THE DEVELOPMENT OF INSTRUCTIONAL MATERIALS ENTITLED "THIS IS DIABETES" FOR USE WITH ADULT DIABETES PATIENTS IN NEWFOUNDLAND AND LABRADOR

CENTRE FOR NEWFOUNDLAND STUDIES

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G. WAYNE MANUEL

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THE DEVELOPMENT OF INSTRUCTIONAL MATERIALS ENTITLED "THIS IS DIABETES" FOR USE WITH ADULT DIABETES PATIENTS IN NEWFOUNDLAND AND LABRADOR

by

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A Report submitted in partial fulfillment
of the requirements for the degree of
Master of Education

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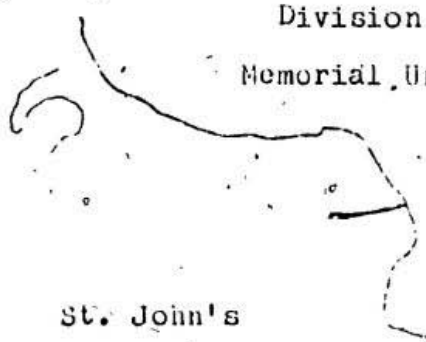

St. John's Newfoundland

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ABSTRACT

St. Clare's Mercy Hospital, St. John's, Newfoundland, expressed a need for instructional material to teach adult diabetes patients in Newfoundland the causes of diabetes and those factors which are important in controlling diabetes. Upon a review of the available literature and audiovisual material about diabetes, the author found nothing which adequately met the need, and the decision was made to develop appropriate new materials.

The prospective learners were identified as adults with wide ranges in education and ages. An analysis of the major concepts necessary to an understanding of diabetes and its control was developed. Results of analysis indicated that a slide-tape presentation would effectively deliver the information necessary and contribute to positive attitudes among viewers, and this format was chosen.

Ongoing formative evaluations of the slide-tape presentation by content and media experts and by learners showed that the presentation did present all the necessary concepts and learners tested responded positively toward the presentation. An ensuing summative evaluation at a diabetes clinic supported the results of the formative evaluation and demonstrated that the presentation is effective as a review.

as well as an initial introduction.

As a result of the evaluation processes, the author recommended that the presentation should be used as an introduction to diabetes patients, followed by a discussion conducted by a live instructor, and that patients be provided with printed materials which supplement and reinforce the slide-tape package.

The resulting presentation has been packaged and placed at St. Clare's Mercy Hospital and the Newfoundland Hospital Association for distribution.

ACKNOWLEDGEMENTS

The development of instructional materials of this type could not be achieved without the cooperation of many individuals. The original idea came from St. Clare's Mercy Hospital, St. John's. The staff at St. Clare's has been more than helpful whenever needed. I would like to thank the experts, especially Mrs. Dee Braffet, who so readily gave of her time and expertise. There were many learners involved during the evaluation stages. Their comments and suggestions were appreciated. My supervisor, Dr. R.T. Braffet, has been extremely helpful and encouraging during the project. Finally, my love and appreciation to my wife, Maxine, for all the support, encouragement, and of course, the typing. Maxine, I couldn't have done it without you.

TABLE OF CONTENTS

LIST OF TABLES

TABLE Page

LIST OF FIGURES

FIGURE Page

CHAPTER I

INTRODUCTION

Diabetes Mellitus-An Overview

Diabetes Mellitus, commonly called diabetes, is a prevalent condition in today's society. Approximatbly nine thousand individuals in Newfoundland have the condition ("Health of Canadians", 1981). Diabetes can afflict anyone, but the risk becomes greater with age. Krolewski and Warren (1985) give the average annual incidence rates of diabetes to be 2 or 3 by age twenty, 12 by age fourty, and 65 by age sixty (p.14).

Definition. Diabetes Mellitus is "a group of disorders characterized by glucose intolerance" (Gabriel, 1985, p.14). Glucose is the chief fuel supply for the human body "but the beneficial effects of glucose occur only when the body's glucose levels stay within a fairly narrow range". (Gabriel, 1985, p.14). This is accomplished mainly through a hormone called insulin.

> Following ingestion of a carbohydrate, glucose is absorbed into the bloodstream, elevating the blood glucose level. In response the pancreatic beta cells (in the islets of Langerhans) secrete insulin, which binds to the receptors on insulin-dependent cells (which make up most of the body) and allows them to absorb the extra glucose (Gabriel, 1985. p.16).

The insulin also "directs some of the sugar to be stored

as glycogen (stored glucose) in the liver and muscles.... Between meals, insulin controls the release of stored fuels" (Sims and Sims, 1981, p.24). It is when the body suffers from an insufficient supply of insulin, that the glucose intolerance rises and diabetes occurs.

Symptoms. The deficiency of insulin results in a high blood glucose level which in turn exposes itself through any number of symptoms. The inability of the cells to absorb the glucose they need causes starvation of the cells which in turn increases the individual's appetite. Also, as the blood glucose level increases water is drawn out of the cells, and as the renal threshold for glucose is exceeded the glucose passes out of the circulatory system through the kidneys. Hence, frequent urination may indicate a diabetic condition. To counterbalance the excessive loss of fluids, the individual may experience an increase in thirst. As well, any or all of the following symptoms may occur:

1. Itchy skin
2. Pain, numbness, tingling feet
3. Slow healing of cuts
4. Weakness and fatigue
5. Blurred vision

(Manuel, MacNeil & Hewson, 1981, p.2)

If an acute deficiency of insulin occurs, the cells of the body become starved and fats and proteins are broken down to meet the energy requirements of the body. As a by-product, ketone acids accumulate in the bloodstream. The result may be a condition called ketoacidosis. When high blood sugar is combined with ketoacidosis, other symptoms may occur as well. These include:

1. Rapid breathing
2. Sweet smelling breath
3. Vomiting
4. Stomach-ache (Manuel et al., 1981, p.2)

Types. The present classification system for diabetes mellitus gives two major classifications: Type I, also called insulin-dependent diabetes mellitus (IDDM); and Type II, also called non-insulin-dependent diabetes mellitus (NIDDM).

Type I diabetes, which affects approximately ten per cent of the population, usually afflicts people under the age of forty. Evidence supports the idea that in genetically disposed individuals, autoimmune abnormalities cause the insulin deficency that occurs. "An environmental insult such as a virus might trigger an autoimmune reaction that would have an adverse effect on the patient's

beta cells" (Smith, 1965, p.566). The destruction of the beta cells causes a total lack of, or a shortage of, insulin. A severe shortage of insulin usually comes about abruptly in Type I diabetes, causing the individual to exhibit the classic symptoms of hyperglycemia. Finally, a Type I diabetic may also experience ketoacidosis (that is, an increase in the amount of ketones in the blood).

Approximately 90% of diabetic patients have Type II diabetes, which usually has its onset after the age of forty. The onset of Type II diabetes is gradual and often has "few or no classic symptoms of diabetes" (Marble and Ferguson, 1965, p.555). Also, it does not usually result in the ketoacidosis complications. As a result of the absense of these classic symptoms, an individual with Type II diabetes may not be diagnosed as such for a long period of time. Hernandez (1983) does point out, however, that there are symptoms which an undiagnosed Type II diabetic patient may experience. These include "extreme tiredness, vision changes, frequent infections, generalized itchiness or itchiness localized in the perineal area, and poor healing" (p.12).

Whereas Type I diabetes is characterized by the dramatic decrease of insulin or usually, no insulin at all, Type II diabetes patients do produce some insulin; the problem is

either insufficient quantities of it or resistance to it (Gabriel, 1985, p.20). The reasons for this insufficient supply of insulin or the inability to use the insulin are heterogenous. Heredity appears to play a more significant role in the onset of Type II diabetes than in Type I diabetes. "'Studies in identical twins indicate a much higher degree of concordance (95+%) than in twin sets in which the onset of diabetes in the index twin is under the age of 40 years (about 40%), suggesting a stronger influence of heredity'" (Marble and Ferguson, 1985, p.555). Smith (1983) also points out that "there is definitely a higher incidence of NIDDM in family members of patients who have this disease than there is of IDDM in relatives of patients with IDDM" (p.586).

The most prominent environmental factor that plays a part in the onset of Type II diabetes is obesity. Kahn (1985) says that Type II diabetes "is associated with obesity in more than 80% of patients" (p.46). "The main effect of obesity is to cause increased resistance to insulin action on most tissues" (Smith, 1983; p.586). Loss of weight and maintenance at a lower level usually results in a reversal of this intolerance. Hernandez lists other potential environmental risk factors which may interact with the genetic factor to cause the diabetes.

These include "stress, physical activity, pregnancy and certain medications" (Hernandez, 1983, p.11).

Treatment. Vignati and Cunningham (1985) describe the treatment of diabetes in the following way:

> The triad of insulin, diet and exercise has been the basis of treatment of diabetes for the past 60 years. Each of these therapeutic modalities can have an impact on the health of the diabetic and each, individually or in combination with the others, has place in the treatment regimen (p.453).

A consideration of diet, one of the legs of the triad, leads one to the fact that the basis of treatment for all patients with diabetes is the "regulation of the type and quantity of food ingested" (Flood, Halford, Cooppan and Marble, 1985, p.577). Although the basis of treatment of diabetic patients is the same, the methods vary for Type I and Type II diabetes, as stated in Maryniuk (1982):

> Goals for diet therapy are similar for the patient with IDDM or NIDDM: to achieve optimal nutritional status, ideal body weight, and normal blood sugars. However, the methods for reaching those goals vary considerably depending on whether the individual has Type I or Type II diabetes. (p.559)

The Type I diabetic individual "must balance food intake with insulin and energy in order to achieve normoglycemia" (Maryniuk, 1982, p.59). To accomplish this "timing of meals and consistency of intake are imphasized" (Arky, Wylie-Rosett and El-Beheri, 1982, p.59). These

aspects of the food intake need to be correlated with the insulin peaking times. The number of calories is far less important than keeping the amount consistent from day to day.

"Weight reduction is the primary objective of therapy in the majority of Type II diabetic individuals" (Arky et al., 1982, p.59). Weight reduction is accomplished through a controlled caloric intake. Since Type II diabetics already have high levels of circulating insulin, the reduction of the individual's weight is often sufficient to curb the disease.

Type II diabetics who are not obese are often prescribed a meal plan similar to that of the Type I diabetic. Even though they have an endogenous supply of insulin and are not insulin-dependent in the strict sense, "some may do better with an insulin dose which will permit a satisfying food intake" (Flood et al., 1985, p.359).

A second important aspect of the triad of treatment for diabetes is exercise. Exercise is prescribed alongside reduced caloric intake to aid in the weight reduction of Type II diabetics. The benefits of exercise are not limited to a means of weight reduction, however. Campaigne, Gilliam, Spencer, Lampman, and Schork (1984) found that

"regular high-intensity physical activity can lead to improvements in metobolic control and cardiovascular fitness in young children with IDDM" (p.61). Vignati and Cunningham (1985) state one of the metobolic effects of the exercise to be an "increased insulin sensitivity (decreased insulin requirements)" (p.454).

The amount of exercise is a consideration in determining the beneficial effects. Although "the duration and frequency of the activity sessions are dependent upon the patient's age, time availability, and level of endurance fitness" (Vignati and Cunningham, 1985, p.459), the experts agree that occasional exercise will not offer the benefits previously described. "It has been suggested that a workout time of 15 to 30 minutes 3 times per week is the minimul commitment to endurance exercise training in order to produce health and fitness benefits" (Vignati and Cunningham, 1985, p.459).

The third and final leg of the triad of treatment is insulin. Insulin is presoribed to Type I and some non-obese Type II diabetic patients. Insulin injections are administered at least once every day and quite often several injections a day are needed for best control of the blood glucose. The injections are planned so that the peak effect corresponds to the highest levels of the

the blood glucose levels. The physician, then, should prescribe the type and time of injections to correspond to the individual's diet. As well, the physician needs to take into account the type of activity of the diabetic. Generally, the more strenuous the activity, the less insulin is needed.

Type II diabetic patients who are unable to control their diabetes through their diet and exercise activity may be prescribed an oral hypoglycemic agent, commonly called "diabetic pills". These oral hypoglycemic agents have been mistaken for insulin or as a cure for diabetes. In fact, they have two effects on the body: to stimulate insulin release, and to increase the sensitivity and number of insulin receptor sites. There are many such agents on the market and, again, the physician should prescribe the best agent according to the appropriate indications.

