourteen male and twenty-two female subjects. Thirteen subjects were single, twelve married and eleven were widowed Twenty of thirty-six subjects lived alone. Of these, seventeen were women and three were men.

Twenty-two spoke English as a first language, nine, French and five, others. Six subjects were presently employed and twelve were living only on their government pension. Most subjects (26) paid nothing for their drugs due to senior citizen benefits while five paid from $25-50, and two paid from $50-75. Six subjects felt that the cost of drugs was a problem for them. In regard to education, four had attended elementary school only, eleven, junior high, fifteen, senior high school and six had attended university.

Twenty-seven of the subjects had a chronic illness, such as diabetes, or arthritis, etc. Thirty-two of these subjects also had a history of cardiac problems. Thirty-five subjects were experiencing cardiac symptoms on admission to hospital or when seeing their doctor. The majority of subjects were still experiencing some symptoms of congestive heart failure by the three week delay interview. Sixteen subjects had recently been prescribed digoxin and twenty had been taking this drug for a period up to seven months. Two had taken digoxin briefly before this study began (See Table 13).

Subjects' responses to a few general health and attitude questions were not included in the data analysis. (See Appendix F.)

Table 13

Biographical Information

Care Program:	Home Care	15
	Acute Care	21
Sex:	Male	14
	Female	22
Language:	English	22
	French	9
	Other	5
Marital Status:	Single	13
	Married	12
	Widowed	11
Living Arrangement:	Alone (female)	17
	Alone (male)	3
	With other (female)	5
	With other (male)	11
Present Employment:	None	30
	Full	6
Income:	Pension only	12
	Pension plus company benefit	16
	Well off	8
Education:	Elementary	4
	Junior High	11
	High School	15
	University	6
Cost of drugs:	nothing	26
	< $25	3
	$25-49	5
	$50-75	2
Cost is a problem:	yes	6
	no	30
Presence of chronic illness:	yes	27
	no	7
Has history of cardiac problems:	yes	32
	no	4
Presence of heart disease symptoms:	yes	35
	no	1
Time on Digoxin:	1-3 months	16
	4-7 months	20
Has been prescribed Digoxin before:	yes	2
	no	34

CHAPTER FIVE

DISCUSSION

Knowledge

The prediction that specific instructions would lead to the subject's increased knowledge of his/her heart condition (congestive heart failure) and of the medication, digoxin, was borne out by the data. It appears that if instructions are given to patients prior to the reading of medical information, they should be presented in the form of specific, concrete statements rather than in the form of general rules.

The approach of giving specific instructions was used successfully in the study by Bradshaw, Ley and Kincey (1975). However the present study differed in some important ways. The specific instructions were used as a priming strategy or orienting device to help the subject focus on the main ideas to follow i.e., the information sheet. The instructions related directly to the key ideas of the one-page sheet. Attentional phrases used in the instructions, were thought to aid the learner to focus on key aspects of the message and decrease distraction. It appears that the combined effect of specific instructions with attentional phrases corresponding to the idea units of the information sheet contributed to increased recall, particularly over the three week delay.

Results show that important elements of the total knowledge score, such as the recall of side-effects of digoxin and symptoms of congestive heart failure, were much better retained by

the group receiving specific priming. This was considered critical information, central to better management of a medication regime.

The fact that the group differences emerged over time suggests that particularly with older people, processing of specific facts requires an interaction between perceived need and opportunity. Subjects perhaps did well on the three week delay interview, since they then had more time with the material, and had it handy to refer to if any health concern surfaced (as expressed by many subjects). These results also support other research which states that patient's knowledge of side-effects and precautions was improved by written information (Clinite & Kabat, 1976). The need for well presented, important information in the form of a permanent copy is evident in real, day-to-day living.

The side-effects of digoxin and symptoms of congestive heart failure were stressed in the specific instructions to the subject. These instructions appeared to be effective in alerting the subjects to material of critical importance which followed.

In regard to the significant result of increased knowledge of the symptoms and definition of heart failure, only 6 of the 36 subjects had read any information about this condition before. Most subjects were grateful to receive this information which appeared to allay fears regarding the severity of their heart condition. For many the initial diagnosis of "failure" sounded alarming, thus they may have been highly motivated to learn about their cardiac condition.

An important limitation of this study was the fact that it focused on knowledge of digoxin. While the results may be generalizable to individual or a few other drugs, it is less clear of the effect of specific instructions on elderly patients with more then one diagnosis and on a number of medications. The approach was successful in increasing subjects' knowledge about digoxin. Digoxin is only one drug among many (up to ten) these subjects were taking. To be given specific instructions for ten medications would likely be overwhelming. On the other hand, the number of drugs as an ex post facto variable had no effect on patient's learning about digoxin. This very positive result, while somewhat at odds with previous research as discussed below, suggests that the best strategy may be to teach about the drugs one or two at a time, and that particularly potent or critical drugs be covered first.

Another problem directly related with increasing number of drugs is the potential for detrimental interactions. This is information of critical importance, making it necessary to individualize the specific instructions to each patient's needs.

