DIABETIC CONTROL OF ADOLESCENTS AND YOUNG ADULTS WITH TYPE 1 DIABETES

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Diabetic control, which comprises insulin administration, dietary management, regular exercise and frequent self-monitoring of blood glucose, is a difficult performance especially in adolescents and young adults with type 1 diabetes as they are simultaneously in a physiopsychosocial changing period. The purposes of this study were to examine the diabetic control and the obstacles to diabetic control of adolescents and young adults with type 1 diabetes. The sample comprised of 30 adolescents and young adults who attended the diabetic clinic at King Chulalongkorn Memorial Hospital. They were interviewed by a structured interview form and data were analyzed by content analysis.

The results revealed that the majority of the samples took insulin administration incorrectly, particularly in the items of the timing for injection, where it was found that 93.3% of the samples took insulin at different times, and 88% of the samples took insulin less than 30 minutes before meals. When considering the adjustment of insulin it was shown that 50% of the samples had self-adjusted their insulin dose, further, about 23.3% of the samples took insulin irregularly. While the most common obstacles for insulin administration were management problems (83%) and inadequate realization about diabetic complications (53.3%). For dietary management, the majority of the samples had bad control in their eating (53.3%). The most common obstacles were lack of self-control and inconvenience when eating out (83.3% and 56.7% respectively). For physical exercise, most of the samples did not perform any physical exercise (63.3%) for which lack of a companion for exercise was the most common obstacle for exercise (33.3%). Finally, the majority of the samples had a device for self-monitoring of blood glucose (66.7%) but most of them did not monitor their blood glucose (45%). The most common obstacle for this aspect was inconvenience to monitor and pain intolerance which represented 60% and 43.3% respectively.

These findings suggest that diabetic education should provide skills to solve the problems of diabetic control that occur in their daily life-style and affiliate it with strategies to promote the 4 aspects of the diabetic control as mentioned above.

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เฉลาศรี เสงี่ยม : การควบคุมเบาหวานของวัยรุ่นและหนุ่มสาวที่เป็นโรคเบาหวานชนิดที่ 1 (DIABETIC CONTROL OF ADOLESCENTS AND YOUNG ADULTS WITH TYPE 1 DIABETES) คณะกรรมการควบคุมสารนิพนธ์ : บังอร ผลเนืองมา, M.S., สุวิมล กิมปี, ค.ม. 97 หน้า. ISBN 974-664-219-7

การควบคุมเบาหวานซึ่งประกอบด้วย การฉีดอินสุลินที่ถูกต้อง การรับประทานอาหารที่เหมาะสม การออกกำลังกายอย่างสม่ำเสมอ และการตรวจน้ำตาลในเลือดด้วยตนเอง เป็นสิ่งที่ยากต่อการปฏิบัติ โดยเฉพาะผู้ป่วยเบาหวานที่อยู่ในช่วงวัยรุ่นและวัยหนุ่มสาวที่มีการเปลี่ยนแปลงหลายด้านพร้อมๆกัน ทั้งด้านร่างกาย จิตใจ อารมณ์ และสังคม การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาการควบคุมเบาหวานและอุปสรรคต่อการควบคุมเบาหวานของวัยรุ่นและหนุ่มสาวที่เป็นโรคเบาหวานชนิดที่ 1 กลุ่มตัวอย่างเป็นผู้ป่วยเบาหวานชนิดที่ 1 ที่มารับการตรวจรักษาที่แผนกตรวจโรคเบาหวาน โรงพยาบาลจุฬาลงกรณ์ จำนวน 30 ราย กลุ่มตัวอย่างดังกล่าวถูกสัมภาษณ์โดยใช้แบบสัมภาษณ์ชนิดมีโครงสร้าง วิเคราะห์ข้อมูลโดยการวิเคราะห์เนื้อหา

ผลการศึกษาพบว่า วัยรุ่นและหนุ่มสาวที่เป็นโรคเบาหวานชนิดที่ 1 มีการควบคุมเบาหวานด้านการฉีดอินสุลินไม่ถูกต้อง โดยเฉพาะด้านเวลาในการฉีดอินสุลิน ซึ่งพบว่า ร้อยละ 93.3 ของกลุ่มตัวอย่างฉีดอินสุลินในเวลาที่ไม่ตรงกันในแต่ละวัน และร้อยละ 88 ของกลุ่มตัวอย่างฉีดอินสุลินก่อนมื้ออาหารน้อยกว่า 30 นาที เมื่อพิจารณาด้านปริมาณอินสุลินที่ฉีด พบว่า ร้อยละ 50 ของกลุ่มตัวอย่างปรับลดปริมาณอินสุลินด้วยตนเอง นอกจากนั้นยังพบว่า ร้อยละ 23.3 ของกลุ่มตัวอย่างละเลยการฉีดอินสุลินอย่างต่อเนื่อง ขณะที่อุปสรรคที่พบมากที่สุดคือ ไม่วางแผนจัดเวลาในการฉีดอินสุลิน (ร้อยละ 83) , ไม่ตระหนักถึงอันตรายของภาวะแทรกซ้อนในระยะยาวจากเบาหวาน (ร้อยละ 53.3) ด้านการควบคุมอาหารพบว่าส่วนใหญ่ของกลุ่มตัวอย่างไม่ควบคุมอาหาร (ร้อยละ 53.3) ซึ่งอุปสรรคที่พบมากที่สุด คือ ไม่สามารถหักห้ามใจตนเองได้ และไม่สะดวกเมื่อรับประทานอาหารนอกบ้าน (ร้อยละ 83.3 และ 56.7 ตามลำดับ) ด้านการออกกำลังกายพบว่า ส่วนใหญ่ไม่มีการออกกำลังกาย (ร้อยละ 63.3) โดยอุปสรรคที่พบมากที่สุดคือ ไม่มีเพื่อนในการออกกำลังกาย (ร้อยละ 33.3) สุดท้ายคือด้านการติดตามประเมินผลการควบคุมเบาหวาน พบว่าส่วนใหญ่ของกลุ่มตัวอย่างมีอุปกรณ์ตรวจน้ำตาลในเลือดด้วยตนเอง (ร้อยละ 66.7) แต่โดยมากตรวจน้ำตาลในเลือดไม่สม่ำเสมอ (ร้อยละ 85) ซึ่งอุปสรรคที่พบ คือ ไม่สะดวกในการตรวจน้ำตาลในเลือดเมื่ออยู่นอกบ้าน และไม่สามารถทนต่อความเจ็บปวดจากการตรวจน้ำตาลในเลือดได้ (ร้อยละ 60 และ 43.3 ตามลำดับ)

จากผลการศึกษาในครั้งนี้ มีข้อเสนอแนะว่าในการให้ความรู้ผู้ป่วยเบาหวาน ควรมีการฝึกทักษะการแก้ปัญหาอันเกิดจากการควบคุมเบาหวานในการดำเนินชีวิตประจำวัน ร่วมกับใช้กลวิธีต่างๆในการส่งเสริมการควบคุมเบาหวานทั้ง 4 ด้านดังกล่าว

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CHAPTER I

INTRODUCTION

Background and Significance of the Study

Type 1 diabetes or insulin dependent diabetes mellitus (IDDM) is a serious chronic illness that always occurs in young people. It results from inflammatory destruction of the beta cells of the pancreas , leading to essential complete loss of the ability to synthesis and release insulin so the diabetics require insulin therapy by injection through their lives. People with diabetes are at 2-4 fold increased risk of myocardial infarction and stroke. Diabetes is the most common cause of blindness with it's onset in working age adults, and of non-traumatic amputations, and is the leading single cause of end-stage renal disease requiring dialysis and transplantation (Cryer, 1999 : 12) . On the other hand, it is also the leading cause of peripheral and autonomic neuropathy that makes the patients suffer from those symptoms (Tamborlane & Ahern, 1997 : 285).

