DAILY LIVING AND COPING STRATEGIES IN INSULIN-DEPENDENT DIABETICS -
DIAGNOSTIC REASONING IN NURSING

by

Berit Lundman

Umeå 1990
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Daily living and coping strategies in insulin-dependent diabetics - Diagnostic reasoning in nursing.

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ABSTRACT

Within a defined geographical area, all patients, 192 in total, with insulin-dependent diabetes of at least 2 years' duration and free from long-term diabetic complications were identified. Their experiences of the influence of the disease on daily living, tedium, and smoking habits were evaluated using a questionnaire and related to metabolic control. A case-referent study concerning smoking habits among 25 patients with good, and 25 with poor metabolic control was performed. The influence of menstruation on metabolic control was studied among 20 diabetic women and 20 healthy controls. Coping strategies and their outcomes were studied among 20 patients, using the interview technique. Among those with unsatisfactory metabolic and/or emotional outcomes, plans for nursing intervention were agreed on, using diagnostic reasoning. Only a minority of the patients reported that the disease caused them considerable problems in their daily lives. The greatest problems occurred in connection with regularity in daily life, diet management, and exercise. Patients with good metabolic control ($\text{HbA}_{1c}<6.7$) had a higher number of hypo-glycemic comata (7 vs 1, $p<0.001$). Patients with poor metabolic control ($\text{HbA}_{1c}>9.0$) reported more often that they were smokers ($p<0.01$) and the women fertile aged in this group more often reported problems with metabolic control during menstruation ($p<0.05$). Twenty-nine (18%) were defined as suffering from tedium. There was a higher proportion (NS) of high tedium scores among patients in both good and poor metabolic control groups than in those with intermediate metabolic control. Sixty (31%) of the patients were smokers, prevalence of smoking increased significantly with increasing $\text{HbA}_{1c}$-levels (17.5% among patients with the best metabolic control, 47.5% among those with the worst metabolic control). In the case referent study exposure to smoking was found to be significantly more common among those with poor control (odds ratio 6.0). No systematic change in metabolic control during the menstrual cycle could be found. Problem-solving coping strategy based on the monitoring of blood glucose in combination with sensitivity to signs of actual blood glucose level and logical reasoning, was found to have the best coping outcome, both regarding metabolic control and well-being. The results are summarized in a model for diagnostic reasoning in nursing.

Key words: Insulin-dependent diabetes, metabolic control, daily living, coping strategies, attitudes, tedium, smoking habits, menstruation, nursing, diagnostic reasoning in nursing.
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Abbreviations

BMI  Body mass index
HbA1c  Hemoglobin A1c, glucosylated hemoglobin
NANDA  North American Nurses Diagnosis Association
IDDM  Insulin-dependent diabetes mellitus
IR  Insulin reaction
Daily living and coping strategies in insulin-dependent diabetics - Diagnostic reasoning in nursing.

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ABSTRACT

Within a defined geographical area, all patients, 192 in total, with insulin-dependent diabetes of at least 2 years' duration and free from long-term diabetic complications were identified. Their experiences of the influence of the disease on daily living, tedium, and smoking habits were evaluated using a questionnaire and related to metabolic control. A case-referent study concerning smoking habits among 25 patients with good, and 25 with poor metabolic control was performed. The influence of menstruation on metabolic control was studied among 20 diabetic women and 20 healthy controls. Coping strategies and their outcomes were studied among 20 patients, using the interview technique. Among those with unsatisfactory metabolic and/or emotional outcomes, plans for nursing intervention were agreed on, using diagnostic reasoning. Only a minority of the patients reported that the disease caused them considerable problems in their daily lives. The greatest problems occurred in connection with regularity in daily life, diet management, and exercise. Patients with good metabolic control (HbA1c<6.7) had a higher number of hypo-glycemic comata (7 vs 1, p<0.001). Patients with poor metabolic control (HbA1c>9.0) reported more often that they were smokers (p<0.01) and the women fertile aged in this group more often reported problems with metabolic control during menstruation (p<0.05). Twenty-nine (18%) were defined as suffering from tedium. There was a higher proportion (NS) of high tedium scores among patients in both good and poor metabolic control groups than in those with intermediate metabolic control. Sixty (31%) of the patients were smokers, prevalence of smoking increased significantly with increasing HbA1c-levels (17.5% among patients with the best metabolic control, 47.5% among those with the worst metabolic control). In the case referent study exposure to smoking was found to be significantly more common among those with poor control (odds ratio 6.0). No systematic change in metabolic control during the menstrual cycle could be found. Problem-solving coping strategy based on the monitoring of blood glucose in combination with sensitivity to signs of actual blood glucose level and logical reasoning, was found to have the best coping outcome, both regarding metabolic control and well-being. The results are summarized in a model for diagnostic reasoning in nursing.

Key words: Insulin-dependent diabetes, metabolic control, daily living, coping strategies, attitudes, tedium, smoking habits, menstruation, nursing, diagnostic reasoning in nursing.
This thesis is based on the following papers, which will be referred to in the text by their Roman numerals.


V. Lundman, B., Asplund, K., Norberg, A. Metabolic control, food intake, and mood during the menstrual cycle in patients with insulin-dependent diabetes. Submitted for publication.

INTRODUCTION

DIABETES

Diabetes is a clinically heterogeneous disorder, which is characterized by a defect in insulin secretion or action. Insulin is essential for normal metabolism. In diabetes glucose cannot readily be used by the cells of the body and accumulates in the blood, and if blood glucose becomes too high is, excreted in urine. Because they cannot metabolize glucose, the cells instead metabolize glycogen, fat and protein (Bressler and Johnson, 1982). This process is accompanied by fatigue, weight loss, dehydration, and if untreated leads to ketoacidosis. With proper treatment, the consequences of severe hyperglycemia can be avoided. There are different types of diabetes (National Diabetes Data Group, 1979). In insulin-dependent diabetes (IDDM) there is very little or no remaining endogenous insulin production. A supply of insulin is therefore needed, and the patient has to inject insulin, usually several times a day (Small, et al., 1988). IDDM is a serious and complex disease and it is not possible to maintain normalized blood glucose levels all the time. If blood glucose levels are elevated over an extended period of time there is risk of developing long-term complications, such as, retinopathy, nephropathy, neuropathy, and cardiovascular diseases (Pirart, 1978; Hanssen, et al., 1986; D'Antonio, et al., 1989; Colwell, et al., 1990a). If too much insulin is injected there is a risk of hypoglycemia (Gale, 1980).