Other problems resulted from subjects being on a number of medications. Some medications have similar side-effects such as anorexia and nausea, common initial side-effects of digoxin toxicity in the elderly. Other medications gave subjects very distressing side-effects i.e., antihypertensive drugs, which could mask digoxin's effects. Other subjects had prescription

changes over the study period which made it difficult for the patients to assess if what they were experiencing was a problem with digoxin and/or with other medications. From a research standpoint, it would have been useful to have obtained more complete information about the subject's side-effects. More detailed questions could then have been asked in regard to them, rather than relying on the subjects to report them. This situation nevertheless reiterates the fact that in many cases, only the doctors know what is happening to a given patient. If the patient is not in frequent contact with the doctor, there is then no effective means of monitoring the severity of side-effects and life-endangering symptoms. Ultimately the patient must pay for his/her ignorance. Self-education is in their best interest and the health care system must recognize this responsibility.

Behaviour

The prediction that specific instructions would lead to improved compliance with the medication protocol over the study period was not borne out by the data. Also not borne out was the development of a definable routine by subjects to remember their medications in regard to specific instructions. These results replicate those of previous studies which demonstrated an inconsistent relationship between knowledge and compliant behaviour (Klein, German, McPhee, Smith & Levine, 1982). This does not mean that compliant behaviour is totally independent of knowledge but does suggest that factors other than knowledge must be present to achieve increased compliance. In this study the contact between the subjects and the

experimenter was perhaps too brief to stimulate increased compliant behaviour in a particular segment of the subjects. However, it is also possible that even the brief encounters may equalize, or overpower many other variables. Indeed, studies support the value of direct interpersonal contact between the health care provider and the patient as a means of increasing knowledge and encouraging compliance (Weintraub, cited in Given et al, 1978). A number of subjects did express their appreciation for this contact. The 48 hour interview (B) seemed to come at a crucial time for many newly discharged hospital subjects as they were having difficulty establishing their medication schedule. Patients' behaviours are difficult to change and perhaps it is the ongoing contact which is needed to further stimulate compliance.

Compliance is closely related to the degree which patients perceive the therapeutic regime as beneficial (Ley, cited in Fedder, 1982). If patient satisfaction is closely related to compliance, then patients must receive as much information as possible about their condition and medication. Ley, in Fedder (1982) notes patients want as much information as possible but the physician's evaluation of this need differs. If patients do not receive complete information or misinterpret medical advice it is likely that compliance problems will appear.

Non-compliance with medical regimes can be costly to the health

care system. Through misuse of drugs, either under/or overuse, disease states can reoccur or complications develop from drug toxicity or the interactions between medications. The resultant problems increase the need for medical attention and/or use of hospital services when readmission is required for acute cases of mismanagement.

The analysis of compliance was dependent on the reliability of self-reported measures in regard to the taking of their digoxin, as prescribed. Some reserchers have raised questions about the dependability of such self-reports, although others suggest they can achieve high levels of reliability (Klein, German, McPhee et al, 1982). It was felt by the experimenter that subjects were perhaps more forthcoming in their responses in regard to compliance as they viewed the experimenter as interested but not involved with their medical regime.

Other means of assessing compliance such as pill counts and blood tests were too difficult to initiate for this ambulatory population. Pill counts are not always accurate either, as one can over-estimate compliance insofar as taking too many pills one day may be balanced by taking too few the next.

This study focused on compliance and routine established with one particular medication, digoxin. This is perhaps not representative of patients' compliance and routine with their total number of medications.

A surprising result was obtained in this study in that the

group taking the largest number of medications (7-10) demonstrated increased compliance and routine. This figure may be misleading as questions in regard to compliance were asked for digoxin and non-prescription drugs only. Digoxin is usually prescribed as a single daily dose, and only occasionally twice per day. Research has found that more medication doses are omitted when prescribed at four or more per day than at a lesser number (Hulka et al. 1976; Marston, 1970). As some subjects were taking up to 30 pills per day, which markedly increased the complexity of their medication regime, it is likely their compliance levels would also be affected.

Another possible reason that the group taking the largest number of medications demonstrated increased compliance scores is that five in this group received special assistance from nurses. The home care nurses gave three subjects a special container to minimize their chances of forgetting their medications. It had sections for each day of the week plus four principal time periods for each day. At a glance the patient could see if he/she had forgotten to take his/her prescribed medication. In two other situations nurses who were friends of the subjects helped establish a secure routine for them so they could remember all their medications on time. All of these patients were taking from 7-10 medications.

Compliance with one regime cannot be regarded as assurance of compliance with another. Drugs with unpleasant side-effects may be

omitted. Subjects experiencing distressing side-effects may not have identified digoxin as the cause and assumed it was another drug. Four patients did omit digoxin once because of side-effects they felt this medication had caused.

Subjects experiencing an adverse reaction were more likely to report it to a health care professional (Weibert & Dee, 1980). In this study, more subjects appeared to wait for their next appointment rather than contact their nurse or doctor directly. This may be reflective of the frequency of medical follow-up appointments especially for the hospital subjects.

Some non-compliance is intelligent when it results from understanding a drug's adverse effects and then is reported to the physician. In this study four subjects omitted one dose of digoxin because of side-effects and then three contacted their doctor. If monitored by the doctor, this type of informed behaviour is seen as positive. While there is no direct evidence during the short duration of this study that specific instructions made a difference, the obtained result of increased knowledge can only be advantageous. It must also be recognized that the opportunities to show differential effects were minimal. All subjects received the same information, and hopefully referred to it when the need arose. In that overall compliance was quite high, the availability of accurate, useful information is paramount, and differences in recall of only secondary concern. The patients uniformly reported satisfaction with the materials, and many expressed sincere

abatement of anxiety, likely due to the interaction of personal contact and both verbal and printed information. Again, data obtained confirmed prior research findings.