The result of the diabetes control and complications trial (DCCT , 1993 : 983) demonstrated that intensive management which comprises multiple insulin injections and self monitoring of blood glucose is able to lower blood glucose level and glycosylated hemoglobin ($HbA1_c$) to levels that are close to normal and markedly lowers the risk for the progression of the microvascular and neuropathic complications of IDDM. From those findings the current therapeutic approaches to management of

the patients with type 1 diabetes are built on that supposition. Nevertheless, insulin injection still cannot mimic physiological in insulin releasing by the pancreas in nature, the diabetics required implementation of a complex and highly demanding therapeutic programs that have to carried out primarily by themselves (Pat Mahachoaklertwattana, B.E.2542:40 ; Drash & Becker, 1991:922). Therapeutic programs for good metabolic control in patients with type1 diabetes comprises insulin administration, dietary management, physical exercise and the evaluation of glycemic control (Supawadee Likitmaskul, B.E.2542:20 ; American Diabetes Association, 1999 : S32). There is a widespread agreement that diabetes in adolescents and young adults makes day-to-day diabetes management especially difficult. Tamborlane and Ahern (1997 : 285) conclude that diabetes in adolescents presents a formidable challenge to health care providers. Because of the combination of the severe degree of insulin deficiency compared with non-insulin dependent diabetes mellitus (NIDDM) and the physical and psychoemotional changes that accompany normal growth and development. In addition, diabetes management requires a degree of responsibility and behavior control which is contrary to the characteristic of adolescents. The daily demands of diabetes have an impact on the personal and public lives of adolescents, and an interaction with vital development tasks such as independence, body image, identity, sexuality, responsibility and self-esteem (Daneman & Frank, 1996:694).

A variety of studies have demonstrated that psychosocial factors, such as stress and coping styles, during the period of adolescence are often associated with neglect of self monitoring, dietary recommendations, and insulin injections (Gray et al, 1998:902). In Dunning's perspective, diet management and insulin injection seem to be an obstacle for adolescent's life style (1994 : 129). Srisamai Viboolyanont (B.E.

2542 : 60-61) has suggested that adolescents with type 1 diabetes begin to neglect diet management which they had controlled well in childhood because they prefer fast foods and junk foods like other adolescents.

Not only adolescents but young adults or those in early adulthood also have difficulties with diabetic control. Diabetic treatment in these years can often conflict with normal developmental tasks as the young adults are faced with increasing worries concerning current and future health, as well as employability as a direct result of the diabetes (Anderson & Laffel ,1997:822). At period of life is often thought that to begin separating from the parents, seeking education and a career, and finding a partner with whom to share one's life are the major developmental tasks to be accomplished. (Fain & D'Eramo-Malkus, 1996: 729-730).

Drash and Becker (1991:933) have concluded that the following evidence are barriers to accepting the therapeutic program of the young person with diabetes. For example, restrictive therapeutic programs which are intrusive, and demand major alterations in life style. Also, chronic complications that diminish the patient's physical capacities and diminish life expectancy further alter the patient's plans for the future. Cryer (1994:1378) has said that hypoglycemia remains one of the most important barriers to the achievement and maintenance of near normal blood glucose levels in type 1 diabetes. This is because hypoglycemia results in frightening loss of control and makes young people with diabetes face a life filled with hazards.

Parents and health care providers also play a role in adolescent noncompliance. As teenager mature, there is often a mismatch between what is expected of them in terms of independent self-care and their own interest and capabilities in this regard. Establishment of unrealistic goals for adolescent frequently results in premature

withdrawal of active parental involvement in daily diabetes management, contributing to poor adherence and poor metabolic control. (Danemann & Frank, 1996:712).

The daily demands of diabetes are complex, requiring technical competence with comprehension of complicated concepts of blood glucose balance. Knowledge about diabetes and the self-management is a prerequisite for self-care. Thus, inadequate knowledge will potentially have an impact on metabolic control (Danemann & Frank, 1996:710). From the same perspective, Coates and Boore (1996:99) have suggested that in order to manage diabetes, individuals must understand their medications and diet and know how to modify them according to exercise. They need to know how to monitor their blood glucose levels, and how to modify their regimen during illness or disruption of normal routine. One of the reasons why people do not manage their diabetes fully may be lack of knowledge.

About 80% of adolescents and young adults with type 1 diabetes in the diabetes clinic at King Chulalongkorn Memorial Hospital have poor diabetes control determined by the measuring of glycosylated hemoglobin ($HbA1_c$) concentration that is more than 8% different from American Diabetes Association's recommendation. (ADA, 1999: S32). Indeed, those young people with type 1 diabetes have the likelihood of the development of increasingly severe chronic complications that may impair vision, renal function, and neurological status, and that may also result in a decrease in life expectancy in adulthood. Extracting from adolescents and young adults issues that are interfering with their ability to care for their diabetes and which serve as the obstacles for diabetic control can solve the problem of poor diabetic control in this group. The goal of this study is to develop nursing services which help promote diabetic control of adolescents and young adults with type 1 diabetes not only

to prevent and ameliorate severe chronic diabetic complications, but also help them to develop skills and to have a positive approach to day-to-day living with their diabetes.

Research question

1. How do adolescents and young adults with type 1 diabetes control their diabetes?

2. What are the obstacles to diabetic control of adolescents and young adults with type 1 diabetes?

Purposes of the Study

1. To describe insulin administration, dietary management, physical exercise, and self-monitoring of blood glucose of adolescents and young adults with type1 diabetes.

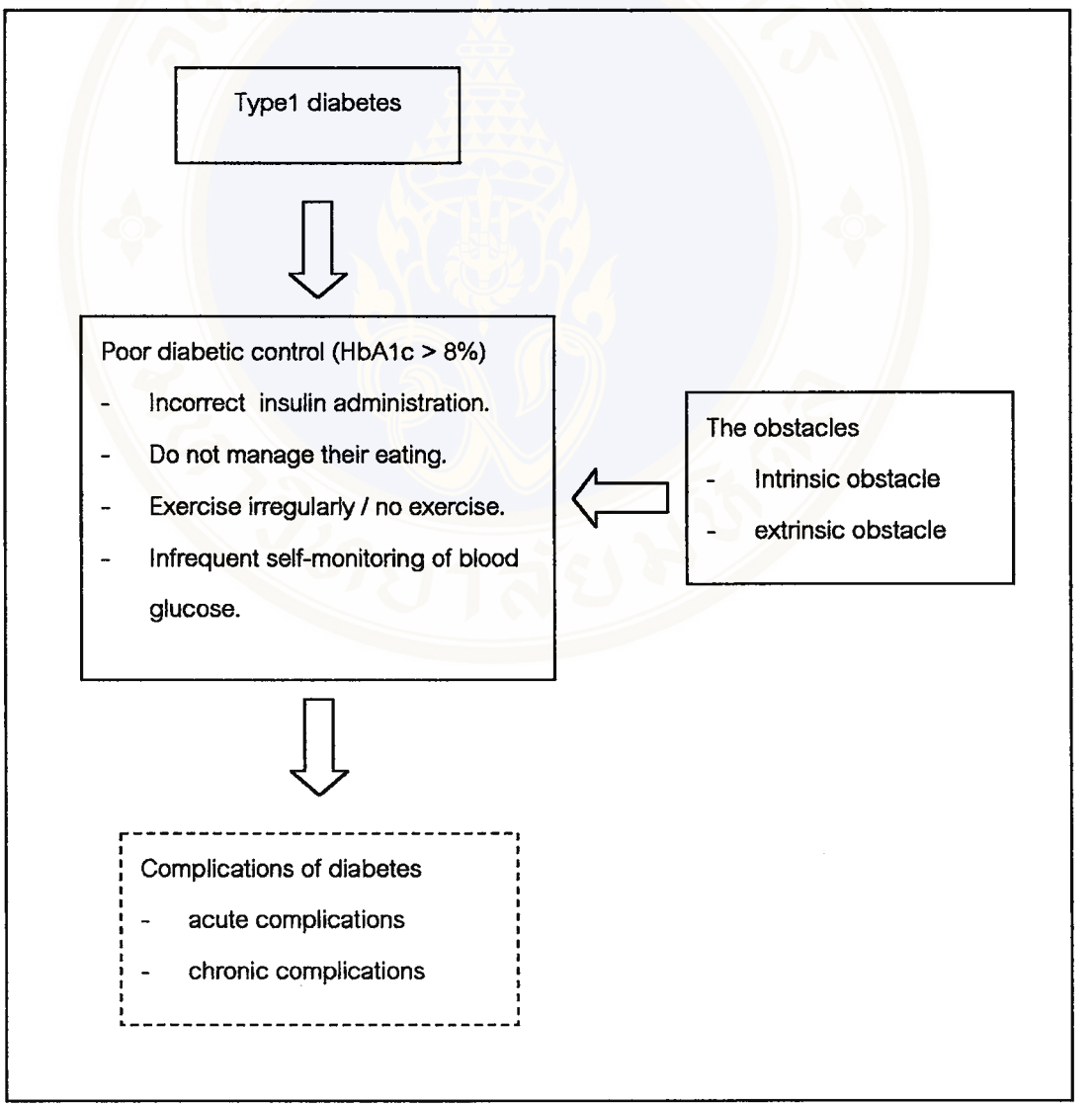
2. To explore the obstacles to insulin administration, dietary management, physical exercise, and self-monitoring of blood glucose of adolescents and young adults with type1 diabetes.