LIVING WITH INSULIN-DEPENDENT DIABETES

IDDM affects the total functioning of the individual and his daily life in many different ways. Patients with diabetes are told to live a very regular life; to eat a prescribed diet of specific types of food at set times throughout the day (Andersson, et al., 1986; Anderson, et al., 1987) to exercise regularly (Zinman, et al., 1984) to inject appropriate amounts of insulin several times a day (Murray, et al., 1988) to test their blood or urine glucose at frequent intervals (Delamater, et al., 1990) and, to make judgements of current blood glucose, and correct for if discrepancies from the desired (Peterson, 1982). This is a complicated set of tasks that have to be done all the time. In addition patients have to live with the threat of acute or long-term complications (Jensen, 1985). Despite the fact that IDDM affects virtually every aspect of everyday life, the diabetic patient is expected and encouraged to lead a "normal" life. Thus, diabetes may lead to a conflict between maximizing somatic and psychological adjustment, or to a conflict between the management of the disease, and the person´s total goal in life.
Psychological factors in relation to diabetes have been investigated both regarding the influence of the disease on personality and the influence of psychological factors on the disease. This research has yielded mixed results, and has been the subject of several major reviews, many of them critical (Hauser, 1979; Fisher, et al., 1982; Surwit, et al., 1983; Barglow, et al., 1984; Wilkinson, 1987).

Treatment for the insulin-dependent diabetic patient can be seen as a series of behaviors that allow patients to regulate their blood glucose thus accomplishing, through external behavior change, what the body usually accomplishes automatically.

In Sweden, multiple injection of short acting insulin before meals, 3-4 times per day and medium acting insulin at bedtime is a common regimen. (Amqvist, 1986). Development of new devices for injection, so-called insulin pens, has facilitated the administration of insulin (Murray, et al., 1988) and many patients prefer to use these pens instead of conventional syringes (Engström, 1990). Equipment for the self-monitoring of blood glucose is free in Sweden, and many patients use it as an aid for management of the disease (Sönkensen, 1980; Colwell, et al., 1990b).

The diabetic patients' internal resources, such as coping ability, knowledge, skills, and beliefs are of vital importance in their adjustment to the demands of the disease. There are also external resources available, such as health care providers, medication, technological devices, literature, management programs and social support systems.

NURSING

Nursing is mostly concerned with daily living as it affects health and is affected by functional health status (Carnevali, 1983, p 4). Nursing is an interactive, interpersonal process that facilitates people's adaptation to different health related demands in daily life and enables development, release, and channeling of resources for coping with one's circumstances and environment (Erickson, et al., 1983, p 49).

There is a general agreement among nursing theorists that the concepts inherent in nursing are person, health, environment, and nursing. They constitute the metaparadigm for nursing (cf. Meleis, 1985; Fawcett, 1989; Marriner-Tomey, 1989). However, the idea that nursing is one concept in nursing has been criticized as being somewhat illogical (Travelbee, 1977; Hallberg, 1990). Hallberg (1990) has found it more appropriate to define the fourth concept as nursing intervention, consisting of interaction and nursing activities based on a thorough analysis of the patient's needs and problems. Travelbee (1977) has suggested nursing therapeutics, which is the preferred term in this work. The identified above dimensions of nursing intervention are likewise included in this concept. In agreement with Kim (1987) the concept health
is regarded as being so closely connected to the concept person that the two are conjoined.

**Person**

Important concepts related to the person with insulin-dependent diabetes, addressed in this work are health, growth and development, coping, and self-care.

**Health**

Health is often seen as the opposite of suffering from disease. This view is based on the perception of a dichotomy between healthy and sick people. Carlsson, et al. (1979) distinguish between objective and subjective health, relating objective health to signs and symptoms of disease, and subjective health to the person’s experience of illness. Sarvimäki (1987) defines being healthy versus not being healthy as a relationship between the individual’s intentions, or goals, and the capacity to live up to these intentions or achieve the goals. To be unhealthy implies an imbalance between the goals and resources. There is, however, an ongoing discussion about the meaning of the concept of health, mainly focused on whether health is something the person has or something the person is (cf. Fromm, 1969), and whether or not experiences of health are consistent with having a disease (for review see Nordenfelt, et al., 1987).

The view of health in relation to insulin-dependent diabetes used in this work is that experience of health is quite consistent with living with insulin-dependent diabetes. Ternulf Nyhlin, et al. (1987) used the expression "not ill, but having a disease", to describe this phenomenon. In concordance with this view it also seems important to stress maintaining health, and paying attention to factors promoting movement towards health. Coping strategies among those who experience health in spite of a disease, as well as for dealing with factors that have negative consequences for health also have to be elucidated (cf. Antonovsky, 1987).

Even if many people with insulin-dependent diabetes experience health, there are reports of higher frequencies of certain psychological problems among diabetics in comparison with non-diabetics. Such problems include e.g., fatigue and irritability (Surridge, et al., 1984), guilt (Dunn, et al.,1986) depression (Friis and Nanjundappa, 1986), anorexia (Steel, et al., 1987), fear and anxiety about future (McFarland, et al., 1989), and sexual concerns (Schiavi and Hogan, 1979). These conditions of emotional distress can be interpreted as signs of not being healthy, but the importance of this phenomenon must be seen in the context of their meaning for the individual person.
Age and developmental stage are important variables affecting human behavior. Erikson (1982) describes eight stages of psychosocial development through which man progresses. Each stage represents a developmental task or decisive encounter resulting in crises, which the individual has to work through and solve. The eight stages concern trust - mistrust, autonomy - shame, initiative - guilt, industry - inferiority, identity - identity confusion, intimacy - isolation, generativity - stagnation, and integrity - despair. Out of each crisis a virtue may develop: hope, will, purpose, competence, fidelity, love, care and wisdom. The way these crises are solved contributes to the character and health of the individual. Erikson (1982) says that the stages are systematically related to each other, that all exist from the beginning, and the solution of one crisis is influenced by the solution of earlier crises.

Coping

Coping occurs whenever a person encounters an event or a situation that requires some special effort to deal with it or handle it and there is a growing conviction that the ways people cope with illness, stress, or threat in everyday living affects their psychological, physical, and social well-being (Pearlin and Schooler, 1978; Antonovsky, 1987; Felton and Revenson, 1984; Folkman, 1984; Lazarus and Folkman, 1984; Folkman and Lazarus, 1988a; Benner and Wrubel, 1989). The overall theoretical framework of coping is transactional in that the person and the environment are seen in an ever ongoing relationship of reciprocal action, each affected by and in turn affecting the other (Lazarus and Folkman, 1984; Folkman and Lazarus, 1988b).

Coping has been defined both as the process and the outcome of this process (Ray, et al., 1982). In this work the outcomes of the coping process have been addressed. Coping outcomes are important because through measuring outcomes the caregiver can determine whether interventions achieve the expected effects. According to Lazarus and Folkman (1984) the coping processes have both a problem-focused component that serves the function of the management or alteration of the person-environment relationship and an emotion-focused component that serves the regulation of stressful emotions. Folkman and Lazarus (1980) have found that emotion-focused coping was likely to be used for health problems, especially when the problems were appraised as uncontrollable.