Evaluation of Printed Material

The overall response to the printed material was positive. The majority of patients (83%) expressed a need for information about all the other medications they were taking. Others requested knowledge of particular drugs that can interact with digoxin, i.e., quinidine and potassium. In the cardio-vascular field many new drugs are on the market and are being prescribed. These anti-anginal and antiarrhythmic agents have particularly potent side-effects. Patient awareness of these drugs becomes even more crucial. Indicative of the subject's need for information is the fact that 75% of the subjects felt the most important item they learned about digoxin was its side-effects.

There is, then, a definite need for patients to be informed about their medications. They should know both the generic and trade name, action and potential side-effects of all drugs they are taking. Additional information should be given in regard to scheduling of their medications and drugs that should be avoided to prevent detrimental interactions.

The majority of subjects found the pamphlet on congestive heart failure helpful. Again, a large number (61%) found the most important information they learned was the symptoms of congestive heart failure. This is also critical information the patients need

to know to better monitor their condition and determine when to ask for medical attention.

For the information sheet, the one page format was selected. It was felt that this would not appear over-whelming in the amount of information and could be placed near their medications for quick access. Other formats such as wallet size cards for medication information should also be evaluated.

The majority found the material easy to read. Eleven percent required a special magnifying lens to read it and two subjects needed it read to them. An increase in the type size from 10 point to 12 or 14 point might have benefitted these subjects. Vanderplas and Vanderplas (1980) found their elderly subjects performed better with the larger type size. Adequate type size would have to be selected against the constraints of the amount of information to be on each page.

The readability formula appeared [redacted]ve been successful in obtaining these previous results. Efforts should be made to use material of high reading ease in the design of health care information.

Future Research

Implications for future research would include the use of specific instructions with other medical conditions to establish the generality of these findings. Testing should include other medications, and the maximum number of medications which could be covered with this approach. Studies should be carried out to

relate these instructions to long-term recall and compliance.

Strategies to improve compliance is an under-researched area, particularly in the interaction of knowledge with patients' perceptions and attitudes. Devices to increase compliance levels need to be studied, such as the containers introduced by the nurses for their patients (They are available in the pharmacy).

Many older people are discharged under conditions which discourage regular drug taking i.e., living alone, experiencing health problems and physical limitations. They are usually given little information prior to discharge and are often bewildered by the names and number of drugs and when to take them, as documented in this study. They should be given a medication instruction session prior to discharge and presented with written information as an aid to memory for each drug they are prescribed. An early check on their progress with medications after leaving the hospital could gradually decrease errors. MacDonald, MacDonald and Phoenix (1977) found that four-fifths of patient errors occurred within the first week after discharge. This dramatic trend appeared not to have occurred in this study, as at the 48 hour interview, 6 subjects had omitted a dose, while 3 weeks later 8 subjects had omitted one dose of digoxin. This perhaps occurred with digoxin since the risk of toxicity increases the longer one is on it. The results obtained reflect the number of patients who did experience a toxic reaction and therefore omitted a dose. Therefore instruction and follow-up should perhaps continue well

beyond this critical period, both to ensure the establishment of an effective routine and to reinforce an existing one.

Another area of concern deals with the importance of the patient's relationship with the health care team in stimulating compliance. More research is needed regarding the role of nurses in promoting compliance, as they spend more time with patients than the doctor. If patient compliance does respond to interpersonal contact with a health team member, the nurse has more opportunity to promote this and influence patients' behaviour.

Areas for further work for educational technologists would be in the use of processing strategies. Effective organization of material aids learning, particularly in the elderly. In areas such as this new techniques such as Pyatte and Wright's organized content technique should be tested as it deals with effective presentation of written material. Jonassen (1982) in his book The Technology of Text, also concludes that additional research is necessary in this area. Other areas for research in regard to processing aids is in the use of headings, spacing and other typographical cueing strategies which increase contrast between essential and non-essential material.

This study has demonstrated that the priming strategy specific instructions, is an effectiye mechanism to increase recall for elderly subjects on digoxin. More research needs to be done with this population and with other types of priming strategies. The use of instructional objectives and pre-questions may also be

effective for this type of learner and for this type of information.

This technique could be an effective patient teaching tool to be used by health care professionals. An advantage is that it is not time consuming once the principles are understood. Educational technologists should be working with health care workers to help them design effective programs to meet the needs of this population. They can facilitate learning indirectly by working with subject matter experts.

Educational technology is a rational, problem-solving process, and a way of thinking systematically about learning and teaching. Along with the skills and resources required, also necessary is the awareness of the uniqueness of the individual. A course on the psychology of aging should be a part of all educators' repertoire so as to develop appreciation of aging as part of life. Needs and problems of the aged must be considered and negative stereotyping replaced with fact. Positive attitudes must be fostered which involves the re-examining and re-defining of values associated with aging. Particular attention should be given to the further development of learning theory (through research) which considers the needs of the elderly.