Education. Encompassing the whole spectrum of treatment for diabetes is the education of the diabetic patient. "Education is probably the most vital part of treatment, and if this is not achieved, all may be lost. Without education of the patient to understand what is being done with and for him, the whole therapeutic system

unravels" (Krall, 1985, p.471). Anderson (1985) suggests that the physician who is treating a diabetic needs to redirect attention from the disease and subsequent treatment to the individual who has the disease, since "in diabetes it is the patient who must implement the treatment on a daily basis" (p.31).

The ultimate goal of the treatment of diabetes is maximum control of the blood glucose level of the diabetic patient. The purpose of educating the diabetic patient is to equip the patient with the tools to reach this goal. Krall (1985) gives three steps of the educational process-each one being a prerequisite of the next.

> Of all the educational goals desired for the diabetic, the first objective is an increase in the patient's knowledge. Without knowledge, there is no basis for a change in attitude or life style. The second of these is attitudinal change because without motivation, the knowledge gained will not be put to use. The ultimate result is an appropriate change in behaviour and compliance in self-care. The final result should be improved quality of life. (p.472)

Home Monitoring. The goal of the triad of treatment discussed earlier is to achieve the optimal control of the blood glucose level. Smith (1983) states that "there is increasing concensus that better control does lessen the incidence of complications, specifically microvascular complications" (Smith, 1985, p.591). Vital to the task of

maintaining this control is testing and monitoring of the blood glucose levels, which ideally should be between 70 and 140 mg/dl. Until recent years the primary method of testing the blood glucose level at home was to test the diabetic's urine for an "overflow" of glucose and ketones from the blood. This was at best a rough idea of the actual level of the blood glucose level "since renal threshold is variable and also urine might be negative for glucose and yet blood glucose could be quite high" (Hernandez, 1983, p.17).

Recent developments have allowed the testing of blood-glucose levels directly with more accurate results than is gained through testing the urine for glucose. These developments have made it possible for the diabetic to more closely monitor progress in controlling blood glucose levels. One method of blood glucose testing is by "reagent strips in which the color of a drop of blood obtained from the finger is compared visually with a color chart" (Smith, 1983, p.591). Chemstrip bG from Bio-Dynamics and Dextrostix from Ames are two examples of the reagent strips that are on the market. Schade, Eaton, Mitchell, and Friedman (1981) studied the ability of patients to accurately check the glucose level using

Chemstrip bG.

> Results demonstrate that (1) well motivated diabetic subjects can adequately monitor their blood glucose concentration at home, (2) there is a marked variability between subjects in their ability to accurately monitor blood glucose concentration using Chemstrip bGs, and (3) the use of the Chemstrip bG tends to influence their reading toward the prelabeled glucose reading on the Chemstrip chart. (p.423)

The second method of directly testing the blood glucose level directly is through the use of blood glucose monitors. The patient obtains a drop of blood from the finger, but rather than comparing it with a chart, inserts it into a meter which gives an electronic readout of the glucose level.

A position paper by the Health and Public Committee of the American College of Physicians (1983) suggests the use of home monitoring of blood glucose for patients with special problems, such as pregnancy and frequent episodes of hypoglycemia or severe hyperglycemia. The paper also suggests that "home monitoring may also be appropriate for any patient with diabetes who is well motivated and capable of adhering to a rigorous management program" (Health and Public Policy Committee, 1983, p.273).

Complications: (Short and long-term). If Joslin's triad of factors are not in balance, the diabetic may develop complications. In the short-term these could include hypoglycemia (low blood-sugar) and hyperglycemia (high blood-sugar). Causes of hypoglycemia include skipping

meals or snacks, delaying meals, too much insulin, excessive exercise without increased food intake, and drinking sweet alcoholic beverages on an empty stomach. It can occur suddenly (within minutes) and may involve any number of symptoms: hunger, sweating, paleness, headache, nausea and vomiting, weakness, blurred or double vision, dizziness, irritability and mood changes, nervousness, and shakiness. A diabetic who experiences hypoglycemia should be treated immediately or unconsciousness may occur. The treatment involves the administering of some simple form of sugar such as orange juice, honey or candy.

Hyperglycemia (high blood-sugar) occurs slowly over hours or days. It may occur as a result of any combination of the following reasons: overeating, insufficient medication, insufficient exercise, illness, and emotional stress. The symptoms of hyperglycemia are the classic symptoms of uncontrolled diabetes. Treatment should involve an injection of prescribed insulin or a visit to the doctor. If no treatment is administered and the blood-glucose level rises above 600 mg/dl, the diabetic patient may go into a coma. Finally, as Hernandez (1983) points out, persistent hyperglycemia is the primary cause of many of the long-term complications of diabetes (p.20).

Among the long-term complications is large blood vessel disease. This is the "narrowing or plugging of large blood vessels resulting in decreased circulation, especially to legs and feet" (Manuel et al., 1981, p.22). This often results in amputations of the feet or legs of the diabetic. Most and Sinnock (1983) emphasize that "diabetic persons have a 15 times higher risk of lower extremity amputations than nondiabetic individuals" (p.87).

Another long-term complication is small blood vessel disease. Damage to small blood vessels in the kidneys may cause poor kidney functions as well as an increased incidence of kidney and bladder infections. Retinopathy is caused by damage to the small blood vessels in the eyes. The results may be a decrease in vision, blurred vision or hemorrages in the retina.

Other long-term complications include diabetic neuropathy, insulin hypertrophy, insulin atrophy, skin changes, sexual problems (Manuel et al., 1981, p.22) and heart disease. Leland and Maki (1985) state that "heart disease occurs eventually in a majority of patients with diabetes mellitus and continues to be the outstanding factor in overall diabetic morbidity and mortality rates" (p. 555).

Personal hygiene. Along with the close day to day monitoring of the blood glucose level, it's imperative that the diabetic pay special attention to those areas which have a high risk of future complications. In the pamphlet "Your Eyes and Teeth Matter Too" (1980), the Canadian Diabetes Association emphasizes the importance of carefully watching for any changes in vision, as well as regular checkups to guard against the development of retinopathy. Proper hygiene habits for the teeth are also emphasized. Diabetics are cautioned to watch for swollen or bleeding gums, painful or loose teeth, and bad breath irregardless of what is eaten.

The CDA also stresses special care of the feet in the pamphlet "Treat Your Feet... with care" (1980). The diabetic's feet should be carefully washed and dried each day and checked for anything that might cause problems such as cracks, bruises, cuts, swelling, blisters, redness, corns and callouses. As well, extra care should be taken when cutting toenails and even in choosing the type of socks and shoes.

Origin of Project

During the summer of 1982, the author was approached by St. Clare's Mercy Hospital, St. John's, to produce

educational materials that presented an overview of diabetes. These materials were also to (a) be relevant to Newfoundland patients, and (b) be inexpensive to reproduce. The following report describes in detail the development of the instructional materials.

CHAPTER II

NEEDS ASSESSMENT

In the initial meeting with representatives from St. Clare's Mercy Hospital, two broad goals for providing information to diabetes patients were established:

1. To develop an inexpensive, reproduceable, printed reference manual for diabetes patients in Newfoundland.

2. To develop inexpensive teaching materials that are relevant to diabetes patients in Newfoundland.

A decision was made to proceed with two separate but coordinated projects, each of which would attempt to meet one of the above goals.

A team of researchers and producers directed by the author designed and produced a book which addressed the first goal.

The design and production of inexpensive teaching materials was developed separately by the author and is the subject of this report.

Specific Goals

Three specific desirable goals to be achieved by the teaching materials were identified:

1. Adult diabetes patients in Newfoundland were to

be presented with information explaining what diabetes is and what factors are important in controlling it.

2. Adult diabetes patients in Newfoundland were to be presented with information concerning their particular type of diabetes (insulin-dependent diabetes or non-insulin-dependent diabetes) and its treatments.

3. Adult diabetes patients in Newfoundland were to be presented with information on how to react to unusual situations such as traveling or pregnancy.

These goals were then ranked in order of their importance. It was determined that Goal 1 was primarily general information pertaining to all diabetes patients, and a necessary prerequisite to the understanding of the more specific situations found in Goals 2 and 3. As such, Goal 1 was a logical choice for development into an introductory teaching package.

It was further determined that the requirements for Goal 2 varied from patient to patient. Not all patients needed the same information, and even information common to most patients was not needed in the same sequence for all patients. It appeared that it would be less confusing and more valuable to the individual patient to have access to this information as needed, rather than being presented with an overall view of Goal 2 information in a general

learning package.

Goal 5, while containing content that could be included in a general teaching package, was specific to special cases and as such it was determined that that material would be the subject of a future instructional package.

The decision was than made to limit the scope of this project to meeting the requirements of Goal 1, which is to explain what diabetes is and describe the factors that are important in controlling it.

Rationale of Need

Burton and Merrill (1977) speak about several types of needs (p. 25); two of which are a felt need and an expressed need. A felt need is one that people agree is present. When an individual or group takes action to meet a need that they feel is present, then the need becomes an expressed need.

Experts at St. Clare's Mercy Hospital were consulted concerning the need for materials for instructing diabetes patients in the nature and control of the disease. Experts were in agreement that there is a felt need for such material. According to the experts, nearly all individuals seem familiar with diabetes in general terms, but lack knowledge of the specific content to be addressed

by this project. Experts at St. Clare's indicated that people know few of the specific facts regarding diabetes before they, or someone close to them, are afflicted with diabetes. Doody and Grose (1981) state that "patients with a lot of exposure to an affected relative had better understanding than patients with limited exposure' (p. 287). What is required when people are first confronted with a personal need to know about diabetes is simple, yet thorough, instruction explaining the nature and control of the disease.

All experts emphasized that they feel the need for such instructional materials is greater for people who live in remote outlying areas. Very often these people have no access to any formal diabetic clinic. Additionally, isolated areas such as coastal Labrador and the South Coast of Newfoundland have special dietary problems, since availability of fresh foods is severely limited during winter months.

The health professionals at St. Clare's Mercy Hospital not only felt there was a need for learning materials for diabetes patients; they also expressed their need. The expression occured by setting in action the planning and implementation of this project.

Statement of Need

Experts in the health field expressed concern that diabetes patients in Newfoundland often do not have a basic understanding of the causes of their disease, and that there is an urgent need for instructional materials that can communicate these concerns in layman's terms.

Alternative Solutions

When an educational need has been established and a decision has been made to proceed in providing materials to meet that need, there are three options available to the instructional developer (Thiagarajan, Semmel & Semmel, 1974). These options are:

1. To locate and implement materials which are already produced and which will satisfy the instructional need.

2. To adapt or modify materials which meet some of the needs but which are not appropriate in the form in which they were originally produced.

3. To produce new materials if no other suitable materials exist.

Review of Available Materials

Although it was specified by the staff at St. Clare's Mercy Hospital that they wanted new materials developed,

it was necessary to review the existing instructional materials to determine that no suitable materials already existed.

The author first approached the Patient Education Nurses at St. Clare's Mercy Hospital and Grace Memorial Hospital as well as the dietician at St. Clare's Mercy Hospital to find out what they were using as resources for themselves and for their patients. The author then approached the CDA for any materials that were available through that organization. This was followed by a search of hospital, public, and university libraries in St. John's, Newfoundland. The bulk of the materials found were highly technical and used for training professionals. The remaining material which is relevant to the goal was of two basic types: (a) printed materials, and (b) 35mm filmstrips. The printed materials are from two main sources: (a) The Canadian Diabetes Association (CDA), and (b) private companies which produce medications for diabetes patients.

The CDA produces many excellent pamphlets which are free of charge. These, however, are not oriented toward the teaching of the overall concept of diabetes control. Rather, each takes a particular topic and deals with it in detail. Two such pamphlets are The Diabetic Way of Eating (1977), and Travelling with Diabetes (1973).

These can be very useful as reference guides for the patient at home.

Many of the pamphlets produced by private companies can be used as reference guides at home, similar to those produced by the CDA. An added shortcoming of these materials, however, is that one of their main functions is to provide sales promotion for particular products of commercial firms.

Take Charge of Your Diabetes by Charles M. Peterson, M.D. (1979), is a comprehensive and explanatory text on diabetes, and as such can provide the diabetes patient with an excellent source of information. However, diabetes patients with a lower reading level will probably have difficulty understanding the complexities of the text.

An important source of diabetes information is found in a series of filmstrips produced by the Trainex Corporation (1977). This is good material but the series has serious shortcomings. Because of the age of the material, newer material is not included. The blood glucose monitor, for example, had not been developed when these filmstrips were produced. Additionally, the duration of each filmstrip is too long. A recommended time for filmstrips is 12 to 15 minutes, and these are much longer. There are often poor use of the visuals

with frequent mismatching of pictures and narration. Additionally, many visuals are repeated again and again when different pictures would have been more appropriate.