Under comparable conditions, people respond in different ways. People differ in their sensitivity and vulnerability to certain types of events, as well as in their interpretations and reactions. Both biological factors and early social experiences are important determinants for coping. The individual’s strategy is also influenced by the course of his
life, and especially by his experiences of psychological stress and successful ways of dealing with it (Kiely, 1972).

In a study of coping in patients with chronic illness, among others diabetes, Felton and Revenson (1984) found information seeking to have salubrious effect on adjustment and wish-fulfilling fantasies to have deleterious consequences.

Coping outcomes in patients with insulin-dependent diabetes are most often measured by metabolic variables. Today, glucosylated haemoglobin (HbA1c) is the most common tool for measuring the long-term metabolic control (Sosenko, et al., 1980; Goldstein, et al., 1982; Jerntorp, et al., 1988). However, the importance of emotional outcomes has been the subject for increasing attention.

There are many studies on psychological and emotional outcomes in IDDM, as well as on different psychosocial and personality predictors for metabolic control and compliance (for reviews see Johnson, 1980; Dunn and Turtle, 1984; Fisher, et al., 1982). Many of these studies have been criticized because they have failed to identify particular psychosocial characteristics. The psychosocial approaches was frequently found to be unsuitable for the specific case of diabetes (Hauser, 1979; Barglow, et al., 1984; Wilkinson, 1987).

Self-care

Patients with insulin-dependent diabetes themselves have the total responsibility for day-to-day care. To develop a state of preparedness for action, necessary for adequate self-care different kinds of knowledge are needed. Pörn (oral communication, 1990) distinguishes between different kinds of knowledge, such as factual knowledge, proposition of knowledge, knowledge of means and methods, understanding, and judgement. Others have distinguished between knowledge based on concrete experiences vs. abstract conceptualization and active experimentation vs. reflective observation (Grahn, 1987).

Studies regarding knowledge about diabetes among diabetic patients and the effect of diabetes education on behavior and metabolic control have given divergent results. Some of them have shown an increase in knowledge after an education program, but with no subsequent effect on metabolic control (cf. Bloomgarden, et al., 1987). Others have found the desired effects both as regard to knowledge and metabolic control (Rubin, et al., 1989; Surawy, 1989). A lack of relationship between knowledge of diabetes and metabolic control has also been shown (Lockinton, et al., 1988; Jacobson, et al., 1990). Most of these studies have focused on factual knowledge. There is general agreement among diabetic caregivers that knowledge about diabetes and its manifestations is necessary for the diabetic patient (Peyrot, 1985). However, factual knowledge per se is not enough. Factual knowledge and knowledge of means and methods have to be connected to modification of behavior. Feed back possibilities are also
crucial for effective learning (Lockinton, et al., 1988). Furthermore, the optimal program for the educational process for patients with IDDM has not been agreed upon. Jovanic and Peterson (1984) have evaluated the effect of their different educational programs as to their success in maintaining normoglycemia for prolonged periods of time. After programs for pregnant patients they found normalized HbA₁c values in 100% of the patients after 6 months, while one-to-one education had the least effect in metabolic terms; 10-40% of the patients in these groups had normalized HbA₁c after 6 months. This is a finding which stresses the issue of the importance of individual motivation in the educational situation.

Self monitoring of blood glucose has become a major adjunct in diabetes and has proved to be a very helpful tool for the diabetic patient in the daily management of the disease (Christiansen and Sachse, 1980). It is now considered to be the most valuable instrument, for regulation of blood glucose levels in daily life, (Skyler, et al., 1978; Alberti, et al., 1982; Colwell, et al., 1990b).

Besides knowledge of diabetes and its management, and the possibilities of feed-back, knowledge of emotional components, as well as self-knowledge are important to be able to carry out adequate self-care (Rubin, et al., 1989). Furthermore the person with insulin-dependent diabetes needs the technical skill to carry out appropriate insulin injections, and self-monitoring of blood glucose. Thus, for adequate and successful self-care, many kinds of knowledge are needed.

Nursing therapeutics

One of the most important responsibilities for the caregiver is to help the individual with diabetes to obtain the requisite knowledge for appropriate self-care, thus, to perform appropriate nursing therapeutics for the individual diabetic patient.

Concepts within the domain of nursing therapeutics further addressed in this work are the caregiver, transaction, and diagnostic reasoning will be addressed here.

Transaction

Interaction between the patient and the caregiver has been considered a core of nursing (Orlando, 1961) and many nursing theorists have focused on interaction (for review see Meleis, 1985). When interaction aims at achieving a mutual goal, King (1981) has labelled it transaction.

In her theory of goal attainment King (1981) focuses on the personal systems of the patient and the caregiver, and their interaction with each other and with the environment. Transaction is defined as a process of interaction in which people communicate with the environment or each other to achieve goals that are valued (King, 1981). Thus, transaction can
be seen as goal-directed human behavior. Perception and communication are central concepts in the study of human interactions that lead to transaction.

King (1981) describes seven steps in the process of interaction that lead to transaction and goal attainment: 1), action, one member of the caregiver-patient dyad initiates behavior e.g. asks questions or makes statements; 2), reaction, the opposite member of the caregiver-patient dyad responds, e.g. answers questions, makes statements; 3), disturbance or problem, is noted; 4), mutual goal setting, some goals are agreed upon, each member shows or states agreement; 5), exploring means to achieve goals is initiated by one member, or behavior is initiated; 6), agreement on means to achieve goals, the other member agrees on means to achieve goals, both move towards the goal; and, 7), transactions are made- the goal is achieved.

The Caregiver

There are many clinical disciplines involved in the care of the diabetic patient, such as physicians, specialist diabetic nurses, dietitians, medical pedicurists, social workers, all treating the same patient, and all having their own discipline-specific knowledge base, training and perspective. The emergence of diabetic nurse specialists lead to the fact that the nurses have taken over many of the tasks which previously belonged to the physician and consequently, many nurses have been trained to think and act within the pathophysiological, psycho-pathological models instead of within a nursing model.

Even if the diabetic nurse specialist and the physician have a shared area of responsibility in caring for the diabetic patient it is necessary to distinguish their discipline-specific roles. The physician focuses on the pathophysiology and treatment of disease, while the diabetic nurse specialist focuses on the consequences of the disease for daily living and functional health status (Carnevali, et al., 1984; Axelsson, et al., 1986; Axelsson, 1988). In practice human caring allows the commitment and consciousness of the caregiver to touch the human center of the person (Watson, 1988). This commitment leads sometimes to recognition of deeper intrapsychic conflicts, or other forms of psychopathology, which is a discipline-specific area of psychologists and psychiatrists. Although the caregiver deals with daily living, it is important that he/she has sufficient knowledge of closely allied disciplines, to be able to consult other when appropriate or necessary.

Diagnostic reasoning in nursing

According to Kim, et al. (1984 p 129) a nursing diagnosis is a statement of a problem derived from a nursing assessment that points to specific interventions and outcomes. Intensive work aimed at developing methods
for diagnosing nursing problems have been carried out mainly in the USA. Using a deductive approach the North American Nursing Diagnosis Association (NANDA) has presented a list for nursing diagnoses, which is summarized in a taxonomy (Kim, et al., 1984; Hurley, 1986).