The number of elderly is increasing in proportion to other age groups and successive cohorts have each experienced more years of education. Educational technologists must prepare themselves to work with older populations and with a variety of agencies such as health and social welfare. Effective and thorough design of patient teaching

material is critical. Through development of quality instructional design, educational technologists can enhance the personal and social life of clients seeking medical attention.

References

Allen, W. (1975). Intellectual abilities and instructional media design. AudioVisual Communication Review, 23, 139-169.

Arenberg, D. (1965). Anticipation interval and age differences in verbal learning. Journal of Abnormal Psychology, 70, 419-425.

Arenberg, D., & Robertson-Tchabo, E. (1977). Learning and aging. In J. Birren, & K. Warner Schaie (Ed.). Handbook of the psychology of aging (p. 421-449). New York: Van Nostrand Reinhold Company.

Ausubel, D. P. (1977). The facilitation of meaningful verbal learning in the classroom. Educational Psychologist, 12, 162-178.

Basen, M. (1977). The elderly and drugs -- problem overview and program strategy. Public Health Reports, 92(1), 43-48.

Bell, R., & Sullivan, J. (1981). Student preferences in typography. Program Learning and Educational Technology, 18(2), 57-61.

Bolton, E. (1978). Cognitive and noncognitive factors that affect learning in older adults and their implications for instruction. Educational Gerontology, 3, 345-353.

Botwinick, J. (1978). Aging and behaviour. New York: Springer Publishing Company.

Bradshaw, P., Ley, P., & Kincey, J. A. (1975). Recall of medical advice: comprehensibility and specificity. British Journal of Social Clinical Psychology, 14, 55-62.

Brooks, L., Dansereau, D., Spurlin, J., & Holley, C. (1983). Effects of headings on text processing. Journal of Educational Psychology, 75(2), 292-302.

Canestrari, R., Jr. (1963). Paced and self-paced learning in young and elderly adults. Journal of Gerontology, 18, 165-168.

Caranasos, G. J., Stewart, R., & Cluff, Leighton, E. (1974). Drug induced illness leading to hospitalization. Journal American Medical Association, 228, 713-717.

Chisholm, M., Lundin, S., & Wood, J. (1983, September). Withdrawing digoxin -- worth a try. Geriatric Nursing, 290-292.

Clinite, J. C., & Kabat, H. F. (1976). Improving patient compliance. Journal of American Pharmacology Association, 16, 74-76.

Cohen, L., Manion, L. (1980). Research methods in education. London: Croom, Helm, p. 240-260.

Craik, F. I., & Lockhart, R. S. (1972). Levels of processing: a framework for memory research. Journal of Verbal Learning and Behaviour, 11, 671-684.

Deberry, P., Jeffries, L. P., Light, M. R. (1975). Teaching cardiac patients to manage medications. American Journal of Nursing, 75, 2191-2193.

DiVesta, F. J. (1975). Trait-treatment interactions, cognitive processes and research on communication media. AV Communication Review, 23, 185-196.

Ellor, J. R., Kurz, D. J. (1982). Misuse and abuse of prescription and nonprescription drugs by the elderly. Nursing Clinics of North America, 17, 319-329.

Faw, H., & Waller, T. G. (1976). Mathemagenic behaviours and efficiency in learning from prose materials: review, critique and recommendations. Review of Educational Research, 46(4), 691-720.

Fedder, D. (1982). Managing medication and compliance: physician-pharmacist-patient interactions. American Geriatrics Society, 30(11), S113-S117.

Frase, L. T. (1969). Structural analysis of the knowledge that results from thinking about text. Journal of Educational Psychology, 60(6, Pt.2), 1-16.

Frase, L. T. (1973). Boundary conditions for mathemagenic behaviours. Review of Educational Research, 40(3), 330-347.

Frase, L. T., & Kreitzburg, V. S. (1975). Effect of topical and indirect learning directions on prose recall. Journal of Educational Psychology, 67, 320-324.

Frase, L. T., & Schwartz, B. J. (1979). Typographical cues that facilitate comprehension. Journal of Educational Psychology, 71, 197-206.

Given, C. W., Given, A. B., & Simoni, L. E. (1978). Association of knowledge and perception of medications with compliance and health states among hypertension patients. Research Nursing Health, 1, 76-84.

Glynn, S. M. (1978 November). Capturing readers attention by typographical cueing strategies. Educational Technology, 7-12.

Glynn, S. M., & DiVesta, F. (1979). Control of prose processing via instructional and typographical cues. Journal of Educational Psychology, 71(5), 595-603.

Glynn, S. M., & Muth, K. D. (1979). Text-learning capabilities of older adults. Educational Gerontology, 4, 253-269.

Glynn, S. M., Okun, M. A., & Muth, K. D., & Britton, B. K. (1983). Adults text recall: an examination of the age-deficit hypothesis. Journal of Reading Behaviour, XV(1), 31-41.

Greco, A., & McClung, C. (1978). Interaction between attention directing and cognitive style. Education, Communication and Technology Journal, 27, 97-102.

Harrison, C. (1980). Readibility in the classroom. Cambridge: Cambridge University Press.

Hartley, J. (1978). Designing instructional text. London: Kogan Page Ltd.

Hartley, J., & Burnhill, P. (1978). Fifty guidelines for improving instructional text. In J. Hartley & I. Davies (Ed.). Contributions to an Educational Technology (p. 182-194). London: Kogan Page Ltd.