Decision to Develop an Instructional Package

The unique nature of the rural communities of Newfoundland and Labrador in terms of their isolation from convenient dietary and medical services increases the importance of providing material designed specifically for the Newfoundland audience. These materials should provide examples and references to which the rural Newfoundlander can identify.

Upon approaching the Patient Education Nurses and dieticians at St. Clare's Mercy Hospital and Grace Memorial Hospital, as well as the CDA, the author was provided with all materials that were used for the education of patients at these hospitals. This was followed by a search of the libraries within St. John's. The overall search for suitable existing materials revealed that none of those which were available met the specific needs of adult diabetes patients in Newfoundland.

An examination of the materials available, in terms of modification or revision to make them suitable for the Newfoundland audience, revealed that the necessary required revisions would be so extensive and the updating

of information would demand so much rewriting that this option was rejected as too expensive and time-consuming to be practical.

The decision was made to design, develop, and produce new materials that would specifically meet the objectives as determined by research conducted by the developer and in consultation with experts in the field.

CHAPTER III

LEARNER ANALYSIS

One of the principle activities in which an instructional developer must engage at the beginning of a project is determining the characteristics of the learners. Thiagarajan, Semmel & Semmel (1974) point out that "learners' preferences determine media and format decisions and learner characteristics dictate such factors as language, style of presentation, choice of examples, size of learning steps, and nature of sequence" (p.26). Thiagarajan et. al. also establish that it is important to focus both on the differences and similarities of any group of learners.

Age

The statement of the need indicates that the project is aimed at adults. Figure 1 gives a breakdown of diabetes patients according to age (Statistics Canada, 1981). A total of 98.1% of patients with diabetes are over fifteen years of age. Experts are quick to point out that the percentage increases with age, however. These figures make it clear that materials developed for diabetes patients must be designed for adults of all ages.

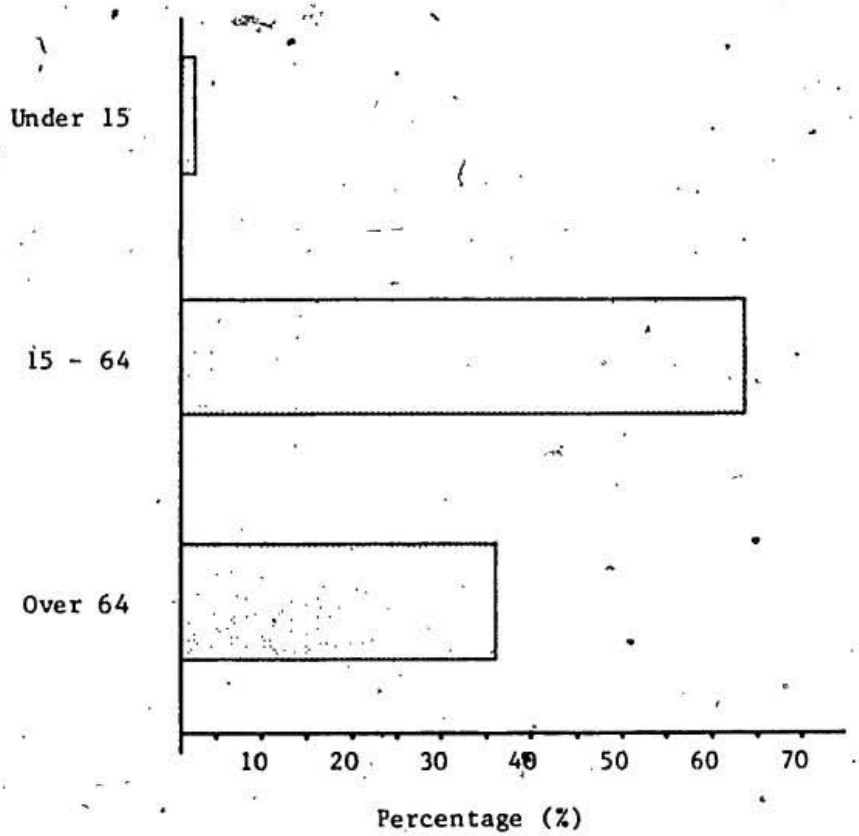


Figure 1. A breakdown of the number of adult diabetes patients according to age.

Sex

Statistics Canada (1981) points out that 60.8% of patients with diabetes are female.

Weight

80% of patients with diabetes are overweight adults with mild diabetes. Furthermore, 50% of the patients with diabetes take no medication, but keep their diabetes under control by controlling their diet (Basic Facts About Diabetes). This suggests that it is very important for the project to stress that the patient must control his or her eating and exercise habits.

Education Level

Adults with diabetes may have any level of education. The developer must choose the vocabulary level of his materials for diabetes patients very carefully. He or she should avoid using obscure medical terminology whenever possible. An everyday language pattern understandable to a maximum number of adults is preferred.

Size of Group

Although the total intended audience is large, the preferred delivery pattern and that which is used most

commonly in delivering diabetes information to diabetes patients is a presentation mode involving small groups in informal settings.

Attitude

The intended learners are primarily people who have just learned that they have an incurable diabetes condition. It is assumed that their attitudes will vary. Some may show disbelief, others may be angry, and some may be reaching out for anything that will help them. A major difficulty in designing materials for this group is in devising a presentation that will attract people with such diverse attitudes into learning the information it contains.

Geographical Location

Although it is hoped that the end result of this project would be of use to diabetes patients everywhere, it is aimed specifically at adults in rural Newfoundland and Labrador. People living in isolated areas of Newfoundland or Labrador are less likely to attend classes on diabetes care after they have been diagnosed as having the disease than are people living in urban areas. To assist all learners in identifying personally with the

presentation, whenever possible both urban and rural settings were used.

Lifestyle

Linked to the geographical location of the learners is their lifestyle. Individuals in urban and rural areas certainly have different lifestyles. The types of occupations in which rural and urban people engage are usually quite different (i.e. fishing, logging, etc. in rural areas as opposed to professional and clerical jobs in urban areas). Additionally, opportunities for scheduled formal recreational activities are much fewer in rural settings.

Individuals in isolated areas such as Coastal Labrador or the South Shore of Newfoundland have another unique problem that is not shared by more urban areas. In many of the remote locations, foods that are recommended by dieticians for diabetes patients are unavailable locally.

Subject Matter Competence

Generally, people have some knowledge of diabetes. However, the information they have is often vague and filled with misconceptions. Nearly everyone knows that

diabetes has something to do with sugar. Many feel that insulin injections are the main source of diabetes control and that pills are another form of insulin. Because of these misconceptions, and because of the wide diversity of knowledge among diabetes patients, this learning package begins by explaining the cause of diabetes.

CHAPTER IV

CONTENT ANALYSIS

Content analysis is the process of establishing the parameters of information to be included in a learning package and delineating a hierarchy to this information.

The normal procedure is to establish the main objective or objectives and to subdivide these objectives into their respective components. The primary objectives are to (1) present information explaining what diabetes is; (2) explain those factors which are important in controlling diabetes; and (3) the importance of personal hygiene in controlling long-term complications. When the information has been subdivided into its basic elements, each element is dealt with individually and in its turn.

The task of the instructional developer is to arrange and sequence these individual elements so that they build structurally into an integrated learning experience in which the learner achieves the objectives originally established.

The conceptual relationships between components identified through the concept analysis process can often be illustrated by presenting the information in diagram form. The content analysis for this instructional package is presented in this manner in Figure 2.

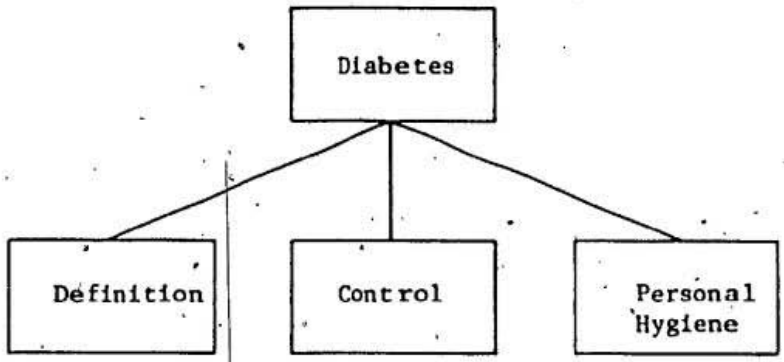
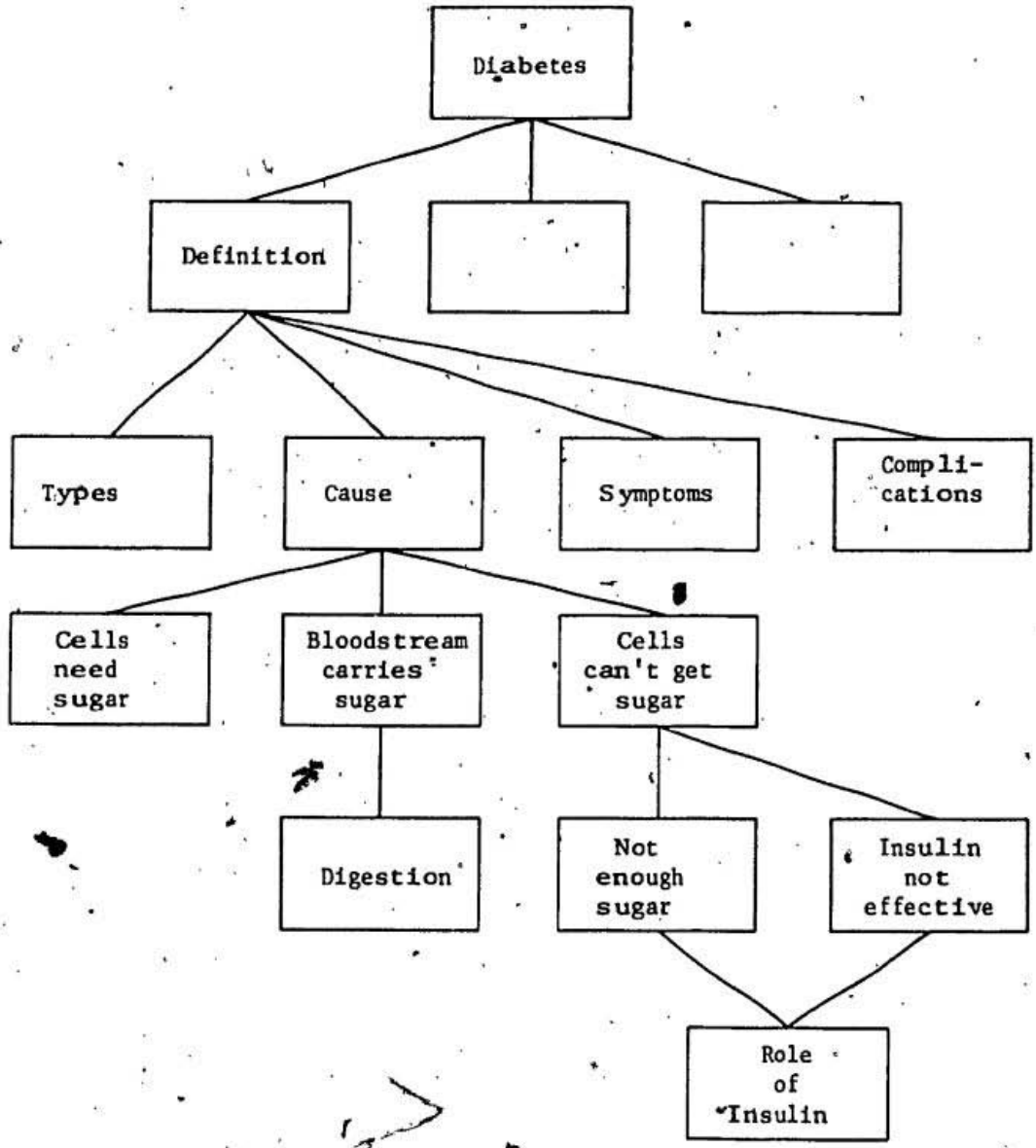


Figure 2. A hierarchy of the concepts involved in an understanding of diabetes and diabetes control.