Carnevali (1983) represents another way of formulating nursing diagnoses. Using an inductive approach, the nursing diagnosis is seen as a conclusion to the actual problem, the cause of the problem, relations to other problems, and possible consequences. Nursing diagnoses can be formulated in two steps, a general nursing diagnosis based on observations and interviews, and a specific nursing diagnosis based on specific tests and investigations (Axelsson, et al., 1986, Axelsson, 1988).

The diagnostic reasoning process used in this work is that of Carnevali. According to Carnevali, et al (1984) the domain for nursing diagnostics is the link between demands and activities in daily living and functional health status (related to age-related biological status, developmental tasks and pathology) and the treatment of the latter. She also stresses the caregiver's ability to think critically and make clinical decisions based on the careful collection of data.

Diagnostic reasoning is a complex integration of critical thinking, and data-collecting processes that are used to identify and classify phenomena in a clinical situation. Carnevali et al. (1984) describe this process in a series of steps. The first step is entry into the data search field and shaping the direction of data gathering. A second step is the coalescing of cues into clusters of chunks, activation of possible diagnostic explanation, hypothesis and data directed search of the data field. A third step includes testing diagnostic hypotheses for fit. The fourth step includes formulation of diagnoses or activating additional diagnostic possibilities, or reshaping the direction of data gathering.

Skills in eliciting relevant information from the patient are necessary for the formulation of an accurate nursing diagnosis and for the construction of a treatment regimen that the patient is likely to follow.

This process of eliciting relevant information and making judgements has much in common with medical problem-solving (cf. Berner, 1984; McGuire, 1985). In research on clinical judgement in nursing, the rationalistic perspective has been predominant, but there is a movement to a more comprehensive or intuitive view according to Tanner (1987). She points to lack of knowledge of outcomes, for both approaches, and the need for research.

As insulin-dependent diabetes is a very complex disease which influences almost everything in the patient's daily life. As people react in different ways, the diagnostic reasoning process would seem to be a valuable instrument for the caregiver. To be able to assess different behavioral and emotional outcomes and to develop appropriate and valid nursing diagnoses more knowledge is needed. Knowledge about underlying factors and their relationship to behavior and other coping outcomes, and to processes of transaction seems particularly important.
AIMS OF THE STUDY

The principle aim of the present work was to describe the characteristics of diabetics with good and poor metabolic control, to elucidate the impact of the disease on the person, to describe coping strategies, and to develop a model for diagnostic reasoning in nursing for the adult insulin-dependent diabetic patient.

The following specific subjects have been investigated:

1. Emotions, attitudes and experience of well-being in insulin-dependent diabetics, and their relation to metabolic control (I, II)

2. The occurrence of tedium among patients with insulin-dependent diabetes (III)

3. Smoking habits and their relation to metabolic control (IV)

4. Metabolic control and food consumption during menstruation among diabetic women and healthy controls. (V)

5. Problem-focused and emotion-focused coping strategies, metabolic and emotional outcomes and diagnostic reasoning (VI)

METHODS

SUBJECTS

Patients with insulin-dependent diabetes were studied. In order to obtain a representative sample, an epidemiological survey was conducted, which showed that there were 3482 diabetics in the Sundsvall Hospital catchment area (June 1985), giving a prevalence of 2.8%. At the start of the study there were 428 patients in the area diagnosed as IDDM according to the classification of the National Diabetes Data Group (1979). To check the diagnoses a sample of 30 patients was selected. The intersubjective agreement was 93%. The disagreements concerned two patients with very atypical onset and course of disease.

Inclusion and exclusion criteria, and drop-outs are shown in Table 1. Clinical characteristics of the patient groups are shown in Table 2.
Table 1. Inclusion and exclusion criteria and drop-outs among 428 insulin-dependent diabetic patient (IDDM) in the hospital catchment area.

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
<th>Number</th>
<th>Non-participants*</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 20 years or above</td>
<td>Younger than 20 years</td>
<td>15</td>
<td>Questionnaire not returned</td>
<td>10</td>
</tr>
<tr>
<td>Duration of diabetes &gt; 2 year</td>
<td>Duration of disease &lt; 2 year</td>
<td>60</td>
<td>No consent</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Pregnancy</td>
<td>6</td>
<td>Failure to visit clinic</td>
<td>5</td>
</tr>
<tr>
<td>Absence of manifest long-term complications</td>
<td>Long-term complications</td>
<td>132</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proliferative retinopathy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Nephropathy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Impaired circulation in lower limbs</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Gangrene of the lower limb</td>
<td></td>
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<tr>
<td></td>
<td>Amputation of the lower limb</td>
<td></td>
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<tr>
<td></td>
<td>Myocardial infarction</td>
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<tr>
<td></td>
<td>Incapacitating angina pectoris</td>
<td></td>
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<tr>
<td></td>
<td>Other severe diseases</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Severe communication problems</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Hypertension</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* Drop-outs in the various substudies are reported in the separate articles (I-VI).
Table 2. Clinical data of the patients in Papers I to VI.

<table>
<thead>
<tr>
<th></th>
<th>Papers I +II</th>
<th>Paper III</th>
<th>Paper IV</th>
<th>Paper V</th>
<th>Paper VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men / Women</td>
<td>104/88</td>
<td>90/68</td>
<td>34/16</td>
<td>-/20</td>
<td>11/9</td>
</tr>
<tr>
<td>Age, year, M (SD)</td>
<td>38 (12)</td>
<td>36 (11)</td>
<td>35 (11)</td>
<td>32 (6)</td>
<td>40 (10)</td>
</tr>
<tr>
<td>Duration of disease, year, M (SD)</td>
<td>18 (10)</td>
<td>17 (9)</td>
<td>15 (8)</td>
<td>15 (7)</td>
<td>19 (7)</td>
</tr>
<tr>
<td>Body mass index, kg/(m)2, M (SD)</td>
<td>24 (3)</td>
<td>24 (3)</td>
<td>24 (3)</td>
<td>22 (3)</td>
<td>24 (3)</td>
</tr>
<tr>
<td>HbA1c, %, M (SD)</td>
<td>7.9 (1.6)</td>
<td>7.9 (1.7)</td>
<td>8.2 (2.4)</td>
<td>7.8 (1.9)</td>
<td>8.3 (1.5)</td>
</tr>
</tbody>
</table>
Participants in the different clinical studies are shown in Figure 1.

![Diagram showing participants in different studies]

**Figure 1. Participants in the different studies.**

**MEASURES**

**Metabolic control**

**Glucosylated hemoglobin:** Glucosylation is a slow chemical process which occurs through the lifespan of the erythrocyte, the prevailing plasma glucose concentration being the most important factor governing the quality of HbA1c formed. Measurement of HbA1c reflects the mean blood glucose level for the preceding two months and is therefore an objective and accurate determinant of long-term diabetes control (6-8 weeks) (Goldstein, et al., 1982; Jerntorp, et al., 1988). The analyses were performed at the Department of Clinical Chemistry, Sundsvall Hospital. Reference interval was 2.6 - 6.1%.