Conceptual framework

This study aimed to study the diabetic control and the obstacles to diabetic control of adolescents and young adults with type 1 diabetes. Diabetic control in type 1 diabetes consists of insulin administration, dietary management, physical exercise and self-monitoring of blood glucose. Good diabetic control can prevent and ameliorate acute and chronic complications from diabetes which is the important goal in current diabetic management. However the investigator believes that adolescents

and young adults with type 1 diabetes do not manage their diabetes very well which may be due to obstacles, both intrinsic and extrinsic. Intrinsic obstacles are, for instance, characteristics and the bio-psycho-emotional factors of a person in the period of adolescence and young adulthood. While extrinsic obstacles are, for instance, family environment, and peer group environment as shown in figure 1.

Figure 1 : Conceptual framework



Scope of the study

This study focused on the diabetic control and the obstacles to diabetic control of adolescents and young adults with type 1 diabetes aged 15-25 years who have poor diabetic control. The samples were type 1 diabetic patients who attended the diabetes clinic of the out patient department at King Chulalongkorn Memorial Hospital.

Expected Outcomes and Benefits from the Study

To improve and develop nursing services in promoting good diabetic control of adolescents and young adults with type 1 diabetes attending the diabetes clinic at King Chulalongkorn Memorial Hospital.

Definition of terms

Diabetic control refers to activities that adolescents and young adults have to perform in order to achieve optimal metabolic control. Those activities consist of : 1) insulin administration, 2) dietary management, 3) physical exercise and 4) self-monitoring of blood glucose. The instruments used in this study were the interview about diabetic control, the diabetic control manual for patient with type 1 diabetes, and the logbook for recording dietary recall and insulin injection within one week.

The obstacles to diabetic control refer to the factors causing difficulties or which served as barriers to diabetic control of adolescents and young adults with type 1 diabetes. The instrument used in this study was the interview which was developed by the investigator to find out the obstacles to diabetic control of adolescents and young adults with type 1 diabetes in 4 aspects which are : 1) insulin administration, 2) dietary management, 3) physical exercise and 4) self-monitoring of blood glucose.

CHAPTER II

LITERATURE REVIEW

In this chapter, the investigator had searched relevant information and collected several study findings. It consisted of subjects as follow:

- Development of adolescents and young adults.
- Relationship of diabetic control and chronic complications of diabetes.
- Components of diabetic control in patient with type 1 diabetes.
- Obstacles to diabetic control of adolescents and young adults with type 1 diabetes.

Development of Adolescents and Young Adults.

Adolescent is a time of rapid biologic change accompanied by increasing physical, cognitive and emotional maturity. Su-cha Chun-em (B.E. 2541 :50) has suggested that adolescent aging 13-20 years, which in this period body image is of paramount importance and the struggle for autonomy and control of personal destiny become more prominent. This period is often associate with varying degree of parental conflict as the peer group replaces parental influence and sets behavioral standards. They beg for more freedom and responsibility; rules and limitations are frequently challenged. Conflict develops when the new values of the adolescent clash with the existing family values. (Danemann & Frank, 1996: 691-693).

There are four basic developmental tasks that adolescents usually address which are emancipation from parents and other significant adults, economic independence, psychosocial differentiation and the adult sexual role, and stable adult self-identify in conformity with society (Travis ,et al.,1987:193).

Young adulthood is a time when one searches for a place in society. Finding a mate, establishing a family, and initiating a career are major tasks to be accomplished. Young adults encounter another type of risk to health : the pressure of achievement oriented stress that often causes "workaholic" habits, including lack of sleep and omission of meals. Erickson has identified the development of self-esteem as major tasks during young adulthood. A sense of being open and capable of trusting others develop through the formation of the intimate relationships. Young adults search for continuing and individuals in their lives to provide meaning. Those who are unsure of their identity may shy away from intimate contact with others, which are result in loneliness. Those with diabetes may be concern about the quality of life and the impact of diabetes on establishing meaningful interpersonal relationships. (Fain & D' Eramo-Malkus, 1996 : 730-741).

Relationship Between Diabetic Control and Chronic Complications of Diabetic

The discovery of insulin in 1922 and its introduction into routine therapy of type 1 diabetes patients soon thereafter literally have saved the lives of thousands of individuals with diabetes mellitus who would have otherwise died within weeks or months of diagnosis (Drash & Becker, 1991:922). According to those discoveries, children with diabetes have survived into adulthood. It did not take so long to discover that they faced a variety of degeneration complications (Tamborlane & Ahern ,1997:

285).As severity of complications, the clinicians try to study the relation of diabetic control and development of complications widely.

One study that has accepted widely is the diabetes control and complications trial (DCCT) that is the randomized clinical trial designed to compare the intensive with the conventional therapy with regard to their effects on the development and progression of the complications of IDDM. The intensive therapy consists of three or more daily insulin injections, while conventional therapy consists of one or two insulin injections daily. The result has demonstrated that intensive therapy delays the onset of retinopathy, nephropathy and neuropathy, by the range of 35-70 %. Unfortunately, the benefits of intensive insulin therapy are accompanied by an increased risk for becoming overweight and hypoglycemia. Therefore, they has recommended that most patients with type 1 diabetes should be treated with closely monitored intensive regimens, with the good of maintaining their glycemic status . (DCCT research group, 1993).

Components of Diabetic Control in patient with type 1 diabetes.

Type 1 diabetes is a chronic illness that requires continuing self-management program to achieve near or normal blood glucose levels to prevent acute complications and to reduce the risk of long-term complications which include: 1).insulin administration , 2).dietary management , 3).physical exercise , and 4).self-monitoring of blood glucose (American Diabetes Association, 1999: S32; Supawadee Likitmaskul, B.E.2542:20)

1. Insulin administration

The principal goal of the use of insulin therapy in type 1 diabetes is the elimination of the clinical symptoms of hyperglycemia and the prevention of the diabetic ketoacidosis and hyperosmolar coma. Secondary goal includes the restoration of lean body mass and exercise capacity. The following are recommendations for practical aspects of insulin used (Rosenzweig , 1994: 465,473).

Site and rotation of injection

Many studies have shown that insulin is absorbed faster from the abdomen than from the leg or arm, resulting in a more rapid attainment of peak concentrations in the circulation such as the Pickup & William's suggestion, injection into the abdomen may be better for preprandial injections of short acting insulin and into the thight for intermediate acting insulins (1997: 33-9). Injection of insulin into areas with little subcutaneous fat may result in intramuscular administration which is painful associated with more rapid insulin absorption and can cause tissue scaring. It is now recommended that patients should rotate their injection sites within the particular anatomic region rather than between regions.

Insulin injection technique

Before injecting, an appropriated area of skin is wiped with 70% alcohol. The skin is gently pinched , the syringe is held and the needle is pushed directly through the skin into the subcutaneous tissue at a perpendicular angle. The plunger is pushed all the way down without drawing back. In extremely thin individual may be necessary to inject at a 45 degree angle to avoid intramuscular injection. Disposable syringes can be reused for several injections before the needle become blunt. It is safe to reuse for up to 7 days and the needle should be recapped .