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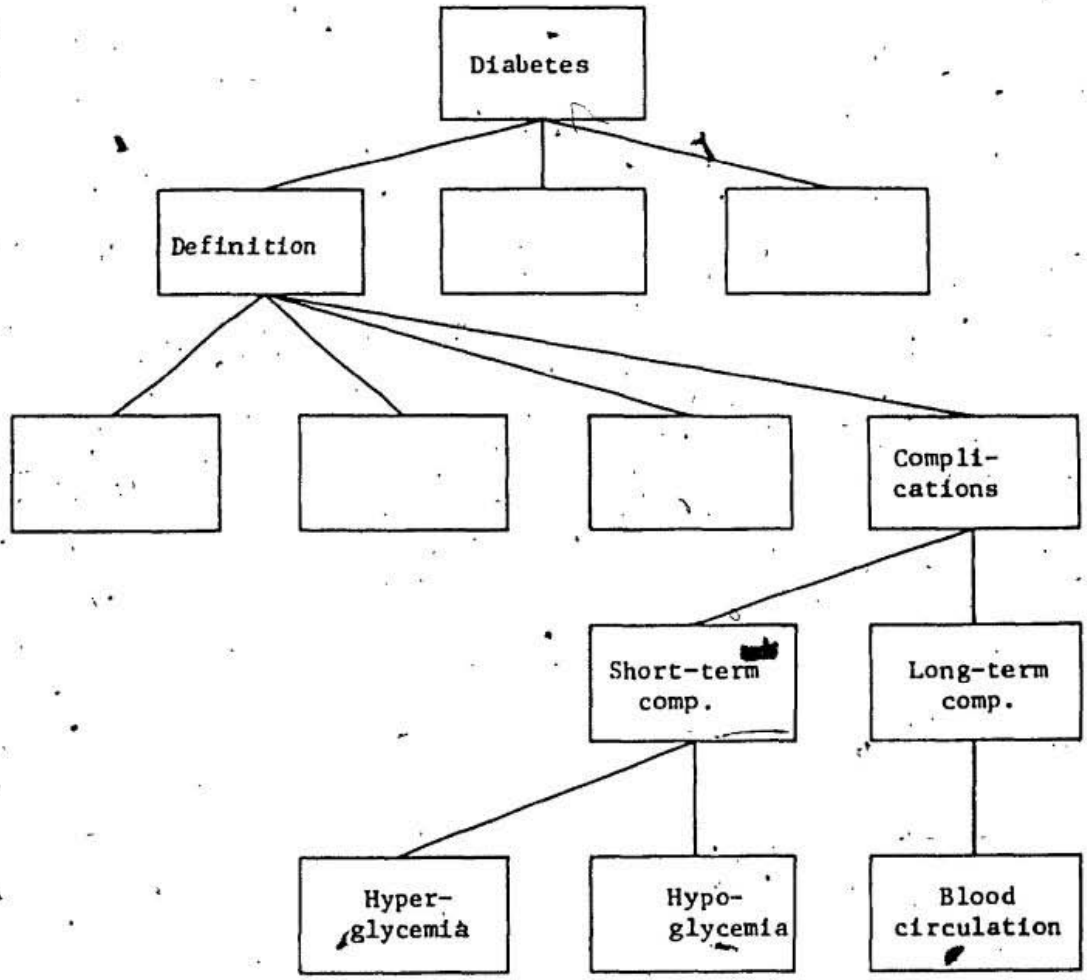

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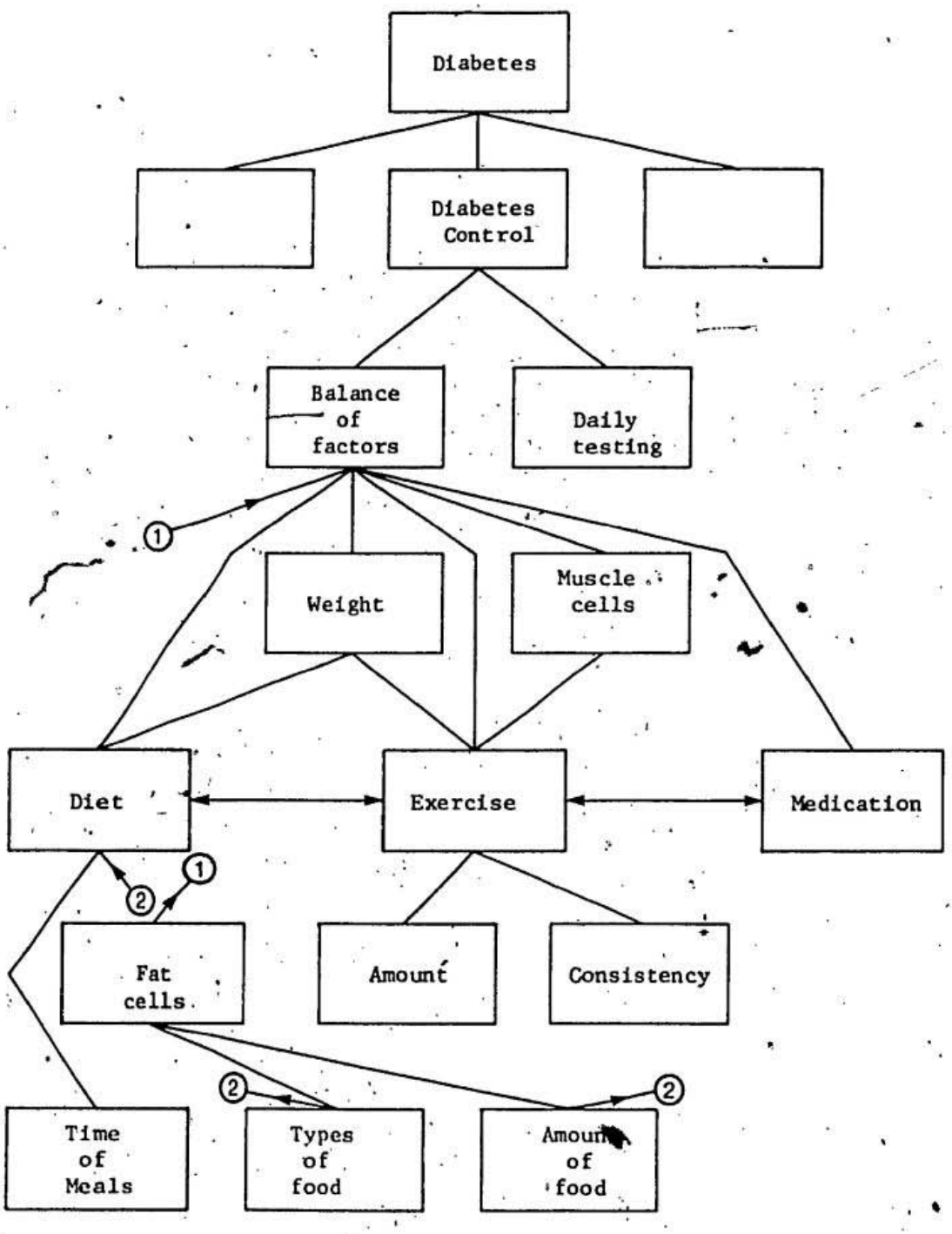

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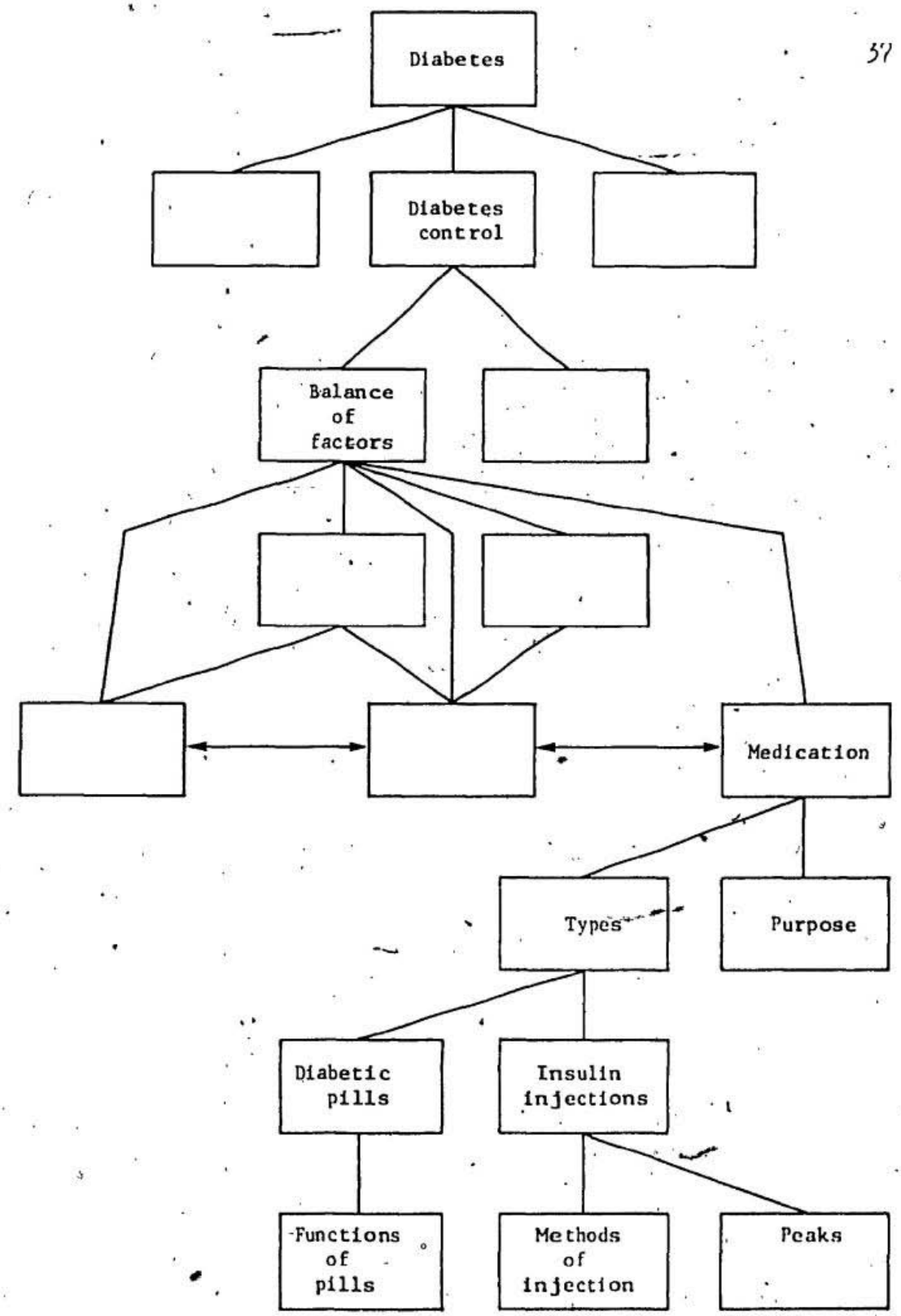

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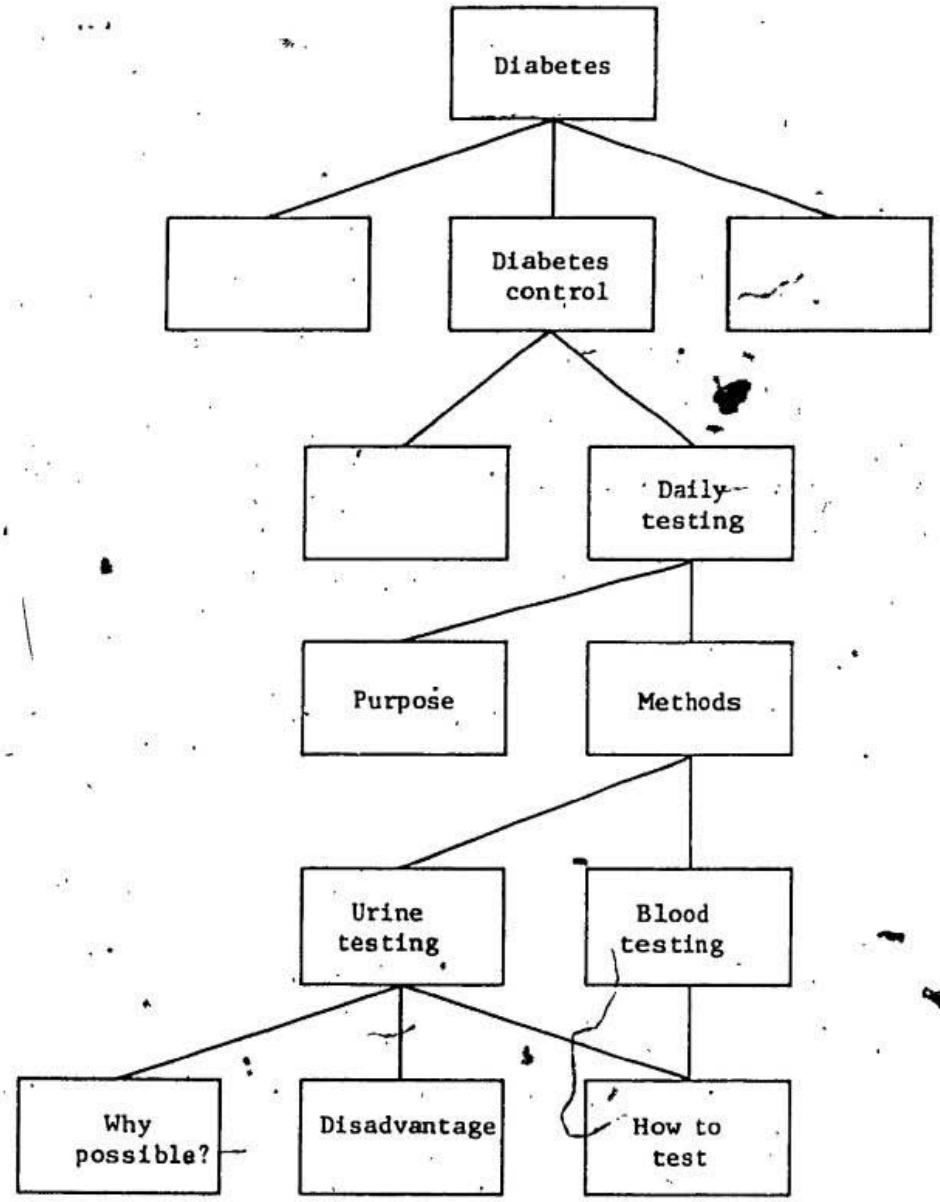