**Glucosylated protein:** Glucosylation of protein is a modification directly dependent upon prevailing glucose concentration, (Johnson, et al., 1982), and reflects an average of metabolic control during the preceding 2 weeks.
The analyses were performed at the Department of Clinical Chemistry, Sundsvall Hospital. Reference interval was 1.7 - 2.8 mmol/l.

Self-monitoring of blood-glucose: Blood glucose was assessed by using reflectometer and test strips (Reflolux II, and BM-test Glycemie 1-44, Boehringer Mannheim AB). Reference interval was 3.5-5.5 mmol/l (fasting).

Experiences of living with insulin-dependent diabetes

Mood Adjective Check List (MACL) (Sjöberg, et al., 1979) is a scale for evaluation of emotional state and mental well-being. It is a self-administered 6-dimensional scale and comprises 71 randomly ordered adjectives, selected from different mood check lists, that describe moods and related feelings. Its response format is symmetric with two acceptance and two rejection categories. A higher MACL-score implies a more positive emotional state as it has proved to be a valid and reliable instrument for the measurement of emotional state (Augustinsson, et al., 1985; Sullivan, et al., 1986).

Daily life questionnaire. The questionnaire was constructed for the study, and was comprised of 23 structured questions related to the following areas: the effect of the disease on daily life (regular hours, food, exercise, injections, self-monitoring, and out-patient visits); the effect of the disease on people around the patient (family, explaining to new acquaintances, questions and concern from those close to the patient, and the need for planning); concern about complications (insulin reactions, retinopathy, nephropathy, gangrene, myocardial infarction); positive effects such as healthier food and personal maturity; absence from work owing to illness; and self-monitoring of blood and urine glucose. The items were rated on an ungraded line that was afterwards divided into three equal parts.

Well-being measurement. Eleven semantic differentials (see. Osgood, et al., 1957), measuring well-being, were constructed by the authors on basis of their clinical experience and literature. The scale seemed as having face validity. The internal consistency of the scales was 0.9 assessed by the split-half method.

Burn-out scale (Tedium measure). The burnout scale as constructed by Pines, et al. (1981) was used. It consists of 21 items which cover three categories, physical, emotional, and mental exhaustion. The respondents state their answers on a 7-point scale ranging from 1 to 7. The total score
is counted as equal to the mean of the answers to all the items. The scale has been reported as having good reliability and validity (Pines, 1981).

**Sense of Coherence questionnaire (SOC).** (Antonovsky, 1987) is a measurement of global orientation. It comprises twenty-nine statements covering three core components considered to be of importance for coping: comprehensibility, manageability, and meaningfulness. The items are arranged as a 7-point Likert scale The instrument has been tested in different cross-cultural samples. The internal consistency has been reported to fall between 0.84 and 0.90 as measured by the Chronbach’s alpha (Antonovsky, 1987). The questionnaire has been translated into Swedish, and adapted to Swedish conditions by Björvell et al. (submitted).

**Interviews.** Semistructured interviews covering six domains of living with IDDM, were used. These domains were: experiences in relation to the onset of the disease; management of the disease in daily life and unusual events; perception of symptoms of high and low blood glucose levels; self-monitoring of blood glucose; family relations; ideas about long-term complications, and about the future. Changes over time, and what had caused these changes in experiences and management were given particular attention. The patients were also encouraged to bring up subjects they wanted to discuss.

Instruments used in the different studies are shown in Table 3.

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STATISTICS

Student's t-test was used for testing of differences between means (I,II, V). The Chi-square test (I,II, V) and Fisher's exact test (V) were used to test for differences between proportions. The Statistical Package for Social Sciences (SPSS 9.0) was used for factor analysis (III). Spearman's correlation coefficient was used for calculations of correlations (I). Multivariate general linear regression programs (SPSS/PC+) (I) and (SYSTAT) (IV), were used for the step-wise multiple regression. Odds-ratios were used for exposure to smoking (V). Cyclicity was tested by comparing the measured variables in different weeks in the menstrual cycle using the Wilcoxon rank sum test (Siegl, 1956). The subjects were used as their own controls and the comparison refers to changes in relation to the preceding week. The differences in nominal data were calculated by chi-square testing and were considered significant (two-tailed test) if the P-value was <0.05.
RESULTS

EXPERIENCES OF THE INFLUENCE OF THE DISEASE ON DAILY LIVING, ATTITUDES, WORRIES ABOUT COMPLICATIONS, AND TEDİUM

Problems in daily living.

The majority of the patients considered the need for regularity in daily life the greatest problem (26%), followed by exercise (26%), and diet management (24%), whereas very few reported that the injections themselves were a problem (0.6%). With regard to relations with people around the patients, the need for planning was considered to be the major problem (18%) (I).

Well-being

Many of the patients thought that the disease had had some positive influence on their lives, 67% stated that the family ate more nutritious food, 59% that they themselves lived a healthier life, 41% that they had a broadened outlook on life, 41% felt that their psychological development had been promoted by the fact that they had diabetes. The absences from work reported by the patients were equivalent to absences among the rest of the population. The patients expressed positive attitudes towards being diabetic and produced expressions conveying experiences of well-being, as they rated themselves more healthy than ill on the well-being measurement. Worries about complications, lack of positive influences, and non-smoking reached statistical significance (p<0.01 - p<0.001) as independent predictors of poor well-being (I).

Worries about complications

The majority of the patients declared that they were concerned about the risk of developing eye damage (45%), kidney damage (25%), insulin reactions (18%), gangrene (14%), and myocardial infarction (10%) (I).

Tedium

The mean tedium score was 2.5. Twenty-nine patients (18%) were defined as experiencing tedium. High tedium scores were significantly related to the following: higher education (p<0.05); higher degree of absence from work (p<0.02); lack of self-monitoring of blood glucose (p<0.05); more problems with insulin injections (p<0.02); and, more problems with diet control (p<0.001); more concern that the need for planning affected the people around them (p<0.01); more concern over influence on family members (p<0.02); more concern about gangrene

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(p<0.01), myocardial infarction (p<0.02), and insulin reactions (p<0.01); experience that the disease had also meant something positive (p<0.05); lack of reports on positive effects of the disease (p<0.02) (III).

**RELATIONS TO METABOLIC CONTROL**

Patients with good metabolic control (HbA1c <6.7%) were more highly educated (p<0.05), and had greater numbers of hypoglycemic comata (p<0.001). Patients with the poor metabolic control group (HbA1c >9.0%) more often reported that they were smokers (p<0.003) (II).