Pickup and Williams (1997: 33-9) has recommended the use of insulin pen 'Pen injector', which is originally introduced to facilitate multiple daily injections. If the needle is left on the pen between the injection air may enter the insulin reservoir. This can slow the delivery of the dose and so cause wastage of insulin after the needle is withdrawn. To avoid this problem, The needle should be primed be expelling 2-4 unit with the pen held vertically and needle upward before each injection, and it should not be withdrawn immediately after the insulin has been administered. Massage the injected site can increase the rate of insulin absorption since it increases local skin temperature (in hot baths or very hot weather for example)

Storage

Once the Insulin is used, the vial can be kept at room temperature for 6 to 8 weeks without loss of potency. Extremes in temperature should be avoided, especially during travelling. Vials of insulin should not be frozen. Unopened vials or cartridges should be stored in the refrigerator at about 2-8 ° C. However in our country the weather is rather hot than the western country so the patients should keep insulin vial within icebox during travelling. This recommendation does not include insulin pen because the amount of insulin in the cartridges is not too much so it can restore its potency in room temperature for few days.

2. Dietary management

According to Crapo's suggestion ; the primary goal of therapy for persons with type 1 diabetes is the maintenance of appropriate body weight and precaution of hypoglycemia and hyperglycemia (1994: 416). The nutritional recommendation for the patients with type 1 diabetes have been issued by the American Diabetes Association (1999 :S 42-S45) as the following.

Calories

Calories requirement for person with diabetes is not different from those without diabetes. The recommended caloric level is based on an individual's desired weight and activity patterns. Srisamai Viboolyanont (B.E. 2542 :54) has recommended that there are 2 choices to estimate desirable body weight:

1) men = (height in centimeter – 100) x 0.9

women = (height in centimeter – 100) x 0.8

2) men = height (in centimeter) – 100

women = height (in centimeter) – 100 – (10% of remainder)

If the patient is overweight, the fist method is recommended, and the latter for those with normal weight or lean. Walai Intrarampan (B.E. 2540 :47) suggested 29-35 and 33-40 Kilocalories per kilograms of ideal body weight for woman and man respectively.

Carbohydrate

The calories gained from carbohydrate is varied and is based on the individual's eating habits and the plasma glucose and lipid level. Fruit and milk have been shown to have a lower glycemic response than most starches, and sucrose produces a glycemic response similar to that of bread, rice and potatoes. Although various starches do have different glycemic response from a clinical perspective, first priority should be given to the total amount of carbohydrate consumed rather than the source of the carbohydrate. The calories and carbohydrate content from all nutritive sweeteners such as sucrose, fruit juice, honey must be accounted for in the meal plan and have potential effect on blood glucose levels.

Protein

The protein intake recommendation for the diabetes is 10-20 % of daily caloric intake that can be derived from both animal and vegetable source. With the onset of overt nephropathy, the general consensus is to prescribe a protein intake of approximately the adult recommended dietary allowance (RDA) of 8 gram per kilograms of bodyweight per day (~ 10% of daily calories).

Fat

The recommended percentage of calories from fat is depend on identified lipid problems and treatment goals . In general should limit fat intake to less than 30% of total calories with saturated fat restricted to less than 10% of total calories. Polyunsaturated fat intake should be less than 10% of calories with monounsaturated fat in the range of 10-15% of calories. Polyunsaturated fat of the omega-3 series are provided naturally in fish and other seafood, and the intake of these foods need not to be curtailed in people with diabetes.

Alcohol

The same precaution regarding the use of alcohol that apply to the general public also apply to people with diabetes. Dietary guidelines for American has recommended no more than two drinks per day for men and no more than one drink per day for woman (one alcoholic beverage = 2 fat exchange).

It is recommended that patient with type 1 diabetes should eat at consistent times synchronized with the time-action of the insulin used.

3. Physical exercise

The benefits that person without diabetes gain from an exercise are improved fitness and psychology state, decreased adipose tissue stores, and weight control. For person with diabetes, exercise has additional benefit ; for example, increase insulin sensitivity which results in a reduction in insulin dosage, and a reduction of risk factors for atherosclerosis (Franz,1996:174). In addition, Landt,et al.(1985:461)has suggested that exercise helps adolescent with diabetes get better self-image. However, caution must be advised to patient with developing chronic complication from diabetes to undertake an exercise (Horton, 1988:201). Hypoglycemia is the most frequent complication of exercise in people with type 1 diabetes. The following are strategies to assist person with type 1 diabetes to exercise safety (Franz , 1996:181-182).

1. Blood glucose testing before and after exercise is essential.

2. Food intake may need to be increased to accommodate exercise. In general, 15 grams of carbohydrate should be taken before or after 1 hour of moderate activity.

3. Strenuous exercise over an extended time requires a decreased insulin doses.

4. Peak time of injected insulin and possible decrease in blood glucose levels with exercise at that time should be considered.

5. Injected sites are not a major concern unless the injection is given in a part of the body that will be exercising immediately.

6. Patient should carry identification and a source of readily available carbohydrate.

For athletes with type 1 diabetes, hypoglycemia can be prevented by the recommendations in Table 1

Table 1 Suggested guidelines for making food adjustments for exercise for individual with type 1 diabetes. Modified from Franz (1996:181)

Type of exercise	Blood glucose	Increased food intake by
Low to moderate intensity (walking or leisurely bicycling <30 min.)	<100 mg/dl.	10-15 g. of carbohydrate / hour
	100 mg/dl.or above	Not necessary to in crease food
Moderate intensity (1 hr. of tennis, swimming, jogging, leisurely bicycling)	<100 mg/dl.	25-50 g. of carbohydrate before exercise, then 10-15 g. per hour of exercise.
	100-180 mg/dl.	10-15 g.of carbohydrate.
	180-300 mg/dl.	Not necessary to increase.
	>300 mg/dl.	Do not begin exercise, until blood glucose is better controlled.
Strenuous exercise (1-2 hr. of football, basketball, strenuous bicycling or swimming)	<100 mg/dl.	50 g. of carbohydrate, monitor blood glucose carefully.
	100-180 mg/dl.	25-50 g. of carbohydrate.
	180-300 mg/dl.	10-15 g. of carbohydrate.
	>300 mg/dl.	Do not begin exercise, until blood glucose is better controlled.

4. Self-monitoring of blood glucose.

According to Travis, et al.(1987:42) who has suggested that in order to integrate diabetes into daily living, the patient must have the knowledge and skills appropriately to perform insulin injection, dietary management and exercise. The outcome management of those performance must be monitored and is best monitored by auditing records especially by self-monitoring of blood glucose.

Rosenzweig (1994:475) has suggested that patient with two injections daily may monitor once or twice a day, in patient with intensive insulin regimens, self – monitoring of glucose is generally performed at least four time a day (before each meal and at bed time). According to Pickup and William's recommendation (1997:33.10); the fingers are usual sites of sampling. The sites of the distal phalanges are less sensitive than the pulp of the fingertip, which should be avoid, while sampling to near the nail may increase the risk of infection. The use of spring-load finger-pricking devices is strongly recommended. It is essential that a single drop of blood obtained is large enough to cover the whole of test area of the strip and should be dripped on the strip in one motion, not wiped onto it. The timing and method of wiping the blood off the strip should be performed as recommended by the manufacturer.

The desired outcomes of glucose control in type 1 diabetes have shown in Table 2 (American Diabetes Association,1999:S33).

Table 2 Glycemic control of people with type 1 diabetes.

Biochemical index	Normal	Goal	Additional action suggested
Preprandial glucose (mg/dl)	<110	80-120	<80 >140
Bedtime glucose (mg/dl)	<120	100-140	<100 >160
HbA_{1c} (%)	<6	<7	>8

The obstacles to diabetic control of adolescents and young adults with type 1 diabetes.