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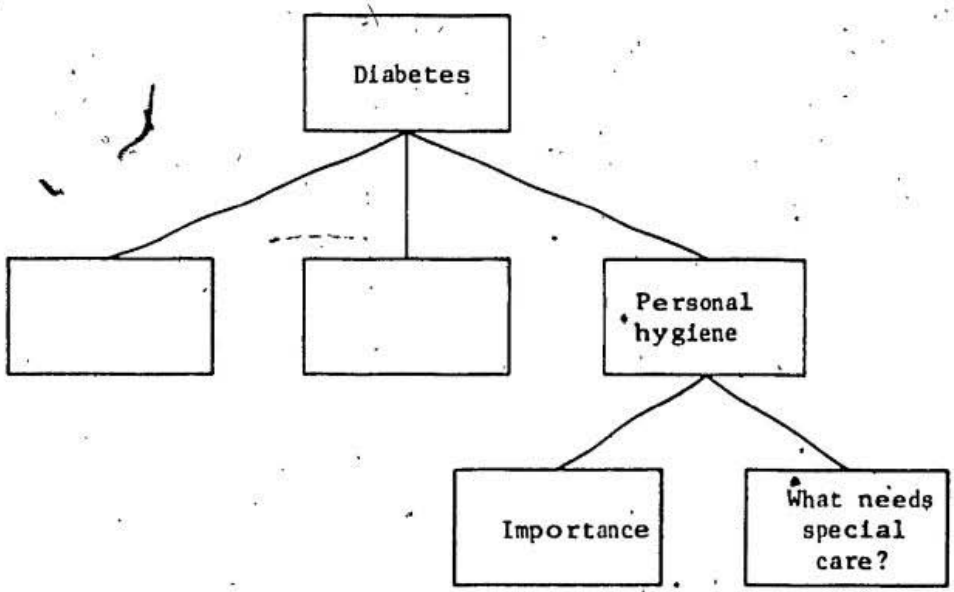

Figure 2. ...continued

CHAPTER V

INSTRUCTIONAL STRATEGY

Entry Point

The present need for instruction about diabetes is really two-fold. First of all, it is important that the learner know what diabetes is. Secondly, he or she should know what factors are important in controlling diabetes. Both parts of this need are knowledge oriented rather than skill oriented. As a result of this limitation, this instructional package does not include the concepts "methods of injection" or "how to test" (see figure 2). These skills do not play a vital role in understanding the problems involved in controlling diabetes. Additionally, methods for teaching skills are very different from those for teaching concepts. The former can be taught most effectively by a hands-on approach with individual instruction by a doctor or nurse, supplemented with carry-home written instructions.

Concepts dealing with "What needs special care" (see figure 2) are not included in this package. The package stresses in general terms that it is important to take special care of certain parts of the body. The Canadian Diabetes Association has excellent reference material

dealing with these concepts in specific detail.

This instructional package also limits its discussion of "diet". The importance of eating properly is emphasized, but the package makes no attempt to prescribe adequate diets for patients. Such a task is best left to professional health workers dealing directly with individual patients.

Instructional Sequence

The definition of diabetes is first examined in the program, since an understanding of what diabetes is is a prerequisite to understanding everything else. This definition includes an explanation of the concepts of sugar and energy. The properties of insulin are discussed and an explanation of reasons the cells cannot get the sugar they need are presented. This discussion leads to a summary of the definition of diabetes. Finally, the symptoms of the disease and the two types of diabetes are explained.

Discussion of the two types of diabetes leads naturally to the fact that both types are serious and that it is important that long-term complications be avoided.

Because of the interrelationships between the many

concepts which the program necessarily discusses, the concept of balance is next presented. A balance of diet, exercise, and medication by the patient is vital in keeping diabetes under control. Each of these three factors is examined in detail. Factors involving diet are discussed, the importance of regular exercise is emphasized, and finally, requirements relating to medication are considered.

Examination of the types of medications, and specifically insulin, leads into a discussion of hyperglycemia and hypoglycemia.

The last items examined include testing and personal hygiene. These concepts are better understood when individuals know the importance of maintaining diet, exercise, and medication in balance.

Rationale for Choice of Media

In choosing the media for this instructional package, several considerations have been taken into account. Gagne & Briggs (1979) suggest that "Dale's (1969) 'cone of experience' is a useful tool" (p. 181) (see Appendix E). Gagne & Briggs (1979) list the twelve categories of Dale's cone of experience.

12. Verbal symbols

11. Visual symbols - signs; stick figures
10. Radio and recordings
9. Still pictures
8. Motion pictures
7. Educational television
6. Exhibits
5. Study trips
4. Demonstrations
3. Dramatized experiences - plays; puppets
2. Contrived experiences - models; simulation
1. Direct purposeful experience (p. 181)

In choosing to use instructional media as described by the levels of the cone, it is important to note that the level of abstraction increases as the cone is ascended. In practical terms, this means that the learner must have more experience, more background, more sophistication, or more training to be able to interpret information from media higher on the cone. Media on the lower levels require progressively less previous experience on the part of the learner to understand the message.

Media lower on the scale tend to require less abstract interpretation from the learner, but media higher on the scale tend to be more efficient at delivering specific information if the learner has the intellectual

tools for decoding them. In applying this to media selection, "a rule of thumb previously suggested by Briggs (1972) is: 'Go as low on the scale as you need to to insure learning for your group, but go as high as you can for most efficient learning'" (Gagne & Briggs, 1979, p. 161).

Since the target learners of this package are adults, media at the high range on the cone of experience are probably appropriate, but there are two important factors which may restrict the choices. First, as has been mentioned in the learner analysis, the educational level of the target learners can vary as widely as does the total adult population of Newfoundland. Since very little can be assumed about the learner's educational level and since some learners may be illiterate, verbal symbols should be limited. Another factor to be considered stems from a suggestion by Wager (1975) that for attitude objectives, the order of the cone becomes inverted (In Gagne & Briggs, 1979, p.161). In practical terms, this means that the less abstract and more concrete the media chosen, the more likely the learner is to interpret the message in favourable terms. He might not feel compelled to learn details of the message, but he is more likely to accept what information he does

assimilate.

A major underlying motive of this instructional package is to make positive changes in the attitudes of the learners. If Wager is correct, the more abstract higher levels of Dale's cone should be avoided because attitude change is an important goal of this learning package.

The more concrete levels at the lower end of Dale's cone suggest the use of formal classroom settings in order to effect efficient delivery. However, formal classroom settings are not necessarily practical in outlying areas of Newfoundland and Labrador because of their isolation and the limited number of diabetes patients who are able to assemble in any given location. These considerations indicate that media somewhat above the fifth or sixth level of Dale's cone of experience would probably be most appropriate for this package.

Most of the more isolated areas have very limited technological resources available. Expensive and technically sophisticated media such as video cassette recorders are unavailable and too expensive to be practical in introducing learning packages such as this unit.

Equipment such as slide projectors, filmstrip

projectors and audio tape recorders are more commonly available in isolated areas. Gagne & Briggs (1979), Thiagarajan, Semmel & Semmel (1974), and Kemp (1985) suggest that slide-tape presentations are effective for small groups or even individual study. As described in the learner analysis, the most common teaching of diabetes material to new patients takes place in small groups.

Coupled with the facts that slide-tape presentations can be effective irrespective of the learner's literacy level; are generally reasonably inexpensive to produce; can be presented to individuals, small groups, or even large groups; and that they require reasonably inexpensive and portable machinery for delivery to audiences, the decision was made to produce this instructional package utilizing as the media of choice a series of 35mm color slides for the presentation of visual information and an accompanying audio cassette for the presentation of narrative information.

CHAPTER VI

FORMATIVE EVALUATION

Thiagarajan, Semmel & Semmel (1974) state that formative evaluation is "evaluation undertaken for the improvement of the instructional material" (p.127). Furthermore:

> Expert appraisal is one stage of formative evaluation. It is the process of obtaining editorial feedback from various professionals for the improvement of the instructional materials. (Thiagarajan et al., 1974, p.127)

Thiagarajan et al. (1974) mention a second stage of formative evaluation:

> Developmental testing involves the trying out of instructional materials on members of the target-trainee group (learners). The purpose of the testing is to collect feedback to make the materials instructionally and motivationally more effective. (p.157)

Formative evaluation for this learning package incorporated these two stages of formative evaluation into three phases. Phases 1 and 2 involved expert appraisals while phase 3 consisted of developmental testing.

Phase 1: Script Evaluation

Phase 1 involved the evaluation of the first draft of the script. This first draft included a narrative and written proposals for the accompanying slides. The script

was reviewed by three content experts: a medical doctor, a nurse and a dietician who are involved with the treatment of diabetes at St. Clare's Mercy Hospital. All content experts were asked to examine the script for innaccuracies and to suggest areas for improvement. Innaccuracies were then corrected and appropriate suggestions were incorporated into the script.

Phase 2: Content and Media Expert Appraisals

Content expert appraisal. Phase 2 of the formative evaluation process involved the first generation of the slide-tape presentation which was developed from the script derived from phase 1.

The input of content experts was again included in this stage. The Patient Education Nurse at St. Clare's Mercy Hospital and the Patient Education Coordinator at the Health Sciences Complex in St. John's agreed to participate in this phase. Both experts were familiar with the slide-tape presentation since they had regularly used the presentation as part of their weekly diabetes classes during the two year interim between the completion of the original production and the initiation of phase 2 of the evaluation process. The content experts were asked to review the presentation, looking specifically for

innacuracies. Afterwards, a questionnaire (see Appendix A) was completed.

In section A of the questionnaire, the experts were asked to rate the presentation according to twelve items (see Figure 3). All twelve items were rated favorably by the experts. Among the items rated, the level of language was judged as not too difficult or not too simplistic, and the level of difficulty was rated as very low by one of the experts. Since a major objective of the learning package was to maintain a minimal level of language difficulty, this low rating was interpreted as being very positive.

Both experts made comments relating to innacuracies in the presentation. The narrative accompanying one particular slide was somewhat misleading, and the narration was changed in the revised draft of the tape as a result of this criticism. Another change recommended by one expert suggested that a newer brand of testing material be shown in slide 66, but as this change had no bearing on the message of this portion of the presentation, it was decided to retain the original slide.