Hartley, J., & Davies, I. K. (1976). Preinstructional strategies: the role of pretests, behavioural objectives, overviews and advance organizers. Review of Educational Research, 46(2), 239-265.

Hladik, W., & White, S. (1976). Evaluation of written reinforcement used, in counselling cardio-vascular patients. American Journal of Hospital Pharmacy, 33, 1277-1280.

Holley, C., Cansereau, D., Evans, H., Collins, K., Brooks, L., & Larsen, D. (1981). Utilizing intact and embedded headings as processing aids with nonnarrative text. Contemporary Educational Psychology, 6, 227-236.

Hulka, B. S., Cassel, J. C., Kupper, L., & Burdette, J. (1976). Communication, compliance and concordance between physicians and patients with prescribed medications. American Journal of Public Health, 66(9), 847-853.

Hultsch, D. (1971). Adult age differences in free classification and free recall. Developmental Psychology, 4, 338-342.

Hultsch, D. F. (1975). Adult age differences in retrieval: trace-dependent and cue-dependent forgetting. Developmental Psychology, 11, 197-201.

Hurwitz, H. (1969). Admissions to hospital due to drugs. British Medical Journal, 1, 539-542.

Jonassen, D. H. (1982). The technology of text. Englewood Cliffs, New Jersey: Educational Technology Publications, p. 5-136.

Kaplan, R., & Simmons, F. (1974). Effects of instructional objectives used as orienting stimuli or as a summary review upon prose learning. Journal of Educational Psychology 66, 614-622.

Kinsbourne, M., & Berryhill, J. L. (1972). The nature of interaction getween pacing and the age decrement in learning. Journal of Gerontology, 27, 471-477.

Klein, L. E., German, P., & Levine, D. (1981). Adverse drug reactions among the elderly: a reassessment. Journal of the American Geriatrics Society, XXIX(11), 525-530.

Klein, L. E., German, P., McPhee, S., Smith, C., Levine, D. (1982). Aging and its relationship to health knowledge and medication compliance. The Gerontologist, 22(4), 384-387.

Knox, A. B. (1977). Adult development and learning. San Francisco: Jossey-Bass Publishers.

Krupka, R. L., & Vener, A. M. (1979). Hazards of drug use among the elderly. The Gerontologist, 19, 90-94.

Lamy, P. P. (1982). Over-the-counter medications: the drug interactions we overlook. American Geriatrics Society, 30(1), S69-S75.

Lamy, P. P., & Kitler, M. (1971). Drugs and the geriatric patient. Journal of the American Geriatrics Society, 19(1), 23-33.

Levy, M., & Glanz, K. (1981). Drug misuse among the elderly: an educational challenge for health professionals. Journal Drug Education, 11(1), 61-75.

Ley, P. (1979). Memory for medical information. British Journal of Social Clinical Psychology, 18, 245-248.

Ley, P., Bradshaw, P., Eaves, D., & Walker, C. (1973). A method for increasing patients' recall of information presented by doctors. Psychological Medicine, 3, 217-220.

Ley, P., Bradshaw, P., & Kincey, J. (1975). Patients' compliance with medical advice. British Journal of Social Clinical Psychology, 15, 403-408.

Ley, P., Jain, V. K., & Skilbeck, C. E. (1976). A method for decreasing patients' medication errors. Psychological Medicine, 6, 599-601.

Lumsdaine, A. A., Sulzer, R., & Kopstein, F. (1961). The effect of animation cues and repetition of examples on learning from an instructional film. In A. A. Lumsdaine (Ed.), Student response in programmed instruction. Washington, D. C.: National Academy of Sciences-National Research Council (p. 241-269).

MacDonald, E. T., MacDonald, J. B., & Phoenix, M. (1977, September). Improving drug compliance after hospital discharge. British Medical Journal, 618-621.

Marsh, W. W., & Perlman, L. V. (1972). Understanding congestive heart failure and self-administration of digoxin. Geriatrics, 27, 67-70.

Marston, M. V. (1970). Compliance with medical regimens: a review of the literature. Nursing Research, 19(4), 312-323.

McCauley, K. M., Isacson, L., & Schulz, K. (1984, May-June). Congestive heart failure. Nursing Life, 33-40.

Morris, L. A., & Halperin, J. A. (1979). Effects of written drug information on patient knowledge and compliance: a literature review. American Journal of Public Health, 69(1), 47-52.

Morris, L. A., Myers, A., & Thilman, D. (1980). Application of the readibility concept to patient-oriented drug information. American Journal of Hospital Pharmacy, 37, 1504-1509.

Morris, L. A., & Olins, N. J. (1984). Utility of drug leaflets for elderly consumers. American Journal of Public Health, 74(2), 157-158.

Neugarten, B. L. (1975). The future and the young-old. The Gerontologist, 15, 4-9.

Potempa, K., & Roberts, K.V. (1982). Cardiovascular drugs and the older adult. Nursing Clinics of North America, 17, 263-274.

Pyatte, J.A. (1969). Some effects of unit structure on achievement and transfer. American Educational Research Journal, 6(2), 241-261.

Pyatte, J.A., & Wright, E. (1983, August). Organized content technique (OCT): a method for presenting information in education and training. Educational Technology, 13-20.