There is abundant evidence that many adolescents and young adults with type 1 diabetes, most of the time, are non-adherence with one or more aspects of their diabetic control. Several factors which serve as the obstacles to diabetic control in this age group need to be addressed. For clearly understand, the obstacles will be classified into 2 types : Intrinsic obstacles and extrinsic obstacles.

1. Intrinsic obstacles

1.1 Psychosocial issue

Daneman and Frank (1996:712) have said the factors accounting for non-adherence are best understood within the context of normal adolescent development. Attitudes of experimentation, rebellion, and risk taking are often associated with the teen's struggle to control his or her own destiny. It has been suggested that among

adolescents with type 1 diabetes, management issues are becoming battleground on which the struggles for independence is fought . This conclusion concurs with Fort and Lifshitz's opinion that very few adolescents readily accept recommended restrictions imposed by their parents for regulating their disease, especially when such demands interfere with their life-style and make them different from their peers (1992:152).

Furthermore, Anderson and her colleagues have said that "Fundamental conflicts exist between the tasks of managing diabetes and the young adolescent striving to be comfortable with a rapidly maturing body, to define and identity autonomous of parents and to be positively accepted by peers" (1989:179). Fort and Lifshitz (1992:152) have pointed out that management of the metabolic condition of many adolescents with type 1 diabetes is more difficult than that of preadolescent . Although hormonal changes leading to insulin resistance may play a role in this problem, behavioral changes inherent to adolescence are thought to be more important and more likely to affect the metabolic control in adolescents.

In the view of young adults with type 1 diabetes, Fain and D'Eramo-Mulkus (1996:730,731) have said that young adulthood is a time when one search for a place in society. Finding a mate, establishing a family, and initiating a career are major tasks to be accomplished, then they counter another type of risk to health: the pressure of achievement-oriented stress that often causes "workaholic" habits, including lack of sleeps and omission of meals. These behaviors are the factors that make young adults have difficulty adhering to their diabetic control.

Anderson and Laffel (1997:822) have pointed out that the needs of diabetes treatment at this age can often conflict with normal developmental tasks as a young adult is faced with increasing worries concerning current and future health, as well as

insurability and employability as a direct result of the diabetes and faced with decisions concerning sexuality and parenting.

1.2 Complications of diabetes issue

Young people with diabetes often steer a perilous course between ketosis and hyperglycemia on one hand and hypoglycemic episodes on the other (Fort & Lifshitz , 1992:152). Youngster's concern is not for the future, rather, they are more interested in avoiding any situation where they feel out of control, singled out, or inconvenienced such hypoglycemia episodes. Thus overeating and insulin manipulation may represent their attempt to prevent even the mildest hypoglycemia reactions (Daneman & Frank , 1996:702).

2. Extrinsic obstacles

2.1 Family functioning

Johnson and Rosenbloom (1982:359) have stated that high levels of conflict, disorganization , and poor supervision within the family appear to be linked to poor health and adjustment to diabetes. In addition, in some families, parents can either implicity or explicity support the non-compliant relating to their unwillingness to admit that either their children or they themselves may be less than "perfect" (Daneman & Frank , 1996:713).

2.2 Financial issue

Diabetes mellitus imposes enormous social and financial as well as medical burden. One of the most frequently reported barriers to accepting the treatment regimen is not having the glucose testing device available (Ary,et al.,1986:69 ; American diabetes Association,1999:S77) which is in accordance to the study finding

of Pongthip Pothiwara (B.E.2529:84) that most of the patients with IDDM. has problems in diabetic control , most of these have financial problem (66.7%), patients with adequate monthly income have better compliance when compare to those with inadequate monthly income. In addition, Pat Mahachoaklertwattana (B.E.2542:49) has said that dominant problem in diabetic control is self-monitoring of blood glucose as the cost of glucose testing device is too expensive , almost all the glucometer cost more than 5,000 baht and the strip cost about 30 baht each .If testing 4 times daily, patient must pay 120 baht per day or 3,600 baht monthly.

2.3 Diabetic knowledge

The American Diabetes Association (1999:S77) has pointed out that one barrier to self-monitoring of blood glucose is inadequate understanding about the benefits and proper use of self-monitoring of blood glucose results. A number of research studies about knowledge in relation to diabetes have been reviewed by Brown (1990:55) and she has viewed that the knowledge of people with type 1 diabetes may be inadequate to undertaken an active role in their care, she has concluded that a low level of diabetic knowledge may be assumed as a result of poor control.

As mentioned above, good metabolic control can be prevented and delay the progression of complications of diabetes. The diabetic control of patient with type 1 diabetes consists of insulin administration, dietary management, physical exercise, and self-monitoring of blood glucose, however, many of adolescents and young adults with type 1 diabetes are non-adherence with one or more aspects of those management program with leading to poor diabetic control and developing long-term complications in the future. There are various obstacles either intrinsic and extrinsic which affect the

diabetic control of young people with type 1 diabetes . It is important to examine the diabetic control and find out those obstacles in order to develop strategies to promote good diabetic control of diabetes in these age groups.

CHAPTER III

METHODOLOGY

Research design

This study was a survey research which aimed to examine the diabetic control and the obstacles to diabetic control of adolescents and young adults with type 1 diabetes.

Population and sample setting

Population

The population of this study consisted of the adolescents and young adults aged 15-25 years, both male and female, diagnosed to be diabetes type 1 who were attended at the diabetic clinic, out patient department, King Chulalongkorn Memorial Hospital.

Sampling

The sample of this study were 30 adolescents and young adults with type 1 diabetes cases who were attended at the diabetic clinic, out patient department, King Chulalongkorn Memorial Hospital. The purposive sampling method was used to select the sample. The inclusion criterion for the required samples was poor diabetic control patients determined by the mean level of $HbA1_c$ which was more than 8% in the 6 months period prior to the study.

Setting

The data were collected from the diabetic clinic, out patient department of King Chulalongkorn Memorial Hospital which provided care for diabetic patient on Monday to Friday at 07.00-12.00 a.m. The diabetic education room in the clinic was used as an interview room.

Instrumentation

During the study, the following tools were used for the collection of patient data:

1. The diabetic control manual for patient with type 1 diabetes. This tool was a criterion to indicate the correct diabetic control which comprised of insulin injection, diet and exercise management, blood glucose evaluation. This tool was created from knowledge obtained from the literature review and relevant research studies. The validity of the contents of this assessment tool was checked by one physician expert in diabetology.

2. The interview about diabetic control and the obstacles to diabetic control of adolescents and young adults with type 1 diabetes, consisted of :

Part 1: Demographic data, composed of age, gender, duration of diabetic, level of education, occupation, household income, marital status, condition of diabetic control with indicated by HbA1c, number of hypoglycemic episodes, ketoacidosis symptoms and the chronic complications detectable. The condition of diabetic control was collected from the patient's record of the hospital system.

Part 2: Opened-end interviews with objective of finding the details of diabetic control, and the obstacles to diabetic control in each aspect of diabetic control which are as follow:

1. The insulin administration aspect.

This aspect gave details about the insulin administration, such as the continuance, dosage, timing, injected area, injection method and the storage of insulin.

2. The dietary management aspect.

This aspect gave details about the food and beverages, which the subjects had to participate to record the dietary recall within one week, as well as record the insulin injection time in relation to meal times. The subjects would be given a logbook to record the facts about meals and the insulin injection times.

3. The physical exercise aspect.

This aspect gave details about the type of sports or physical exercise, and the practice of consumption behavior while exercising, and blood sugar monitoring, and insulin injection before, during and after exercise and strategies to cope with hypoglycemic episodes during exercise.

4. The blood glucose evaluation.

This aspect gave details about home monitoring of blood glucose the samples who had the glucometer available to test the blood sugar at home. It included the testing method, time and frequency to test the blood sugar related to the diet and injection time. In the case of unavailability of a glucometer, the subjects would be asked about signs and symptoms to assess the diabetic control.

3. Logbook for recording dietary recall and insulin injection. This logbook was written up by the samples and described all the food and beverages consumed and

the insulin injections within one week. The heading of the logbook would show the time, type, amount of food and beverage, and the insulin injection time.