In a subsequent case-referent study among 25 pairs with good and poor metabolic control the exposure to tobacco was further investigated. Five out of 25 of the patients with good metabolic control (HbA1c < 6.7%), and 15 out of 25 of the patients with poor metabolic control (HbA1c >9.0%) reported that they were smokers (p<0.01, odds ratio 6.0) (IV).

Among the women in the fertile ages, five out of 16 patients in the group with good metabolic control and nine out of the group with poor metabolic control reported problems with metabolic control in relation to menstruation (p<0.05) (II). However, in a subsequent, more comprehensive and thorough study among 20 women and 20 healthy controls, no systematic influence of menstruation on metabolic control was found. No fluctuation in glucated protein or blood glucose levels could be seen during different weeks in the menstrual cycle. Levels of glucated protein were significantly (p<0.05) higher during the premenstrual than during the postmenstrual week, although the difference was small in absolute terms. Food intake and mood remained essentially unchanged throughout the menstruation cycle. (V).

Analysis of the interviews revealed that certain types of coping strategies were associated with metabolic control. Those patients (5) who had good metabolic control (HbA1c < 7.1%) and satisfactory emotional adjustment, all used a combination of strategies including problem-solving based on either self-monitoring of blood glucose, or experiences in combination with sensitivity to current blood glucose level in combination with logical reasoning. (One patient with the same set of strategies had HbA1c 7.8%). None of these coping strategies alone could be related to good metabolic control or to satisfactory emotional adjustment.

Three of the patients used routinization as the predominant coping strategy. In two of them the metabolic outcome was satisfactory (HbA1c 6.1% and 6.7%) but not the emotional outcome. No common coping strategy could be identified for patients with poor metabolic control.
AGE RELATED DIFFERENCES

Younger age was significantly associated with; feelings of anxiety (p<0.05); lack of freedom (p <0.05); insecurity (p<0.05); low self-esteem; more problems with diet control (p<0.05); more problem with explaining to new acquaintances (p<0.05); more concern about that the need for planning affected the people around them (p<0.05); more concern about complications involving eyes, kidneys, and gangrene (p<0.05); experiences the disease had also meant something positive (p<0.05).

DIFFERENCES RELATED TO DURATION OF THE DISEASE

Shorter duration of the disease was significantly associated with; feelings of insecurity (p<0.01); more problems with the need for regularity (p<0.01); more problems with diet control (p<0.05); more concern that the need for planning affected the people around them (p<0.01); more concern about complications involving eyes and kidneys (p<0.05).

PROBLEM-SOLVING AND EMOTIONAL COPING STRATEGIES AND THEIR METABOLIC AND EMOTIONAL OUTCOMES.

Ways of coping were organized into two categories, problem-focused coping strategies, and emotion-focused coping strategies (cf. Lazarus and Folkman, 1984), and related to metabolic control and emotional outcomes. When the most prominent strategies for each individual were considered, certain patterns emerged. The patterns were clustered into five main categories. The strategies were tentatively labelled: expertise, ambiguity, active routinization, passive routinization, and emotion based action.

The specific combination of coping strategies which was labelled expertise, included objective and subjective blood glucose estimations, and logical reasoning based on factual knowledge and experiences. This strategy seemed to produce the most desired outcomes, a feeling of competence or ability to manage the disease without too much emotional impact. The patients in this group also stated that they wanted to help other diabetics in the management of various aspects of the disease. They also stated that on the whole, they enjoyed health and experienced well-being. This combination of strategies was also related to satisfactory metabolic control, mean HbA1c was 7.0%.

The combination labelled ambiguity, included objective blood glucose estimations, logical reasoning based on factual knowledge, and experiences, and attempts to routinize. This set of strategies was somewhat more complex, and was characterized by serious attempts to
control the disease, but these attempts were experienced as failures. The emotional component was also characterized by ambiguity, feelings of "giving up", and compulsion, but also by well-being. This specific set of coping strategies was related to poor metabolic control, mean HbA$_1^c$ was 9.7%.

**Active routinization** included objective blood glucose estimations and strict routinization of daily activities. This strategy seems to be a way of controlling, and managing the disease in daily life which leads to feelings of confidence, but also to anxiety over the uncontrollable and restriction of social activities. Despite a meticulous regimen the patients stated that they sometimes used deliberate temporal distancing as an emotional coping strategy. Active routinization was related to good metabolic control, mean HbA$_1^c$ was 7.3%.

The specific set of coping strategies labelled **passive routinization** included routinized self-monitoring of blood glucose, routinization of daily activities, leaving decisions to others, and believing in authorities. The patients stated that they had to accept the situation and that they did what they were told to do. The emotional outcomes were well-being but also feelings of dependency, and powerlessness. Some patients also produced expressions of shame, above all when they had a feeling of not fulfilling the expectations of others. This set of coping strategies was associated with good metabolic control, mean HbA$_1^c$ was 7.7%.

The set of coping strategies labelled **emotion-based actions**, comprised of a variety of different strategies. The common core was lack of objective blood glucose measurements and reasoning based on emotions. The emotion-based strategies and outcomes were also very individual and difficult to interpret. Statements of well-being were prominent in this group. Metabolic control was poor, mean HbA$_1^c$ was 9.8%.

**DIAGNOSTIC REASONING**

In connection with discussions of interpretations of the interviews between the patients and the researcher (BL), problem areas were identified using the diagnostic reasoning procedure. Plans for nursing interventions were agreed upon and given priority for those patients who wanted to make changes. These plans have to be seen as a first step in an extended plan for nursing intervention (VI).
DISCUSSION

THE PERSON WITH INSULIN-DEPENDENT DIABETES

The reported studies were aimed at elucidating experiences of living with insulin-dependent diabetes. Particular attention was paid to the influence of the disease on daily living, emotions, experiences of well-being and ill-being, and worries about long-term complications. Different coping strategies used by the patients in their daily management of the disease were identified. Patients’ characteristics, smoking habits, coping strategies, and experiential variables were related to metabolic control.

The patients participating in these studies constituted the great majority of a population-based cohort of adult insulin-dependent diabetic patients without serious long-term complications. Those with manifest late complications were not included, since the development of such complications probably adds considerably to psychological strain, and emotional adjustment. It seems urgent important to identify coping strategies and predictors for metabolic control among those who had an opportunity to prevent the development of long-term complications. In order to avoid interference from early psychological reactions to the disease, including crisis reactions in relation to the onset of the disease, patients with an onset of diabetes within the preceding 2 years were not included. Drop outs (11%), did not differ from the participants with regard to sex, age, duration of diabetes or metabolic control. Nevertheless the possibility cannot be excluded that they differ in psychological characteristics.

A model was developed to bring more clarity to the complex and sometimes ambiguous findings in these studies, to obtain deeper insight into complex relationships, and to place the findings in a nursing perspective (Figure 2). The main results will be discussed in relation to the model.