Both experts did suggest that the proportion of young people (i.e. under twenty-five years of age) in the slides was disproportionally high. As a result, certain of the slides (specifically slides 47, 51, and 53) were re-shot

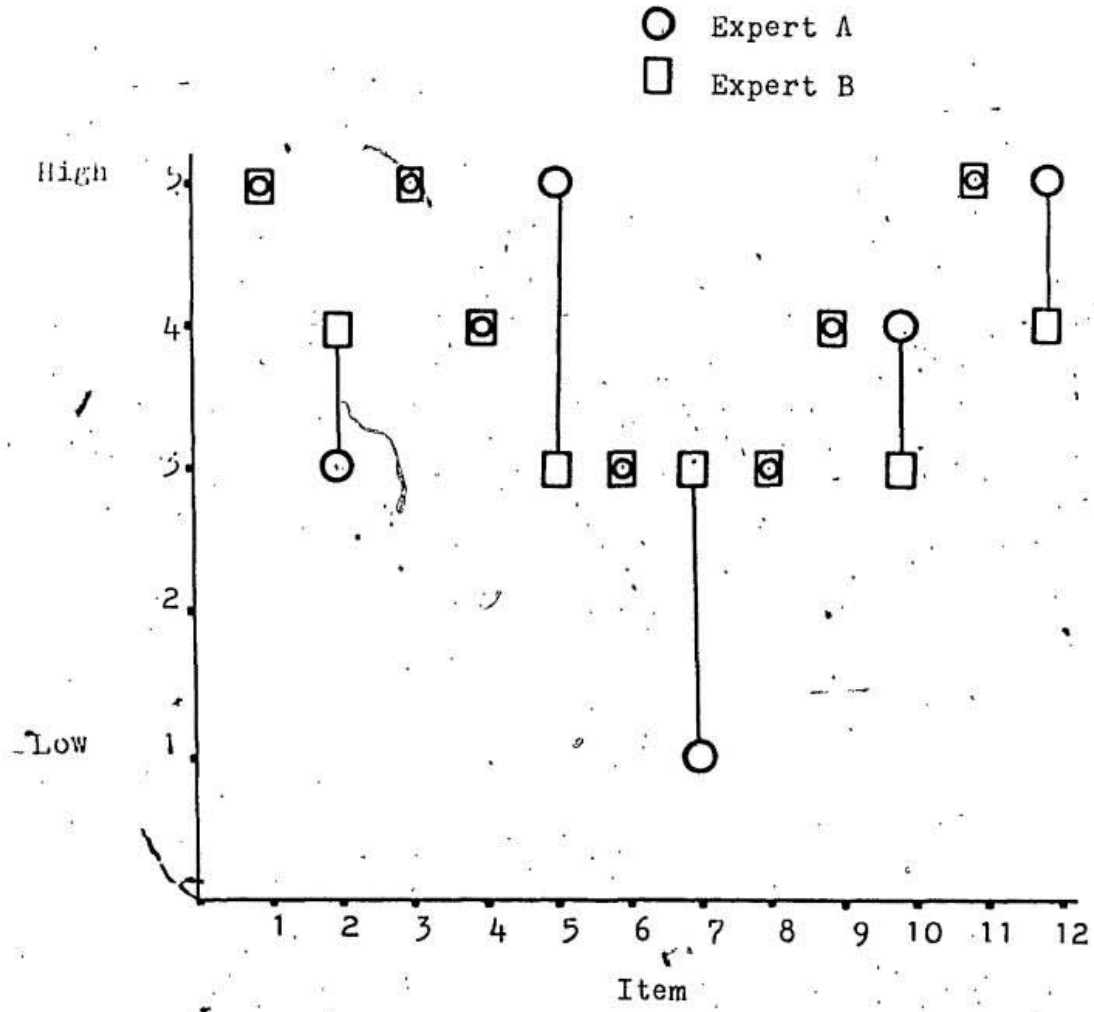

Figure 3. Comparison of expert ratings of presentation according to items on questionnaire.

to show a higher proportion of middle-aged people.

Media expert appraisal. Phase 2 also included the input of a media expert. The Instructional Media Specialist Librarian at St. Clare's Mercy Hospital was asked to view the slide-tape presentation and rate it according to fourteen items (see Appendix B). All items again were rated favourably. She did point out, however, that the print on slide 54 was too small to read easily. She also pointed out that a number of slides had unwanted reflections which were a result of copywork technique. All these slides were re-shot to eliminate those technical problems.

Phase 3: Developmental Testing

The final phase of the formative evaluation of the slide-tape presentation involved the learners - adult diabetes patients in Newfoundland.

The overall goal of the project is to help adult diabetes patients become aware of what their condition is and those factors which are important in controlling their condition. When an individual initially learns that he or she has diabetes, any number of attitudes may arise (as was mentioned in the learner analysis). The goal, then, not only encompasses the learning of particular concepts

(i.e. rote learning) but also implicitly encompasses a positive change of the individual's attitude towards the possibility of controlling the diabetes. Use of a written pre-post test design is effective for measuring cognitive gains but is less useful for determining attitudinal change, particularly with the varied attitudes and educational levels of this unit's intended audience. It was decided, therefore, to determine the effectiveness of the slide-tape presentation through a somewhat different method. This method is discussed in the procedure which follows.

Procedure. The subjects chosen for evaluation during the developmental testing phase were adults who do not have diabetes. These people, rather than diabetes patients, were chosen for several reasons. First, a broad cross-section of ages and educational levels were desired. Second, a group which had minimal exposure to diabetes educational material was important. Although a limited number of diabetes patients were available in the large medical centers of the province, there was an insufficient number of newly diagnosed diabetes patients available to represent anything like a cross-section of the general population.

A desire to test the package with a variety of small

groups of adults in a variety of rural and small town settings influenced the decision to use potential rather than actual diabetes patients as subjects for this phase of evaluation.

After the participants were shown the presentation, the administrator carried out a guided discussion with them (a) to determine if the vital concepts defined in the concept analysis had been adequately portrayed by the presentation, and if the participants had learned these concepts from the presentation; and (b) to determine the attitudes of the participants toward the presentation.

Evaluation instrument. An evaluation instrument was needed to record the learners responses to those questions posed by the administrator to determine (a) and (b) of the previous paragraph. There are three primary concepts that are necessary for the participants to understand: (a) what diabetes is, (b) what factors are important in controlling diabetes, and (c) that daily control of diabetes is very important. These three primary concepts can be subdivided into fourteen secondary concepts:

1. Definition of diabetes
2. Two types of diabetes
3. Seriousness of both types of diabetes
4. Role of insulin

5. Fourteen symptoms of diabetes
6. Importance of balance of diet, exercise, and medication
7. Importance of body-weight control
8. Importance of regular exercise
9. Two types of medication
10. Medication not a replacement for diet and exercise
11. Complications result from uncontrolled diabetes
12. Importance of special care of particular areas of the body.
13. Reasons for complications among non-insulin-dependent patients
14. Importance of daily blood-sugar levels tests to allow for medication adjustments

The attitudes of the learners toward the slide-tape presentation were determined by checking the following items:

1. Overall rating
2. Length of presentation
3. Clarity of presentation
4. Level of difficulty
5. Helpfulness of illustrations

After deciding upon the concepts and attitudes to be

examined, a rough draft of the evaluation instrument was devised. The instrument was designed in a table format in which the administrator could check those items which he or she felt the participants had learned. The evaluation instrument also consisted of appropriate questions to accompany the checklist. By standardizing the questions asked at each showing, it was felt that more accurate and consistent results could be obtained.

The author then showed the slide-tape presentation to a group of four people. The purpose of this showing was as a test of the evaluation instrument. As a result of this test procedure, several items on the list were combined because of an extensive overlap of the responses. Additionally the wordings of several questions were changed for clarification.

Following the revisions of the evaluation instrument (see Appendix C), the author arranged to meet with small groups of participants in their own homes. It was felt that the learners would be more relaxed there than if they were asked to attend a formal presentation. Before seeing the slide-tape show, participants were given a brief description (see Appendix C). The opening comments attempted to inform the participants of the procedure without making them overly anxious, and to encourage them

to feel free to articulate any criticisms they had of the presentation.

Discussion of results. The presentation was shown to a total of twenty-one participants in six showings during the formative evaluation stage. Of the twenty-one participants, eleven were male and ten were female. The ages of the group ranged from nineteen years to over sixty years. Their educational levels ranged from no secondary education to post-secondary training. The participants were selected because they were generally representative of the wide range of adults who are afflicted with diabetes.

Items 1, 5, 10, 11, and 16 of the evaluation instrument focused on the attitudes of the participants toward the presentation. Generally, participants indicated favourable reactions to the production, expressing that they had attained considerable new knowledge about diabetes and that the program would be very helpful and informative to adult diabetes patients.

Evaluation of participants' responses to the concepts that they were expected to have learned as a result of viewing the presentation was not as straightforward as that of the attitudinal evaluation. The administrator of the evaluation instrument had the task of orally testing

all the individuals in a group setting while working within the format of a group discussion. The evaluator's task involved determining whether or not the concepts presented by the slide-tape show were learned from the presentation, or indeed if the concepts were even actually delivered by the presentation.

As mentioned earlier, the administrator used a standardized set of questions to prompt responses. To ensure the participation of all learners, the administrator used several techniques. First, some of the questions were directed at particular participants. Additionally, when a question was answered, the adminstrator asked the other participants, in turn, if they agreed. Finally, the administrator made use of facial expressions (nods, etc.) to decide whether or not the participants had aquired the necessary concepts.

If questions were answered correctly, the administrator asked simply whether that concept had been learned from the slide-tape presentation. If, on the other hand, a question was answered incorrectly, the administrator attempted to discover if the learners could determine if the concept was actually in the presentation or not. The administrator's strategy for extracting this information from the participants was to single out

appropriate slides and ask if the participants remembered them. Through this review of specific portions of the presentation and the participants' responses to this review, it was determined that the concepts in question were indeed portrayed in the presentation.

As expected, not every participant aquired every concept. In general, however, most questions were answered correctly. The participants had difficulty with the "definition of diabetes" (item 2 on the evaluation instrument). In two groups, no one had any idea of the definition as explained in the presentation. The other groups had a broad idea, but could not define diabetes in suitable words. When the administrator singled out portions of the program which portray the definition, most participants said they recalled the slides and the ideas that were associated with them. The explanation for the difficulty most participants had with the definition is that possibly (1) the concept is too complex to be learned from a presentation utilizing this type of media, or that (2) this presentation is too brief in duration and needs to be expanded into either a longer presentation or a series of short presentations which deal in more depth with each concept.

Of the total sample, 81 percent were able to identify

the two types of diabetes (item 5). Of the four participants who did not aquire the concept, two did recall the slide and the portion of the program in which the concept was discussed.

Only 43 percent of the participants said neither of the two types of diabetes was more serious in the long run than the other. The author felt that the program should have been more effective in correcting the participants' very commonplace and erroneous impression that patients taking insulin suffer more complications than those who do not require insulin. In reviewing the presentation, the participants were able to grasp the concept that both types of diabetes were very serious over a long period of time.

The role of insulin in the body was a concept which was adequately aquired by only a small majority (57 percent). Several of those who did not understand the concept appeared to have a vague idea, but were unable to articulate it. Others could give suitable answers when they were provided with verbal prompting.

The participants were all asked to list the symptoms of diabetes. All participants were able to list at least four of the symptoms. The four symptoms specifically stated in the presentation while a visual portraying that symptom was being shown were the most frequently

Table 1

Percentage of Learners Mastering Concepts

Concept	Mastery (%)
1. Definition	0
2. Types	81
3. Seriousness of Types	43
4. Balance of Factors	100
5. Types of Medication	100
6. Medication Compliments Others	100
7. Role of Insulin	57
8. Symptoms	100
9. Weight	81
10. Complications	81
11. Complications for Non-insulin Dependent Diabetics	90
12. Exercise	100
13. Hygiene	86
14. Testing	95

recalled.

The results shown in Table 1 indicate that the remainder of the concepts were adequately portrayed and that most of the participants were successful in aquiring them.

In summary, it should be noted that although not all participants were able to recall all the concepts, most of the concepts were aquired by most of the participants. Due to the complexity of two of the concepts, each will need further explanation, either through an additional series of slides and dialogue, or through discussion and review with a live instructor. The remainder of concepts in the presentation may need to be reviewed more than once to assure aquisition of them, since the program contains a significant number of concepts which need to be mastered.

CHAPTER VII

SUMMATIVE EVALUATION

Once the slide-tape presentation received all the necessary revisions and was ready for its final production stage prior to general distribution, it was necessary to undertake a summative evaluation. Thiagarajan, Semmel & Semmel (1974) refer to summative evaluation as a "validation testing phase, (in which) the material is used under replicable conditions to demonstrate 'who learns what under what conditions in how much time'"(p.9).

Procedure

The summative evaluation of the presentation followed the same general pattern as the formative evaluation. Since the evaluation instrument functioned efficiently in the formative evaluation it was used without revision. The major difference between the formative and the summative evaluations lay with the characteristics of the learners. It was felt that diabetes patients actively involved at a diabetic clinic should be involved during the summative evaluation stage. The Patient Education Nurse at St. Clare's Mercy Hospital allowed the evaluation to be conducted during an opening class of the weekly diabetes

clinic.