While interviewing the samples, the investigator used the diabetic control manual for patients with type 1 diabetes to determine whether the samples had correct diabetic control in each aspect.

Validity and objectivity of the instruments.

Content validity

The assessment tools, particularly the interview and the diabetic control manual for patient with type 1 diabetes were valid by two experts in diabetes : one nurse and one physician. Then the instruments were revised both in content and language according to the experts recommendation.

Objectivity

The revised instruments were initially tested with three adolescents and young adults with type 1 diabetes in order to test for the objectivity.

Data collection

The pertinent data in this study, was collected by the investigator. The steps of data collection are as follow:

1. The letter of introduction from the Graduate office of Mahidol University was presented to the Director of King Chulalongkorn Memorial Hospital for permission in the data collecting.

2. After the request was approved through official channels, the investigator introduced herself to the targeted personnel for this study, including the supervisor

nurse of the out patient department, the head nurse of the diabetic clinic, and the diabetologist in order to request the cooperation with the relevant data collection.

3. The investigator selected the sample in advance everyday from the O.P.D. card in the diabetic clinic according to set criterias. Then the selected cards were labeled with a note so that the investigator could meet the patient in the next morning.

4. The investigator introduced herself and explained the study objectives and the process of study, then asked for cooperation and consent for data collecting according to the consent form of study participation.

5. After the samples agreed to cooperate, the investigator check the most convenient time for the interview with the samples and then persued the study according to the procedure.

6. The samples were interviewed at the specific area in the diabetic clinic of the out patient department, King Chulalongkorn Memorial Hospital through the structured interview. After the interview the investigator requested for a home visit in the case the interviewed data were incomplete. The interviewing time for each sample was about 45 minutes to one hour and the interviewing was with consent from the samples.

7. The completeness for each category of questionnaire after interviewing was checked. (All interviewed questionnaire was checked for the completeness.)

8. Gratitude was expressed to the samples for their cooperation.

Protection of human subjects.

The investigator aimed to give necessary information about the study to the samples and it was empasized that participation in this study was confidential, and all

sample's data would not be disclosed. It was stated that the participation in this study was voluntary, and refusal to participate would not affect current or future care and treatment, furthermore the samples were free to withdraw at any time during the study.

If the samples decided to participate, they would be asked to sign and date a consent form indicating that they had been given information about the study and voluntarily agreed to take part.

Data analysis

The data was analyzed according to the following steps:

1. The frequency, distribution, and percentage of the adolescents and young adults personal data obtained from the sample group were computed.

2. Both parts of the diabetic control and the obstacles to diabetic control were analyzed by using a content analysis technique according to the following procedure:

- The investigator reviewed the whole data in each question, and separated them into 2 groups: the diabetic control and the obstacles to diabetic control. Each group consisted of 4 aspects which were: 1) insulin administration, 2) dietary management, 3) physical exercise, and 4) self-monitoring of blood glucose.

- The investigator coded the answers that were in the same meaning into the same code. Then, the investigator categorized the manifest content of data that were in the same meaning in the same category. Furthermore, the latent content of data had been interpreted and categorized in the category that had the same meaning. The process of coding and categorizing had been used in both parts of the iabetic control and the obstacles to diabetic control.

- During the process of coding and categorizing, the results of categorized data had been categorized repeatedly and often until the meaning of the data were clarified. Then, the investigator discussed with advisors who had experience in using the content analysis technique. The advisors verified the results of the categorized data and adjusted the topics of categories repeatedly several times throughout the study.

- The results of the study were presented by description according to each category and were summarized in frequency and percentage in each aspect of both diabetic control and the obstacles to diabetic control.

CHAPTER IV

RESULTS

This descriptive study aimed to determine the diabetic control and the obstacles to diabetic control of adolescents and young adults with poorly controlled type 1 diabetes. The samples consisted of 30 adolescents and young adults who were diagnosed by diabetologists as type 1 diabetes with poor control aged 15 – 25 years and who were attending the diabetic clinic at King Chulalongkorn Memorial Hospital during February to March 2000. The findings of the study were presented in descriptive form with number and percentage, and in tabulations in the following parts:

Part 1 Demographic findings

Part 2 The diabetic control of the samples

Part 3 The obstacles to diabetic control of the samples.

Part 1 Demographic Findings

Table 3 Number and percentage of the samples categorized according to gender, age, religion, marital status, and duration of diabetes (n = 30)

Sample Characteristics	Number	Percentage
Gender		
Female	21	70.0
Male	9	30.0
Age (years)		
15 – 20	6	20.0
21 – 25	24	80.0
Religion		
Buddhist	28	93.4
Christian	1	3.3
Islam	1	3.3
Marial status		
Single	29	96.7
Married	1	3.3
Duration of diabetes (year)		
Less than 1	3	10.0
1 – 5	12	40.0
6 – 10	8	26.7
More than 10	7	23.3

From Table 3, it was found that the majority of the samples was female (70%) and was in the young adult period or aged 21 – 25 years (80%). Almost all of the samples were Buddhists (93.4%) and single (96.7%). The most common duration of being diabetes was 1 – 5 years (40%) where as the least duration was less than 1 year (10%).

Table 4 Number and percentage of the samples categorized according to education, occupation and household finance. (n=30)

Sample characteristics	Number	Percentage
Level of education		
primary school	6	20.0
secondary school	9	30.0
vocational education/diploma	5	16.7
university	10	33.3
Occupation		
unemployed	9	30.0
employee	9	30.0
student	8	26.7
government officer	3	10.0
own business	1	3.3
Household finance		
enough, with some savings	14	46.7
enough, with no savings	11	36.7
not enough	4	13.3
barely enough	1	3.3

From table 4, it was found that most of thes sample had education in bachelor degree 33.5% and secondary school 30%. The occupations of the samples were employees 30%, which was equal to unemployed. The largest group of the samples had enough money with some savings which was 46.7% and 36.7% had enough money with no savings.

Table 5 Number and percentage of the samples categorized according to HbA_{1c} level, acute complication, chronic complications and body mass index. (n=30)

Sample characteristics	Number	Percentage
$HbA1_c$ Level (%)		
8.1 – 9.0	12	40.0
9.1 – 10.0	14	46.7
10.1 – 11.0	4	13.3
Acute complication		
hypoglycemia	25	83.3
none	3	10.0
diabetic ketoacidosis	2	6.7
Chronic complication		
none	18	60.0
retinopathy	6	20.0
nephropathy	4	13.3
neuropathy	2	6.7
Body Mass Index (kg/m^2)		
Underweight (<20)	6	20.0
Normal weight (20-24.9)	18	60.0
Overweight (25 – 26.9)	5	16.7
Obesity grade 1 (27 – 29.9)	1	3.3

Table 5 shows that the majority of the samples had HbA_{1c} 9.1 – 10.0% (46.7%). The most common acute complication was hypoglycemia (83.3%). The majority of the samples did not have any chronic complication (60.0 %) and had normal weigh (60%).

Part 2 The diabetic control of the samples.

The details of diabetic control of adolescents and young adults with type 1 diabetes in this study will be demonstrated in each aspect of the diabetic control which include: 1) insulin administration, 2) dietary management, 3) physical exercise, and 4) self-monitoring of blood glucose.

1. Insulin administration

All of the samples received an insulin administrative regimen. 15 samples injected intermediate-acting insulin twice daily, while another 15 samples injected short-acting insulin before the three main meals of the day plus injected long-acting insulin at bedtime, that were four times a day. The majority of the samples used insulin pens which received from the company for injection (20 Samples or 66.7%).. The rest of the samples used syringes for insulin injection.

Six items emerged from the interviews and the diabetic control manual for patients with type 1 diabetes which included : 1) continuity of insulin injection, 2) adjustment of insulin, 3) time of insulin injection, 4) the length of time to inject before meals, 5) site and rotation of injections, and 6) needle manipulation for reuse.

1.1 Continuity of insulin injection.

Three categories emerged from the variety of continuity of insulin injection of the samples which included : 1) regularly, 2) irregularly, and 3) omission more than 1 month.