Rabbitt, P. (1977). Changes in problem solving ability in old age. In J. E. Birren & K. Warner Schaie (Ed.). Handbook of the Psychology of Aging. (p. 606-625). New York: Van Nostrand Reinhold Company.

Raffoul, P. R., Cooper, J. K., & Love, D. W. (1981). Drug misuse in older people. The Gerontologist, 21, 146-149.

Reder, L., & Anderson, J. (1980). A comparison of texts and their summaries: memorial consequences. Journal of Verbal Learning and Behaviour, 19, 121-134.

Reder, L., & Anderson, J. (1982). Effects of spacing and embellishment on memory for the main points of a text. Memory and Cognition, 10(2), 97-102.

Reynolds, R. E., & Anderson, R. C. (1982). Influence of questions on the allocation of attention during reading. Journal of Educational Psychology, 74(5), 623-632.

Rickards, J. P. (1976). Interaction of position and conceptual level of adjunct questions on immediate and delayed retention of text. Journal of Educational Psychology, 68(2), 210-217.

Rickards, J. P., & DiVesta, F. J. (1974). Type and frequency of questions in processing textual material. Journal of Educational Psychology, 66, 354-362.

Sackett, D. L., Gibson, E. S., Haynes, B. R., Hackett, B. C., Roberts, R. S., Taylor, D. W., & Johnson, A. L. (1975, May). Randomized clinical trial of strategies for improving medical compliance in primary hypertension. The Lancet, 1206-1208.

Salomon, G. (1972). Can we affect cognitive skills through visual media? An hypothesis and initial findings. AV Communication Review, 20, 401-422.

Shore, H. (1976). Designing a training program for understanding sensory losses in aging. The Gerontologist, 16(2), 157-172.

Stults, B. M. (1982). Digoxin use in the elderly. American Geriatrics Society, 30(3), 158-163.

Taub, H. A. (1980). Research with meaningful prose. Educational Gerontologist, 5, 175-187.

Tinker, M. A. (1963). Legibility of print. Iowa U.S.A.: Iowa University Press.

Vanderplas, J. M., & Vanderplas, J. H. (1980). Some factors affecting legibility of printed materials for older adults. Perceptual and Motor Skills, 50, 923-932.

Walmsley, S. A., & Allington, R. L. (1982). Reading abilities of elderly persons in relation to the difficulty of essential documents. The Gerontologist, 22(1), 36-39.

Walmsley, S. A., Scott, K., & Lehrer, R. (1981). Effects of document simplication on the reading comprehension of the elderly. Journal of Reading Behaviour, XIII(3), 237-248.

Wandless, I., & Davie, J. W. (1977, February). Can drug compliance in the elderly be improved? British Medical Journal, 359-361.

Weibert, R. T., & Dee, D. A. (1980). Improving patient medication compliance. New Jersey: Medical Economics Company.

Williamson, J. (1980, September). Paving the way to safe prescribing for the elderly. Geriatrics, 32-39.

Appendices

Appendix A

General and Specific Instructions

General Instructions

I am giving you some information to read about Digoxin, which your doctor has prescribed for you.

You must be sure to know why you are on this drug.

Remember to take your medication as your doctor has ordered.

Be sure to contact your doctor if you feel unwell while taking this medication.

Be sure you follow your doctor's advice about any other medications you are taking.

You must be sure to know how you are doing with your diagnosis of congestive heart failure.

Specific Instructions

I am giving you some information to read about Digoxin, which your doctor has prescribed for you.

Note that it will make your heart stronger and help to regulate it.

Be sure to take your medication at the same time each day and do not omit a dose.

Note that Digoxin can be toxic. Watch for side-effects. Look at the side-effects listed here. Call your doctor if you have any stomach upsets or vision changes.

Do not take any 'over-the-counter' drugs without asking your doctor first. Note the importance of taking Potassium if your doctor has ordered it.

You must be sure to weigh yourself every day before breakfast. Check yourself for signs of edema. See what it says here about the signs of reoccurring heart failure. Watch for these and call your doctor if they occur.

Appendix B

Information Sheet on Digoxin

INFORMATION ON DIGOXIN

Digoxin strengthens the heart muscle.

Digoxin increases the amount of blood expelled from the heart. It will provide more blood to meet your body's needs and help regulate and strengthen your heart.

Take digoxin only as your doctor orders.

Take digoxin at the same time each day. Never skip a dose or take extra pills. If you forget to take two, or more doses in a row, call your doctor. Stop taking digoxin only when your doctor has told you to do so. Leave the pills in their original container. Do not take anyone else's pills as they may be a different dose. Keep this drug away from children.

Digoxin can be harmful to you.

Watch for possible harmful effects while on this drug. If any occur do not take your next dose of digoxin and call your doctor.

Warning signs are:

- -loss of appetite, feeling sick to your stomach, abdominal pain, vomiting or diarrhea for more than a day
- -a change in your vision, such as, blurred vision, seeing rainbows or a yellow haze around bright lights
- -headache, unusual sleepiness or confusion
- -a change in your usual heart rate or rhythm

Digoxin can interact with other drugs and become harmful to you.

Take all the drugs the doctor orders for you. If you are on potassium do not stop taking it as that could lead to harmful effects developing. Tell your doctor about any other drugs you are taking, including non-prescription drugs. For example, cold remedies, nose drops, laxatives and antacids can interfere with the effect of digoxin.