There were five patients (three females and two males) with ages ranging from teenage years to post-retirement years who were participants in the clinic.

The administrator of the program presented the opening comments explaining the purpose of the presentation, and the patients were then shown the slide-tape presentation. The administrator followed the slide-tape presentation with group discussion, the purpose of which was to evaluate the extent to which learning had occurred and to determine the attitudes of the participants toward the presentation.

Discussion of Results

This group differed from the participants in the formative evaluation stage in several important ways: 1) the setting was a formal classroom situation in the hospital; 2) the participants were diabetes patients; and 3) the participants had physical infirmities which functioned as distractors from the presentation.

The administrator found that the participants were much more reluctant to respond in the group discussion than were the participants of the formative evaluation. It

seems likely that this was due in large part to the formal situation (i.e. classroom setting in hospital) in which they found themselves and in which they felt uncomfortable and ill at ease.

All of the participants in the summative evaluation were diabetes patients. However, most of this group were not newly diagnosed patients, but were patients who had diabetes for quite some time and had at least some prior knowledge of the concepts in the presentation.

Among the physical infirmities found in the group, one older person was partially deaf and it is impossible to know how much of the audio portion of the presentation he missed because of his handicap.

As a result of the differences in the participants involved in the summative evaluation stage, as discussed above, it was more difficult than in the formative evaluation stage to decide whether concepts had been learned through the presentation. Nevertheless, there are several comments that can be made about the responses.

The patients were not able to give acceptable answers to the questions corresponding to the definition of diabetes and the role of insulin. These results were basically the same as the findings from the formative evaluation. Most of the patients were able to give

suitable responses to the remainder of the questions.

The procedure followed was identical to the formative evaluation procedure. If a question was answered correctly, each of the participants was asked if he agreed. Then the participants were asked if this material was information that they had learned as a result of the presentation. If a question was answered incorrectly, the administrator questioned further to determine if the participants felt that the presentation dealt with the concept. The patients responded positively in each case, and in several cases the patients referred back to particular slides in the presentation.

The questions which referred to the participants' personal attitudes toward the presentation were each answered positively. All participants indicated that they enjoyed the presentation and all felt that viewing the program was a valuable experience and that they had learned important information about the disease with which they were afflicted.

Use of Package since Initial Productions

In the interim between the initial production and the evaluation, quite extensive use had been made of the package. The Patient Education Coordinator at the Health

Sciences Complex at St. John's, Newfoundland, used the presentation on a weekly basis since September, 1983. From then until June, 1984, eighty-eight patients viewed the presentation at that facility.

In the two year period previous to June, 1984, the Patient Education Nurse at St. Clare's Mercy Hospital, St. John's, Newfoundland, has shown the presentation to approximately 400 people. Included in this large group were diabetes patients, relatives, and numerous health professionals.

The family physician at the Grenfell Regional Health Services in St. Anthony, Newfoundland, has shown the presentation to approximately 100 patients. This physician also used the presentation in two lectures she presented to the general public.

The Health Centre in Forteau, Labrador, also used the presentation with thirty diabetes patients.

During a two year period from September, 1983, when the package first became available to health officials in Newfoundland, until June, 1984, over six hundred viewers saw the presentation. The responses from health officials who used the presentation were positive, and the patients who viewed it indicated that they understood it and found the information helpful to their understanding of diabetes.

CHAPTER VIII

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The slide-tape presentation was originally produced to give newly diagnosed patients a better understanding of their condition. The formative evaluation stage showed that the concepts are presented clearly enough to allow learning by the target group. It was discovered during the summative evaluation, however, that the normal audience for the presentation is not made up solely of newly diagnosed patients. In fact, the audience is usually a mixed group of new patients and patients who have had diabetes for some time and who are back in hospital because their condition is out of control. Patients with reoccurring problems need a review of the very concepts discussed in the presentation and can obtain important benefits from viewing the presentation. The Patient Education Nurse at St. Clare's Mercy Hospital pointed out that this is one of the primary uses they make of the program.

Throughout the whole process of producing and evaluating the slide-tape presentation, responses to the package from professional health workers and from patients

were very favourable. The package has been used extensively since its initial production and has demonstrated repeatedly that it serves a useful need in the education of diabetes patients, a result which was the original purpose of the package.

Recommendations

The slide-tape format is a type of media that generally does not lend itself to the efficient learning and recalling of large numbers of specific facts. However, the medium is very efficient at establishing impressions and influencing attitudes.

This slide-tape presentation is an effective introduction to patients in presenting the basic concepts concerning the nature and treatment of diabetes. It is recommended that following the slide-tape presentation a live instructor should conduct a personal session with patients, in which detailed explanations of the many concepts in the presentation are discussed fully and in which patients' questions are answered.

Following the presentation of the slide-tape show and after the patient has received personal instruction from a live instructor, it is recommended that each patient be given a copy of the booklet Diabetes Care: Guidlines for

the Adult. This booklet was produced at St. Clare's Mercy Hospital as material which compliments and amplifies on the information contained in the slide-tape presentation.

CHAPTER IX

PACKAGING AND DISSEMINATION

Packaging

Each package consists of a slide-tape presentation and an administrator's guide (see Appendix D). The guide gives a brief overview of the slide-tape presentation; includes a copy of the script; and provides a list of addresses where complimentary information on diabetes can be obtained. It was felt that inclusion of the latter item was important since a recommendation of this report is that patients be provided with supplementary reading materials after they have viewed the presentation.

Dissemination

As has been described previously, the original proposal for the slide-tape presentation came from St. Clare's Mercy Hospital in St. John's, Newfoundland. A master copy of the presentation has been retained at the hospital. Any health organization or hospital is granted permission to duplicate copies of the presentation for their own use. The Health Sciences Complex, St. John's, Newfoundland, has made its own copies and uses the material on an on-going basis.

In order to make the presentation accessible to as many professional health workers as possible, another copy of the presentation has been presented to the Newfoundland Hospital Association, who have permission to duplicate it and distribute it to members of their association. It was through the library of the Newfoundland Hospital Association that the previously mentioned physician in St. Anthony, Newfoundland, and the Clinic in Forteau, Labrador, obtained a copy. The author is confident that other professional health workers in the province will avail of this service and thereby gain access to the presentation.

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APPENDIX A

Content Expert Questionnaire

A. Please rate the quality of the slide show on the following items on a scale of 1 to 5, where 1 is poor and 5 is excellent.

1. Clarity of Presentation ---------- 1 2 3 4 5
2. Accuracy of Content ---------- 1 2 3 4 5
3. Appropriateness of Content ---------- 1 2 3 4 5
4. Accuracy of Illustrations ---------- 1 2 3 4 5
5. Appropriateness of Illustrations -------- 1 2 3 4 5
6. Length of Presentation ---------- 1 2 3 4 5
7. Level of Difficulty ---------- 1 2 3 4 5
8. Level of Language ---------- 1 2 3 4 5
9. Potential Utility for Doctors/Nurses ---- 1 2 3 4 5
10. Potential Acceptance by Patients -------- 1 2 3 4 5
11. Potential Acceptance by Doctors/Nurses -- 1 2 3 4 5
12. Overall effectiveness of Program ---------- 1 2 3 4 5

B. Please answer the following questions. Use additional space on back of sheet if required.

1. Were there any inaccuracies in the illustrations?
(Please specify) _____

_____

2. Were there any inaccuracies in the presentation?
(Please specify) _____

_____

3. Other comments. _____

APPENDIX B

Media Expert Questionnaire

A. Please rate the quality of the slide show on the following items on a scale of 1 to 5, where 1 is poor and 5 is excellent.

1. Appropriateness of Instructional Format - 1 2 3 4 5
2. Organization of Materials ---------- 1 2 3 4 5
3. Length of Program ---------- 1 2 3 4 5
4. Clarity of Presentation ---------- 1 2 3 4 5
5. Appropriateness of Language ---------- 1 2 3 4 5
6. Level of Difficulity ---------- 1 2 3 4 5
7. Sequencing of Materials ---------- 1 2 3 4 5
8. Style of Presentation---------- 1 2 3 4 5
9. Appropriateness of Illustrations to Narration -- 1 2 3 4 5

Technical Quality...

10. ...Overall ---------- 1 2 3 4 5
11. ... Print ---------- 1 2 3 4 5
12. ... Illustrations ---------- 1 2 3 4 5
13. ... Quality of Slides ---------- 1 2 3 4 5
14. ... Audio ---------- 1 2 3 4 5

B. Please answer the following questions.

1. Are there any problems/difficulties with the technical qualities of this presentation? (Please specify) _____

2. Are there any other problems/difficulties? (Please specify) _____

3. Other comments. _____

APPENDIX C

Evaluation Instrument

Introduction to Learners: This is a slide-tape presentation about diabetes. It is designed to help new diabetes patients understand what diabetes is and how to control it.

After we view the presentation, I will ask you some questions about what you think of it and what you've learned. I'd like everyone to respond. If you feel something could be improved, say so. Or, for example, if you didn't understand something, tell me. Your feelings toward the presentation will help in making improvements.

Questions asked to learners:

1. What do you think of the slide show? (Dull, Interesting: Good, Bad)
2. What is diabetes?
3. what are two kinds of diabetes?
4. Which type is most serious over a long period of time?
5. Was the length of the slide show okay?
6. What factors do you need to control to keep control of diabetes?
7. What medications are available?
8. Is it important to be particular about your diet and exercise even after you're taking pills or insulin?
9. what does insulin do in the body?

10. Was the slide show too difficult or too easy? How about the words used?
11. Was the information presented clearly or were there areas you didn't understand?
12. What symptoms let you know that the diabetes is out of control?
13. Is it important to keep your weight under control?
14. If diabetes is not kept under control what will eventually happen?
15. Why have non-insulin-dependent diabetics had problems in the past?
16. Were the drawings helpful?
17. Should a person with diabetes control his/her exercise? How much should you exercise?
18. Why is it important for diabetics to take special care of particular parts of their body such as their feet and teeth?
19. Why is it important to test your blood sugar level each day?

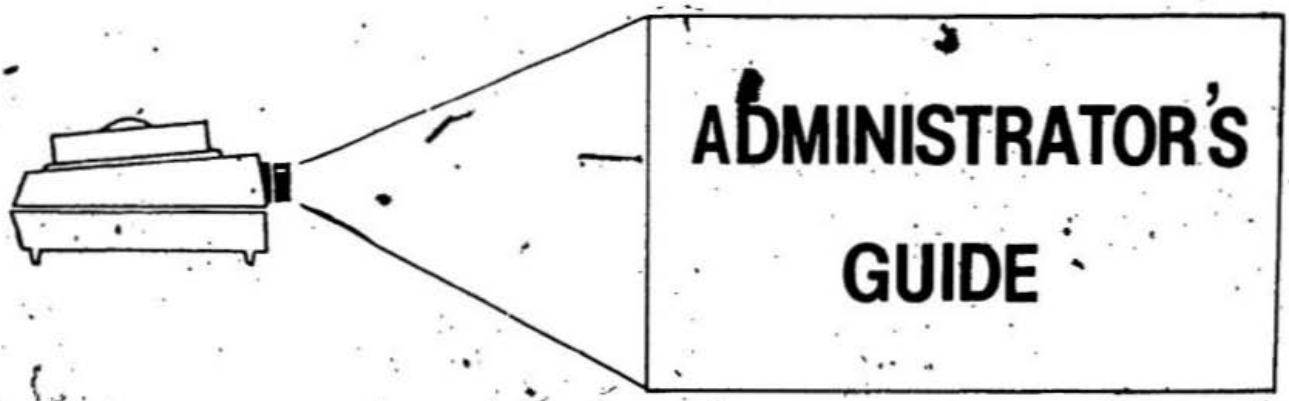
Patient's Names

1. Overall Rating				
2. Definition				
3. Types				
4. Seriousness of Types				
5. Length of Presentation				
6. Balance of Factors				
7. Types of Medication				
8. Medication complements others				
9. Role of Insulin				
10. Level of difficulty/language				
11. Clarity				
12. Symptoms				
13. Weight				
14. Complications				
15. Comp. for Non-ins.-dep. patients				
16. Illustrations (helpful?)				
17. Exercise				
18. Personal Hygiene				
19. Testing				

Administrator's Comments: _____

APPENDIX D

THIS IS DIABETES



To the Administrator

The slide-tape presentation "This is Diabetes", has been developed to give diabetes patients (a) an understanding of their condition, and (b) ways to control the diabetes. The presentation stresses the cause of diabetes and briefly discusses many of the symptoms. Control of diabetes through a balance of diet, exercise, and medication is emphasized through the whole presentation. The need for daily blood-sugar level testing along with good hygiene practices are also discussed. The overall presentation has a positive attitude and attempts to leave the patient with a feeling that he or she can live an active life by controlling their condition.