1.1.1 Regularlity

Nineteen samples (63.4%) had insulin injections continuously, and never omitted any injection. Data related to this category were below:

> 'I'm bored that I have to meet the needle everyday but I'm never omitting injection, because I know that what will happen, if I don't inject it. At first, I was rather fretful and rarely injected, but now I am already familiarized with it and inject everyday'.

> 'I feel a little annoyed but never omit to inject because I know that if I don't inject what will happen'

1.1.2 Irregularlity

Seven samples (23.3%) injected incontinuously. They tried to inject every day but omitted some doses, as the following statement shown:

> 'I'm very..very bored, I don't want to inject anymore, sometime I've got pain through my abdomen till I must stop injecting, tomorrow I'll restart injecting again'

> ' At the time that the doctor told me to inject four-times a day, I started to ignore the injection, I scarcely injected by intention as it was the most boring thing in my life'

> 'I have to contact customers outside the office, then sometimes I omit to inject that dose'

1.1.3 Omission more than 1 month

Four samples (13.3%) neglected to inject the insulin for more than one month. Two samples in this group were admitted to hospital because they developed Diabetic Ketoacidosis whereas another 2 samples had no abnormal symptoms but were only thirsty and had polyurea. Below were statements from some of these samples.

> 'I don't want to live, don't want to be tortured, I can't stand for it anymore if I have to inject for the rest of my life, it's boring...when I don't want to inject I do neglect it, I don't have insulin injection for 2-3 months till now...'

'In the past, I had omitted to inject for several months by attention but now I can omit to inject only one month as it's great torture and it made me struggle to the hospital to have insulin injection'

1.2 Adjustment of insulin

Two categories emerged from the adjustment of insulin dosage. These categories were labeled : 1) no adjustment, 2) self-adjusted.

1.2.1 *No adjustment*

Fifteen samples (50%) injected insulin dosage dose as prescribed by doctors. The following statements were from samples in this group.

'I rarely injected as I was bored, but if I injected I'll inject the same dose as the doctor prescribed'

'I injected the dose that the doctor ordered, I dared not to change the dose if the doctor did not order'

1.2.2 Self-adjustment

Another fifteen samples (50 %) adjusted their insulin dosage by themselves. In this group, there were 9 samples that had insulin adjustment by 1-2 units. And they said that :

'I adjusted 1-2 units of insulin each time up to the amount of food which I eat , the doctor allowed me to adjust in this dosage'.

In addition, there were 4 samples that had insulin adjustment by 5-10 units according to blood glucose level, symptoms, and the amount of food consumed at each meal. A 23-year-old woman who had diabetic for 17 years said :

'I've never injected as the same dose as the doctor prescribed, I think that it must up to the patients who have to learn by doing. They have to learn how much insulin is suitable for them'

There were 2 samples who confessed that they usually underused insulin. A 25-year-old woman said :

> 'I deliberately reduced my insulin dosage to half of the amount prescribed by the doctor, my doctor didn't know this'

> And a 23-year-old woman said 'I have intentionally underused insulin for about one year till now, I'd diminished 3 units of insulin from the dosage prescribed by the doctor '.

1.3 Time of insulin injection

1.3.1 Same time

Twenty eight samples, which were for the majority of the samples (93.3%) had insulin injection at different times each day. All of them gave the reason that they woke up late on their holiday and then they mostly postponed the time of insulin injection. However, there were many young people in this group that had to meet customers outside office.

> 'I must finish my work, air conditioner repairing, for each customer, so the time for injection and eating must come later'.

> 'Although it's convenient to use an insulin pen, however, when I went out to work in another place I had to postpone my injection because of the lack of a suitable place for injecting'.

1.3.2 Different time

Only 2 samples (6.7%) could inject insulin at the correct time. One said that :

> 'In my daily life, I wait for the time to inject, as I have no work to do, so I can do it correctly'

1.4 The length of time to inject before meals.

In this study there were 5 samples who received a lispro insulin regimen which acts rapidly (5-10 minutes) after injection. So the patients do not need to wait for 30

minutes before mealtimes. Another 25 samples received insulin regimen that they had to wait for 30 minutes before mealtimes, in the later group the injection could be categoried into two groups as follow:

1.4.1 Less than 30 minutes

Twenty two samples or almost all of this group (88%) had an insulin injection just before meals. One teenager said that:

> 'After I wake up, I usually take a bath and brush my teeth and then have the insulin injection. After that I dress myself which will take about 10 minutes and have breakfast then go to school'.
>
> 'In the morning I didn't wait, after the injection I have the breakfast immediately because my school started at 7 a.m.'.
>
> 'In the morning I'd rather do it correctly, but at lunch time or when I am eating out I will inject and have a meal right after that.'

1.4.2 30 minutes

There were only 2 samples waited for 30 minutes after injection before having a meal. One teenager said that:

> 'I've tried to do it the way that the doctor tell me and I can do it correctly, except some days which I must go out with my sister, but mostly I try to do as the doctor said'.
>
> ' In the morning, I inject at home and then ride the motorcycle to the office which takes about 20-25 minutes to reach my workplace, then I go to have breakfast.'

1.5 Site and rotation of injection

1.5.1 Abdominal with rotation

The majority of the samples or 22 samples (73.3%) injected at the abdomen and rotated the site of injection within the abdominal region. Sample of statements were as follow:

'When I was diagnosed , I used to inject at my forearm like the nurse used to inject me when I was admitted, but recently I saw my neighbor who is an old diabetic man injecting at his abdomen and he said that his doctor told him that it was the best area for insulin injection. After that I always inject at the abdomen the same as the old man has done'

' I never injected in other sites, I always injected at my abdomen, and change to new site each time which is about this... (use his finger in pointed the area that he moved)... sometimes I changed from the left site to the right site of abdomen if I feel pain and rigidity'

1.5.2 Different sites with rotation

Six samples (20%) rotated their injection site among the forearm, the thigh, and the abdomen inconsistently.

'I know that the abdomen is the best site for injection but I feel awful'

'when I'm lazy to inject, I told my friend or my mother to inject for me at the forearm'.

' I'd rather inject at the abdomen but it often developed rigidity and was painful. It became so rigid that the needle bent and then I will rotate to another site such as the thigh or the forearm'

'... It depended on the convenience whether I wore trousers or a skirt; if I wore a skirt I will inject at the thigh in that day'

1.5.3 Never inject at the abdominal sites.

There were 2 samples (6.7%) in this study who never injected at their abdomen.

'The nurse taught me to inject in the abdomen, but when I went home I dared not to inject in that region, so I always injected in the thigh or the forearm'

'I always injected at my forearm and never injected at the abdomen, because I think it's too awful' said a 21-year-old man.

1.6 Needle manipulation for reuse

All of the samples performed correct and hygiene procedure in insulin injection. They washed their hands before injection, cleaned their skin and the insulin vial with the cotton ball immersed in alcohol. The needle was changed after being used for 2-7 days. Every sample in this study had no signs and symptoms of infection, however, there were some kinds of needle care that should be emphasized:

1.6.1 Re-cap needle without cleaning with alcohol.

The majority of the samples (25 samples or 83.3%) used this method. Several samples said that they usually cleaned their skin with the cotton ball immersed in alcohol. After injecting, they covered the needle with a needle cover, it was unnecessary to clean the tip of the needle with alcohol.

1.6.2 Cleaning the needle with alcohol before re-cap the needle

There were 5 samples (16.7%) used this method. An 18-year-old student said that 'after injecting I cleaned the tip of needle with alcohol every time'.

The details of insulin administration of the samples in this study could be summarized in table 6.

Table 6 Number and percentage of the samples categorized according to insulin administration.