Watch for early signs of congestive heart failure.

Notify your doctor immediately if you have difficulty breathing, frequent coughing, or feel extra fatigued. Weigh yourself at the same time each day and note any sudden weight gain. Look for puffiness in your hands and ankles. Check if your rings or shoes are too tight.

Appendix C

Congestive Heart Failure Pamphlet

Pages 99 - 101

Copyright Material

FACTS ABOUT CONGESTIVE HEART FAILURE

Please contact the American Heart Association to obtain material.

Appendix D

Questionnaires

Questionnaire Number 1

1. Name _____
2. Age ____ 3. Sex ____ 4. Maternal language _____
5. Marital status _____ 6. Living arrangement _____
7. Employment: present _____
   past _____
8. Present income _____
9. Educational level attained _____
10. How many medications are you presently taking? _____

11. Please answer the following questions for each drug you have been prescribed.
    a. name of drug
       why on it

       instructions given by the doctor about this drug

    b. name of drug
       why on it

       instructions given by the doctor about this drug

    c. name of drug
       why on it

       instructions given by the doctor about this drug

    d. name of drug
       why on it

       instructions given by the doctor about this drug

12. Please complete the following about any non-prescription drugs you may be taking.

	yes	no	name	frequency
a. cold				
b. stomach upset				
c. constipation				
d. diarrhea				

13. Please describe any chronic health problems you may have.

14. How would you describe your present state of health?

15. Have you had any problems before with your heart?

16. What symptoms did you have that made you see your doctor?

17. Can you define the condition congestive heart failure?

18. What were your doctor's instructions about the treatment for your heart condition?

19. Have you read any information about this condition?

20. Do you know what action digoxin has on your heart?

21. How long have you been on digoxin?

22. Have you been prescribed this drug before?

23. What were your doctor's instructions about this drug?

24. Do you know of any harmful effects digoxin may have?

25. Have you experienced any negative side-effects from digoxin?

    a. what were they?

    b. what did you do?

26. Do you feel the medications you are taking have:
    a. ____ improved your health
    b. ____ worsened your health
    c. ____ had no effect on your health

Questionnaire Number 2

Congestive heart failure

1. Can you define the condition congestive heart failure?

2. What symptoms would you look for here?

3. Have you had any symptoms of heart failure since I spoke with you last?

Digoxin

4. What does digoxin do for your heart?

5. What harmful effects could occur from this drug?

6. If you had a cold and wanted to take a non-prescription drug what would you do?

7. Have you had what you consider to be a harmful effect of digoxin?

   What was it?

   What did you do about it?

Definable routines

8. Does anyone help you in taking your pills?

   Who?

   What do they do to help?

9. Do you do anything special to help you to remember to take your pills?

10. Where do you keep your pills?

11. Is there any reason why you keep them there?

12. Are they kept in their original containers?

Compliance

13. How do you feel about having to take digoxin?

14. Is it helping you to feel better?

15. Have you had any difficulties with this drug?

16. What is your present state of health?

17. What do you do if you miss a dose?

    Has this happened?

18. How much money do you spend per month on your drugs?

19. Is this a problem for you?

20. Have you read any other material on heart disease or drugs since I first spoke with you?

Information Sheet

21. Have you read the information on digoxin?

22. Where do you keep this information?

23. Would you consider it helpful to receive similar information for other medications you are taking?

24. What do you feel you have learned from this information?

25. Was it easy to read?

Was the print size large enough?

Were there any difficult words for you?

26. Do you have any suggestions for improvements?

CHF Pamphlet

27. Have you read the pamphlet, "Facts About Congestive Heart Failure?"

28. Did the pamphlet help you to understand your condition?

29. What do you feel you learned from it?

30. Was it easy to read?

Was the print size large enough?

Were there any difficult words for you?

31. Do you have any suggestions for improvements?

Appendix E

Scoring Procedures

Scoring Procedures

Composite Knowledge Score

Items	Answer Choice	Questionnaire A	Questionnaire B	Questionnaire C (N = 36)
		(Q.17)	(Q.1)	
Definition of congestive heart failure (3 points)				
	none - 0	28	16	17
	partial response - 1	3	10	8
	partial response - 2	5	9	8
	all stated - 3	0	1	3
		(Q.20)	(Q.4)	
States action of digoxin (3 points).				
	none - 0	20	2	1
	states one incomplete - 1.5	13	24	23
	states two incomplete - 2.0	0	1	0
	complete answer - 3.0	3	9	12
		(Q.24)	(Q.5)	
States harmful (side-effects) of digoxin (5 points).				
	none - 0	29	5	5
	partial response - 0.5	2	6	4
	states 1 - 1	1	2	2
	partial response - 1.5	0	6	7
	states 2 - 2	3	2	7
	partial response - 2.5	1	9	4
	states 3 - 3	0	2	2
	partial response - 3.5	0	2	2
	states 4 - 4	0	2	1
	partial response - 4.5	0	0	0
all side-effects stated - 5		0	0	0