Contents of Package

The package contains the following items:

1. The slide presentation consisting of 78 slides.
2. An accompanying tape (13 min. 30 sec. in length) with audible and inaudible signals.
3. An instructor's guide with script.

Any of the contents of the package may be copied for personal use. All originals should be returned.

Instructions for Use

The following instructions should be followed to allow for synchronization of the audio and visual parts of the presentation:

1. Decide whether you will be using inaudible sounds

(side A) or audible sounds (side B). Place tape in the cassette player. Rewind tape.

2. Load the slides. Focus the projector. Advance to black.

3. Start tape.

Recommendations

Testing has shown that the slide-tape presentation is very effective as an introduction or a review of diabetes. To enhance the effectiveness of the presentation, it is recommended that:

1. The presentation should be shown in small groups where the patients will have an opportunity to discuss any topics that may arise from the slide-tape presentation.

2. A live instructor should review many of the more complex items that are mentioned in the presentation.

3. Copies of the booklet "Diabetes Care: Guidelines for the Adult" should be distributed to the patients after presentation (see "Sources of Information" in this guide). The booklet was produced to compliment the slide-tape presentation.

Sources of Information

The complimentary booklet "Diabetes Care: Guidelines for the Adult" is produced by:

St. Clare's Mercy Hospital

St. John's, Newfoundland

One further source of information and pamphlets dealing with diabetes care is the Canadian Diabetes Association. The C.D.A. presently has three branches in Newfoundland:

1. Eastern Newfoundland Branch
   Canadian Diabetes Association
   153 New Cove Road
   St. John's, Newfoundland.
2. Newfoundland Division,
   Canadian Diabetes Association
   Stephenville, Newfoundland.
3. Corner Brook Branch,
   Newfoundland Division,
   Canadian Diabetes Association
   Corner Brook, Newfoundland.

Script: This is Diabetes

1. Focus
2. Black
3. Music
4. Music
5. Music
6. Music
7. What do automobiles have to do with diabetes, you may ask. Well, nothing, really. But they can help us explain what diabetes is.
8. Automobiles need energy in order to function--our bodies also need energy.
9. This energy comes from different sources, however. An automobile gets its energy from gasoline.
10. We get the energy our bodies need from the food we eat.
11. Many things have to be done before automobiles can use gasoline as energy. Crude oil must first be found and taken from the earth.
12. It must then be refined to a high quality gasoline, which is usable by automobiles.
13. The food we eat is also gathered fro.. the earth and "refined" before it can be used as energy.
14. Some refining takes place before we eat the food, but most takes place after we have eaten, during the process of digestion, which takes place in the stomach and intestines.

15. Food that is used for energy must first be changed to a sugar called glucose.

16. All foods can be changed into sugar. Foods such as honey, table sugar and juices contain simple sugars and are refined almost immediately after eating.

17. Other foods contain sugars that take longer to be refined. Fresh fruits and vegetables, for example, take longer than simple sugars to be refined but still not as long as foods such as bread, potatoes, or fats.

18. The sugar from the foods we eat enters the bloodstream and is carried to all parts of the body; just as the oil refineries send the gasoline to the many service stations.

19. But the gasoline is no good on its own, even in the service station. It must be put in the cars.

20. In the same way the sugar must get into the cells of the body before it can be used as energy.

21. The sugar cannot enter the cells by itself. It needs help. This help is provided by a substance called insulin.

22. Insulin is normally produced by the pancreas. The pancreas is a gland which is located behind the stomach.

23. As the amount of sugar in the blood increases, the pancreas produces more insulin to meet the increased need.

24. Sometimes the pancreas is not able to produce enough insulin, or none at all.
25. Still, other people's pancreas produce enough insulin but the insulin is not able to do its job of getting the sugar into the cells.
26. This condition, in which the cells cannot get the sugar they need, is called "Diabetes".
27. A person can tell if he or she has diabetes by being aware of the symptoms that go along with the condition.
28. A person with diabetes may, for example, be unusually hungry all the time.
29. When the cells do not get the sugar they need, they send a message to the brain, which interprets it as the body being hungry.
30. The individual continues to eat-building up the sugar level in the blood. The kidneys pass the excess sugar into the urine.
31. Water is taken from the body to dilute the large amounts of sugar, causing the person to urinate more often.
32. Increased urination causes a drain of the body's fluids,...
33. ....so the person may also be extra thirsty.
34. There are many other symptoms that may lead the person to believe that he or she has diabetes:

Itchy skin

Skin infections

Pain, numbness, tingling feet

Weight loss, despite increased appetite

35. Slow healing of cuts

Weakness and fatigue

Blurred vision

36. In severe cases there may also be any of the following:

Rapid breathing

Sweet smelling breath

Vomiting

Stomach ache

37. There are two types of diabetes:

Non insulin dependent diabetes, and

Insulin dependent diabetes

38. 85% of all people who have diabetes are non insulin dependent. These people do not usually require any other source of insulin to control their diabetes.

39. This does not mean that non insulin dependent diabetes is less serious. Diabetes is diabetes - no matter the type. All diabetes can lead to complications.

40. In the past, people with non insulin dependent diabetes have not realized the potential danger of not controlling their condition.

41. This usually meant that in the long run, complications

such as gangrene, eye problems, loss of feeling in the legs, and other problems have arisen.

42. These complications can only be avoided by keeping the diabetes very tightly controlled. Control is achieved by maintaining a balance of diet with exercise and medication.

43. Diet is important for several reasons. First of all, diabetes is much more easily controlled when the individual is not overweight.

44. Fat cells have a resistance to the action of the insulin, so it cannot work efficiently.

45. And of course, the more cells there are in the body, the more insulin is needed to get the sugar into these cells.

46. So, quite often for non-insulin dependent diabetes, just keeping the individual's weight under control is enough to keep the diabetes under control.

47. Being physically fit is also an important factor in controlling diabetes.

48. Inactive muscle cells are like fat cells in that they offer resistance to the working of insulin.

49. Exercise is also very important in increasing the circulation of the blood around the body. Increased circulation is very important in curing infections, and helping guard against problems such as heart attack and blurred vision.

50. If an individual cannot control his diabetes through diet and regular exercise, a medication may be prescribed. This medication may be one of two forms: Pills for the non-insulin dependent diabetic, or Insulin for the insulin dependent diabetic.

51. In the past, diabetics have had two false ideas about exactly what the pills are and what they do.

52. Many have thought that these pills were insulin. Not so. Diabetic pills do one of two things; they either stimulate the pancreas to produce more insulin, or they help the cells of the body use the insulin that's already available.

53. Many have also believed that these pills are a cure for diabetes - that once they're taking pills, they need not concern themselves with watching their diet or even bother with exerciseing regularly.

54. This, too, is a misconception - one that has led to many complications. Pills are only effective when helped by diet and exercise. They all work as a team to bring the diabetes under control.

55. Insulin is the second type of medication, and it must be injected. If insulin were taken orally it would be destroyed by the process of digestion.

56. To understand the balance between insulin, diet, and exercise, imagine a ball thrown in the air. It rises until it reaches its peak. The ball is not always

at the same height, but it is still in the air.

57. Insulin is much the same. The efficiency of insulin is very low at first. It's efficiency increases until it reaches it's peak. It has some effect during it's whole duration, but the peak period is more crucial.

58. The required balance is only achieved if the amount of sugar in the blood reaches its highest point as the insulin reaches it's peak.

59. High blood sugar, or hyperglycemia, results when there is not enough insulin. An individual with hyperglycemia experiences the symptoms recognized as those of diabetes.

60. Now, if on the other hand, the insulin reaches it's peak while there is a very low blood sugar level, they may experience an insulin reaction called Hypoglycemia.

61. An insulin reaction may be caused by any number of reasons: ...too much insulin

... too little food, too long between meals, or postponed meals.

62. Too much unusual exercise. An individual, for example, who does not exercise all week, but has a very active weekend, will throw off the balance between the diet and the insulin injections.

63. We've already said that diabetes is only controlled through a balance of diet, exercise, and medication. A very important factor in keeping this balance is

— the daily routine of testing and keeping accurate records of the results.

64. This allows for necessary adjustments to be made to your diet and medication.

65. Urine testing is the most common of the two methods of testing the blood sugar level at home.

66. Urine testing is possible because when a person's blood sugar reaches a high level, it overflows into the urine. A positive result means that the blood sugar level is too high.

67. The urine testing method, has a disadvantage - it cannot tell if the blood sugar level is dangerously low.

68. Very accurate results can be obtained by the second method of testing: blood testing.

69. Blood testing involves first obtaining a drop of blood from your finger.

70. The drop of blood is then placed on a plastic strip and either compared to a color chart or placed in a blood glucose monitor.

71. The blood glucose monitor offers the most accurate results of any of the methods.

72. With the use of the monitor, day - to - day control can be obtained. This control is needed to enable the diabetic to avoid long term complications.

73. Personal hygiene is also very important in preventing long-term complications.

74. Since a person with diabetes has more problems with infections than other people, it's necessary to guard against anything which may cause infections. This means taking special care of areas such as feet, teeth, eyes and skin.

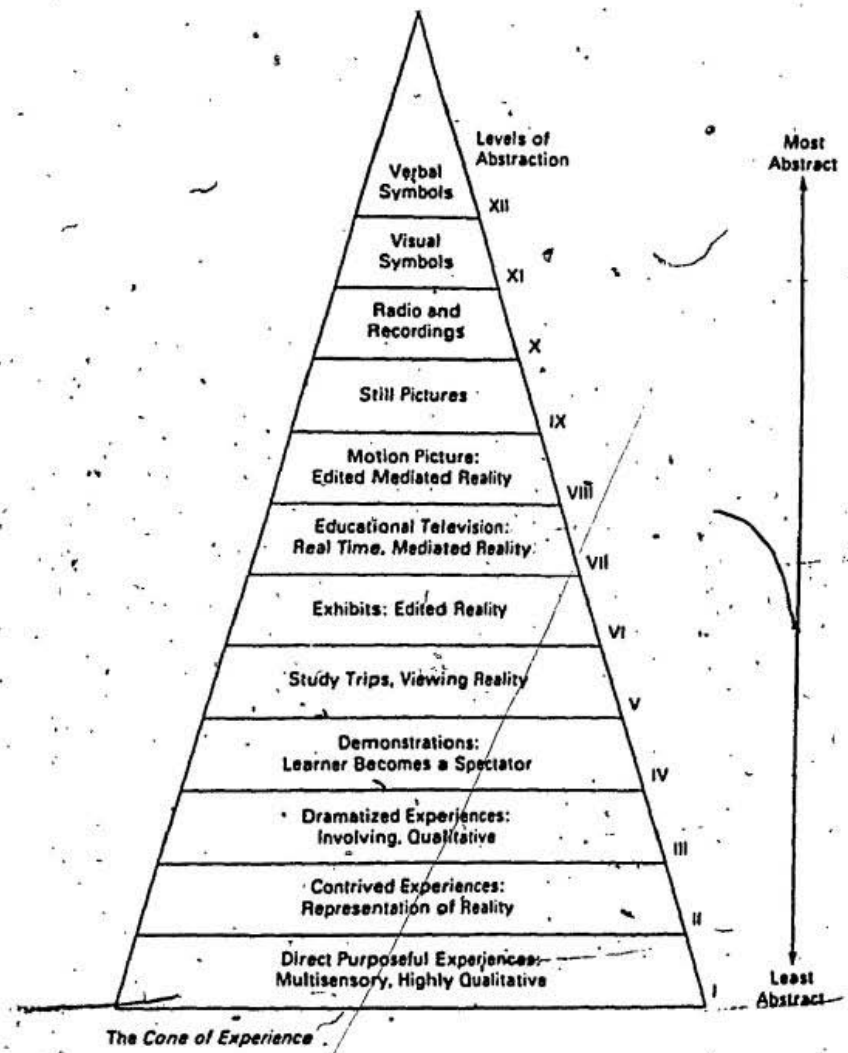
75. At this point, it may seem to you that it will be an impossible task to do all the things necessary to control the diabetes.

76. In a short time, however, these things that are so new to you now, will become habit. The important thing is: learn everything you can about your condition. With this knowledge and a desire to take charge of your diabetes, you can live an active and full life.

77. Music up

78. Black

APPENDIX E



The *Cone of Experience*

APPENDIX F

Slide-tape Presentation

"This is Diabetes"

(under separate cover)