Nursing deals with daily living as it affects and is affected by the functional health status of the individual (Carnevali, et al., 1984). The most important task for caregivers with regard to people with IDDM, is to help the individual to achieve and maintain normalized blood glucose levels, to enjoy well-being, to avoid the development of long-term diabetic complications, and to live in all aspects a "normal" life. In concrete terms this means helping the individual patient to adjust to the demands of the disease in daily living in such a way that interference with the person’s total life goal of life is minimized.

People are alike and different. People are essentially alike in their biophysical make up, in their basic needs, in their lifespan development, and in their need for each other. They differ in their genetic make up and inherent characteristics, and in their coping ability. They have different
experiences and a personal model of their world (Erikson, et al., 1983, pp 54-84). As people with diabetes bear the whole responsibility for the management of the disease, transaction (King, 1981) seems to be of vital importance in nursing for the diabetic patient. Care plans have to be based on mutual agreement between the caregiver and the individual patient.

Figure 2. A model for care for the insulin-dependent diabetic patient.
One of the most important factors that has to be considered in nursing for the diabetic patient is the specific set of coping strategies the individual patient employs in the daily management of the disease. In the study of coping strategies among diabetic patients, a complex relationship was found between problem-focused and emotion-focused coping strategies and their metabolic and emotional outcomes (VI).

The specific set of coping strategies labelled expertise was found to have the best outcome, both in terms of metabolic control and of emotional state. The patients in this group all practised self-monitoring of blood glucose, which has been found to be related to better metabolic control (Colwell, et al., 1990b). They also expressed sensitivity to signs and symptoms of actual blood glucose level, and stated that they based many of their management decisions on these perceptions. Most diabetic patients perceive when blood glucose is too high or too low (Gonder-Frederick, et al., 1986), but there have been discussions in the literature about the validity of the perception of moderately elevated blood glucose levels. However, Cox, et al. (1985) found patients' estimations of actual blood glucose levels to be significantly correlated to actual blood glucose in 7 out of 16 patients under hospital conditions (insulin/glucose infusion) and in 18 out of 19 in home conditions. Gonder-Frederick, et al. (1986) found that the frequency of accurate beliefs about blood glucose was higher than the frequency of inaccurate beliefs in a group of 26 patients with IDDM. There have also been reports of improved accuracy estimations of blood glucose after feed-back training (Gross, et al., 1983; Cox, et al., 1989). Thus for some patients feedback training to acquire more sensitivity to actual blood glucose levels might be one way of improving metabolic control (cf. Cox, et al., 1988).

The patients in the group labelled "Expert", also frequently used logical reasoning based on factual knowledge in their daily management, which emphasises the importance of patient education. They also relied on their earlier experiences, which can perhaps be seen as an expression of self-confidence.

If in accordance with suggestions from Antonovsk (1987), we should learn from those who cope well, we should encourage the patients to use self-monitoring of blood glucose level, try to train awareness of actual blood glucose, give them proper education, and try to enhance their self-confidence. This kind of approach will probably suit many patients.

Routinization was another coping strategy, which seems to be connected with satisfactory metabolic control, but at the expense of emotional well-being. Those patients whose most prominent coping strategy was routinization also reported experiences of powerlessness, feelings of threat, and anxiety about the uncontrollable. These reported feelings might be interpreted as connected to experienced lack of control.
over the disease, and indications that the patients allowed the disease to
direct more of the activities in daily life than they actually wanted it to. It
seems possible that taking more active control over the disease would
benefit these patients, e.g. to train adjustment of insulin doses and food
intake, and to implement plans to increase self-reliance.

The coping strategies labelled ambiguity and emotion based action
were very complex, and the interrelationship between different coping
strategies, emotional outcome, and metabolic control was difficult to
interpret on the basis of available data. Among these patients further
assessments of influencing factors seem to be needed. The result
underscores the need for individualized care.

A question of concern regarding coping is the consistency of a
particular strategy or set of strategies over time. Lazarus and Folkman
(1980) investigated repetitions of coping strategies in relation to stressful
events in daily living, among 100 community residents, during one year,
and found a great interindividual variability.

Logical reasoning based on knowledge was an important component
in some of the coping strategies used. For successful management of
diabetes many kinds of knowledge are necessary. Judgemental knowledge
and knowledge for action seem to be of particular importance for the
daily management of the disease. In this work no attempt was made to
measure knowledge of diabetes, but many patients expressed considerable
knowledge about the disease and its management. Some patients used their
knowledge in their daily management to a high degree, other to a lesser
degree.

Logical reasoning based on earlier experiences was an important
factor connected with successful adaptation, and most of the patients
relied heavily on their experiences when they made decisions about food
and insulin doses. Thus, the patient's own unique experiences, have to be
taken into consideration in the process of transaction.

Self-care can be seen as the base and central core in the daily management
of the disease. In the interview study the patients' daily routines, such as
the nature of, and times for different meals, exercise, times for insulin
injection, injection technique, injection sites, and planning for holidays
were addressed. No attempts were made to judge whether a particular
performance was right or wrong, as this is a very individual thing. Long-
term metabolic control was seen as an outcome criterion for self-care
(VI).

Some habits were found to have a positive influence on the daily
management e.g. regularity in daily life. Other habits such as smoking
were found to be related to poor metabolic control (IV). The nature of
this association was not established, but it is possible that smoking has a
directly adverse effect on metabolic state. The possibility that some
psychological variables could contribute both to poor metabolic control
and smoking, was also addressed. The smokers differed very little from
the non-smokers in several of the measure psychological well-being and attitudes towards the disease and its management. It is not possible to draw any direct conclusions about cause effect relationship, as all the possible confounding variables, such as food intake, exercise and alcohol consumption were not elucidated. However, the results lends further support to the view that patients with diabetes should not smoke. (Lithner, 1984) (IV).

There are many different influencing factors which have to be taken into consideration when caring for the IDDM patient, among them age and development. The way in which individuals respond to the occurrence of diabetes is unique. It depends on the developmental stage and current life situation as well as expectations of the future. For the child the disease may threaten the normal parent-child interaction, as the child can experience the withdrawal of sweets as a punishment. The basic trust can also change to mistrust when the parents have to cause hurt when injecting insulin and drawing a blood samples (cf. Isenberg and Barnett, 1965). Normal adolescence is fraught with problems, the emphasis is on the development of a new identity and on becoming independent. "The additional strains imposed by diabetes may create a nightmare for both the diabetologist and his teenage patient", as Tattersall and Lowe (1981) have described the situation. For the adult the disease might interfere with role performance as a spouse (Jensen, 1985) or parent and with professional career (Friis and Nanjunappa, 1986), and thus interfering with generativity, the seventh of Erikson's (1982) developmental stages. To have to change the routine of daily life might perhaps be most troublesome for the elderly (cf. Jenny, 1984), or the disease might be a further burden for an individual who already has other disabilities and diseases.