Items	Answer Choice		A	B	C
			(Q.25.a)	(Q.7.a)	
Negative effect from digoxin: experienced and described (2 points).					
	no	- 0	31	26	27
	yes	- 2	5	10	9
			(Q.25.b)	(Q.7.b)	
Stated side-effects experienced of digoxin (2 points).					
	incorrect	- 0	32	26	27
	partially correct	- 1	0	0	0
	complete	- 2	4	10	9
			Questionnaire		
				B	C
				(Q.2)	
Stated symptoms of congestive heart failure (5 points).					
	none	- 0		3	1
	partial response	- 0.5		1	1
	1 stated	- 1.0		6	3
	2 stated	- 2.0		7	12
	partial response	- 2.5		0	1
	3 stated	- 3.0		12	13
	partial response	- 3.5		0	1
	4 stated	- 4.0		6	2
	partial response	- 4.5		1	1
	5 stated	- 5		0	1

Items	Answer Choice		A	B	C
				(Q.24)	
Learned from information sheet (3 points).					
	nothing	- 0		1	1
	partial	- 1		20	18
	partial	- 2		11	12
	complete	- 3		4	5
				(Q.29)	
Learned from pamphlet (3 points).					
	nothing	- 0		5	7
	partial	- 1		10	13
	partial	- 2		16	14
	complete	- 3		5	2

Total Knowledge Score: Questionnaire A = 17
Questionnaire B & C = 26

Scoring Procedures

Composite Compliance Score

Items	Answer Choice	Questionnaire A	Questionnaire B	Questionnaire C
		(Q.12)	(Q.6)	
Confirms non-prescription drugs with doctor (2 points).				
	does not check with doctor - 0	7	5	4
	does not need to check - 1	13	2	1
	does check with doctor - 2	16	29	31
		(Q.25.c)	(Q.7.a)	
Action if toxic (side) effect experienced (3 points).				
	does nothing - 0	2	1	0
	makes appointment - 1	1	5	6
	no need to do anything - 2	30	26	27
	calls Doctor/Nurse - 3	3	4	3
			(Q.17.a)	
What subject would do if he/she mises a dose (2 points).				
	omit it - 0		1	4
	take it later - 1		21	18
	call doctor - 2		14	14
Actual occurence of missing one dose of medication (3 points).				
	ommited dose once - 0.0		6	8
	late with digoxin - 1.5		17	16
	has not missed a dose - 3.0		13	12

N = 36

Total compliance score: Questionnaire A = 5
Questionnaire B & C = 10

Items	Answer Choice		B	C
Q.10				
Location of pills				
	not convenient/put away	- 0.0	0	1
	(only one chosen)	- 1.5	15	15
	nearby/open to view	- 3.0	21	20
Pills kept in original containers (2 points).				
	no	- 0	1	1
	yes	- 2	35	35

Total routine score = 15 points.

Scoring Procedures

Composite Routine Score

Items	Answer Choice		Questionnare B	Questionnare C
			N- 36	
Q.8a.				
Requires assistance with medication (2 points).				
	no	- 1	27	28
	yes	- 2	9	8
Q.8b.				
Type of assistance required (3 points).				
	N/A	- 0	27	28
	needs a reminder	- 1	3	2
	someone else gives medication	- 2	2	2
	nurse provided container	- 3	4	4
Q.9				
Degree of routine developed to remember medication on schedule (5 points).				
	none developed	- 0	2	1
		- 1	8	9
		- 2	6	6
		- 3	6	6
		- 4	9	9
	accountable routine with checks	- 5	5	5

Appendix F

Questionnaire Responses

Questionnaire A : Responses

Q.10 Number of medications subjects are taking.

		n
Number of Medications	1	1
(1 - 10)	2	1
	3	5
	4	3
M = 5.9	5	3
	6	9
SD. = 2.2	7	6
	8	4
	9	2
	10	2

Q.11a Knowledge of medication names.

		n
Scores in Percentage	0	0
	16	2
Overall	20	2
M = 69.30	28	1
S.D. = 32.24	33	1
	40	1
Specific Instructions	44	1
M = 72.58	50	1
	66	3
SD = 29.41	70	2
	75	1
General Instructions	80	2
	85	3
M = 65.65	88	3
SD = 35.69	100	12

Q.11b Knowledge of medication actions.

		n
Scores in percentage	0	2
	16	1
Overall	33	2
M = 66.67	44	1
SD = 28.24	50	5
	60	4
Specific Instructions	66	6
M = 68.05	70	1
SD = 26.53	80	1
	85	1
General Instructions	87	1
M = 65.22	90	2
SD = 30.79	100	9

Q. 18 Received instructions from doctor about management of congestive heart failure.

	n
none received	17
partial instructions	14
complete instructions	5

Q. 23 Received instructions from doctor and/or nurse about medication, digoxin.

	n
none received	25
partial instructions	11

Questionnaires A, B, and C: Responses

Subjects' feelings about digoxins effect on their health.

	Q.26 A	Q.14 B	C
positive:	23	30	29
negative:	4	2	2
has no effect:	9	4	5

Subjects' description of their health state.

	Q.14 A	Q.16 B	C
poor:	5	5	10
fair:	21	19	16
good:	10	12	10

Questionnaires B and C: Responses

Q. 13 Subjects' feeling about having to take digoxin.

	B	C	
positive:	30	29	
negative:	2	2	N = 36
no opinion:	4	5	

Q. 20 Subject has read other literature on heart disease or drugs, since receiving material.

	B	C	
yes	4	3	N = 36
no	32	33	