In this study (I, II) younger age was significantly associated with feelings of anxiety, insecurity, and lower self esteem. It is not possible, however, to draw any conclusions from these feelings, but it is possible that they can be related to disturbances in "normal" development. There have been other reports on lower self-esteem among diabetic adolescents, indicating the influence of the disease on development (Sullivan, 1978). Young age was also related to the experience of a lack of freedom and more problems in relation to the environment. These findings seem quite logical, as younger individuals are to a greater degree supposed to try new things. Studying adaptation to the disease Jenny (1984) found differences between young, middle and old aged groups; each displayed different profiles in self-care and health motivation.

No consistent relationship between age at onset of the disease and metabolic control or emotional adjustment was found in this study, but it seems reasonable to suspect that contracting such a serious disease as diabetes may influence the solutions to developmental crises, at least in some people. The reported high frequency of anorexia nervosa in persons with IDDM might be an indication of such an influence (Rosmark, et al.,
The age at onset of the disease, might also be of importance when caring for the adult IDDM patient, as earlier experiences are believed to have great influence on adaptation later in life (Erikson, 1982).

The importance of beliefs and attitudes in diabetes management has been the subject of much research (Linn, et al., 1980; Given, et al., 1983; Becker and Janz, 1985). A diabetic person’s attributional style and belief system, (Bloom Cerkoney and Hart, 1980) as well as psychological make-up, (Lane, et el., 1988) have a great impact on the way he or she deals with diabetes and any problems that may arise. Among the 192 diabetic patients involved in this study, many experienced well-being despite a difficult and chronic disease. Both the answers to the well-being measurement, and the daily life questionnaire point in the same direction (I-III). The need for regularity in daily life, both for the patients themselves and in relation to others, seems to constitute the greatest threat to well-being in this group (I). In the interview study many patients also experienced feelings of well-being (VI). No simple relationship could be found between well-being, ("subjective health") and metabolic control ("objective health"). The lack of any relationship between the experience of well-being and metabolic control, are in agreement with other studies (cf. Davis, et al., 1987; Kaplan, 1987), and points to the significance of other outcome variables in addition to metabolic control.

Whereas many diabetic patients expressed well-being, there is also evidence of heavy burden of the disease on other diabetics. The relatively high proportion of patients suffering from tedium, pointing in that direction. The prevalence of tedium in the patient group is comparable with those groups reported to be most exposed to the development of tedium, or burnout, e.g. health care workers. (cf. Pines and Kanner, 1982; Åström, 1990).

People differ in their physiological condition. The only subject within this extensive domain addressed in this work was the influence of menstruation on metabolic control. No convincing evidence of variations in metabolic control, food intake or mood during the menstrual cycle was found. These results obtained in a group-based study to obviate the possibility that occasional diabetic patients do have menstruation-related problems in metabolic control.(V).

The patient has different sources for information and support. Research into the meaning of social support for health is considerable in its extent (cf. Cobb, 1976; Wishner and O´Brien, 1978). The powerful role of family function and social network in adjustment to a diabetic regimen and metabolic control, has been a recurrent theme in the medical and psychological literature, particularly among children. Good family interaction, and a social network have been found to be related to better adjustment to a diabetic regimen and better metabolic control (Andersson, et al.,1981) while negative interactions and lack of social support have been found to be related to poor metabolic control and worse adjustment to a diabetic regimen (Koski and Kumento, 1977; Schafer, et al., 1986).
Although this issue has not been examined in this work many of the patients in the interview study talked about the family as an source of support, particularly for detection of early signs of hypoglucremia. Many patients also stated that the whole family ate the same kinds of food (VI).

THE CAREGIVER

In their professional roles caregivers need to take into consideration how people are alike and how people are different. They also need a knowledge of pathology and how pathology affects the patient's daily life, as well as the influence of different habits, and coping strategies. A proper knowledge of the influencing factors, and the person's resources and coping abilities, is a further example of an important factor relevant to the caregiver.

The caregiver also needs to be aware of the factors that influence her perceptions in a nursing situation. It is important to recognize that the caregiver's current age, development stage, beliefs and attitudes, among other things influence the nursing situation.

TRANSACTION AND DIAGNOSTIC REASONING

Nursing can be seen as a process of action, reaction, and interaction whereby the caregiver and the patient share information about their perception in the nursing situation. (Orlando, 1961; Kasch, 1985; King, 1981). Through purposeful communication they identify problems, specific goals, and concerns. In this situation it is exceedingly important for the caregiver to distinguish between her understanding of general principles and the meaning which they must discover in the immediate nursing situation in order to help the patient (Orlando, 1961). An important element in caregiver-patient interaction is accurate perception of each by the other. In this work the interpretation of the interviews was discussed with the patients, problem areas were identified, priorities were discussed, and therapeutic plans were agreed upon, using the diagnostic reasoning procedure. The intention in the beginning was to develop a nursing diagnosis, but the diagnostic reasoning and the transaction procedures, gave a deeper insight into the need for further elucidation of the complex interaction between psychological, pathophysiological, and behavioral components.

The model for caring for the person with insulin-dependent diabetes, taking into account the people involved, their individual frame of references, their roles, and the process of transaction and diagnostic reasoning, may be a valuable frame for future research and for viewing the unique individual person in a comprehensive perspective.
CONCLUSIONS

The main findings in the studies concerning patients with insulin-dependent diabetes who were free of serious late complications were:

* The majority consider the need for regular hours, diet management, and exercise the greatest problem, in the daily management of the disease.

* A majority of the patients seem to enjoy health and experience of well-being although tedium is also common.

* Patients in good metabolic control do not experience more well-being than those in intermediate or poor control.

* Smoking is associated with impaired metabolic control

* There are no systematic variations in metabolic control, during the menstrual cycle.

* A combination of problem-focused coping strategies, based on self-monitoring of blood glucose and/or estimation of actual blood glucose level, plus sensitivity to bodily sensation, plus logical reasoning is associated with the best metabolic and emotional outcomes

* A model for diagnostic reasoning in nursing based on a transactional nursing theory may be a valuable tool for the caregiver in caring for the insulin-dependent diabetic patient.
GENERAL CONCLUSIONS

The disease is only one part although an important part, in the patient's life situation. Therefore the influence of the disease and its' treatment have to be seen in relation to the persons' total life goal. People are alike, but also different, and nursing for the person with insulin-dependent diabetes has to be individualized.

In insulin-dependent diabetes the goals are to be threefold; a normalized metabolic state, experience of well-being, and freedom from long-term complications. In order to accomplish a positive long-term outcome in health status, all three aspects have to be addressed.

One the insulin-dependent diabetic patient and the daily management of the disease cannot be fully understood when they are studied separately. The constructed model for nursing for the insulin-dependent diabetic patient has to be tested and expanded. Further development of a multifactorial model for diagnostic reasoning in nursing will require large samples and a longitudinal approach. To assess the independent and interactive effects of coping strategies, behavioral and psychophysiological factors on metabolic control, emotional adjustment and development of long-term complications in insulin-dependent diabetes a prospective approach is needed.
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