Insulin administration	Number	Percentage
Continuity of injection (n=30)		
Regularly	19	63.4
Irregularly	7	23.3
Omission more than 1 month	4	13.3
Adjustment of insulin(n=30)		
No adjustment	15	50.0
Self-adjusted	15	50.0
Time of insulin injection (n=30)		
Different time	28	93.3
Same time	2	6.7
***The length of time to inject before meal** (n=25)		
Less than 30 minutes	22	88.0
30 minutes	3	12.0
Site and rotation of injection (n=30)		
Abdomen with rotation	22	73.3
Different sites with rotation	6	20.0
Never inject at the abdomen	2	6.7
Needle manipulation for reuse (n=30)		
Re-cap needle without cleaning with alcohol	25	83.3
Clean needle with alcohol before re-capping	5	16.7

* Only the samples who received insulin regimen have to wait for 30 minutes before mealtime.

2 Dietary management

According to the information obtained during the interview and the 7-day-dietary records, the features of dietary management in adolescents and young adults with type 1 diabetes could be classified in to 3 categories as follow:

2.1 Bad control

Most of the samples (16 samples or representing 53.3 %) were in this category. As the following sentences indicated.

> 'I usually eat out and always eat a one dish meal that is sold in wheeled shops in front of my office such as Khao-man-kai (oily chicken rice with fermented soybean sauce), Khao-kha-mu (stream pork leg in black soy sauce with rice), khao-mu-daeng (Chinese barbecued pork with sweet black soy sauce). Actually I only eat one dish each meal but always follow it with O-lieng (black coffee with ice) for every meal. I eat as I feel convenient and never keep in mind that I should eat as the doctor recommended '

> 'I've never controlled my eating any more, I eat everything that I want, and eat the same foods as my peers'

The following were features of eating patterns that found among adolescents and young adults in this group:

2.1.1 High fat diet

The majority of the samples in this group always consumed high fat foods (14 samples or 87.5%). These were the sample of foods which were withdrawn from the 7-day-dietary record:

> 'Deep fried chicken with fried garlic, fried potatoes, fried squid, fried grilled fish with chili paste, KFC fried chicken, khao-kha-mu, khao-man-kai, oily salad dressing with vegetables, fried omelet in oil, fried sausages, Calbe (shrimp favored rice crispy)'.

2.1.2 High carbohydrate diet

There were 12 sample (75%) of this group prefered sweetened food or beverage and consumed too much fruit such as :

> 'O-lieng (Black sweetened coffee in ice), 1 glass with every meal, cool creamy coffee 1 can daily, Dutch Mill sour milk 1 little bottle daily, sweetened milk, chocolate milk, sweet taro paste 30 grams after lunch, Tao-suan (yellow soy bean with coconut milk), khao-nieu-sung-kha-ya (sticky rice cooked with coconut milk with custard topping)'
>
> 'On holiday, I will eat the rose apples all day that my mother has already sliced and keep them in the refrigerator '
>
> 'I usually eat 1-2 guavas after a meal'.

From the dietary record, of fruit that often found were three sapodillas with each meal, five to six pods of sweet tamarind...'

2.6.3 Overeating

There were 8 samples (50%) that ate either a large amount of food or a large number of meals. One teenager told that :

> ' In the evening after school I have a dinner with my mother and I am full with one plate but only at that moment. About ten or eleven p.m. I feel hungry again and I will have another meal before I go to bed'.
>
> 'For me... one bowl of noodles must have 2 packs of Ma-Ma (instant noodles), the merchant knows this well'.
>
> 'After school at 4 p.m. I am usually hungry so I always have one bowl of noodles everyday, and have dinner with my parents about 7 p.m., before I go to bed I also have a sugary snack '.

2.1.4 Alcohol drinking and cigarette smoking

There were 4 samples (30.8%) that either had alcohol drinking or cigarette smoking. An 18-year-old student who was an athlete also said that :

' I usually have a drink after playing with my volleyball team. I prefer soda mixer to coke mixer, and sometimes I drink beer or wine'.

'I go out to have a drink with my friend who warns me not to drink so much, but I get drunk every time, I mixed alcohol with soda'

2.2 Moderate control

There were 9 samples (30%) in this group who tried to control their eating as much as possible, but sometime they could not do that. This category could be classified in to 2 subcategories that were as follow:

2.2.1 The foods that make the person lose control when seeing them.

Ice cream was an attractive sweet that all of this group had spoken of in the same manner :

'I perceived that I have a diabetes and have to avoid the sweetened food that I used to prefer which make me irritated sometimes, but I am able to control myself, however when I saw someone eating ice- cream I will loss my self-control if someone persuades me, to eat some'.

'Ice-cream ... if somebody eats it in my sight, I can't stop myself from eating it although I must omit my dinner later'.

'other foods I can control myself well, except the ice-cream, it's the exception!'

2.2.2 The foods that the person can control when seeing them.

Durian was one kind of fruit that many young people said that they could exerise self-denial and refused it.

" I like it very much , but since I've had diabetes I don't eat it any more although somebody eats it in front of me"

Fast foods were another kind of food that several samples said that they could refuse to eat.

"If my friends persuade me to go to the fast food store I will not go with them , because I know that if I go there I'll eat so much "

2.3 Strict control

There were 3 samples in this study (10%) who had strict control in eating.

'I intentionally restrict my eating, I only eat 1 ladle of rice at each meal. I always eat it with Kang-Som (sour soup with mixed vegetable) and eat no snacks at all. I know that it's inadequate because I often developed hypoglycemia and that is the reason why I must underuse the insulin injection'

A 7-day-dietary-record of a young woman indicated that:

'2 ladles of rice, Pad-Kra-Pao-Kai (spicy fried rice with basil leave and chicken) 3 tablespoons, Kang-Chud-Tao-Hu (Tofu soup) 1 small bowl and one medium orange' and she said that 'I never eat more than this, I think that the amount that doctors and nurses suggested is too much for me, so I never eat such amounts of food'.

'In the evening, I deliberately omit dinner but eat fruit instead, however, I developed hypoglycemia before bedtime frequently'.

2.4 Good control

Only 2 samples in this study (6.7%) were able to control their eating well as the statements below indicated :

'In the past, I was eating indulgently. Since I was diagnosed with diabetes and knew that I can't eat so much sweet food, I try to restrain myself in eating and I found that I can do it until now and I still control my eating. I do not feel that dietary control is a difficult task' said a 19-year-old Islamic teenager who is pregnant.

'In the morning I carry the tin carrier (Pin-to) which contain the diabetic food which my mother cooks for me to school. Everybody in my school knows that I am a diabetes. At first I am so shy and attempt to make up my mind that I am a diabetes. When I see the gang of friends are able to eat everything that they want but I do not eat. I can restrain myself and now I get used to the diet control' said a 15-year-old student.

The details of dietary management could be summarized in Table 7

Table 7 Number and percentage of the samples categorized according to dietary management.

Dietary management	Number	Percentage
Bad control	16	53.3
- high fat diet	14	
- high carbohydrate diet	12	
- overeating	8	
- alcohol drinking and cigarette smoking	4	
Moderate control	9	30.0
Good control	2	6.7
Strict control	3	10.0

3. Physical exercise

The features of physical exercise extracted from the samples could be classified into 3 categories according to the regularity of physical exercise as below:

3.1 None

The majority of the samples had no exercise in their daily activity (19 Samples or 63.3%).

> 'The aspect of exercise or sport never comes to my mind. In spite of having several machines for exercise, I never use them '
>
> 'Never... I don't like it'

'I usually went to swimming in the past, since I had diabetes I dared not to exercise anymore'

3.2 Sometimes

There were 6 samples (20%) in this category and they could be classified into 2 subcategories on frequency of exercise:

3.2.1 Exercise monthly

Five samples exercise about one time in a month, as these statements show:

'Up to my mood, if I am feeling well I will exercise... I think that I have exercise about once in a month'

'I tried to exercise if I have someone to accompany me, I think that I exercise only monthly'

'I used to play badminton but now I seldom play it, except some days when my sister came back home then I'd play badminton with her, oh....only monthly'

3.2.2 Exercise weekly

There was one sample in this group which exercised regularly but only weekly as she said :

' I take much effort to exercise frequently and I will do it as much as possible. At present I always have a quick walk with my mother at 'Suan-Luang-Ro-Kao' every Sunday that I have leisure time'.

3.3 Regular

Only five samples of this study (16.7%) had regular exercise which could be classified into 3 subcategories on intensity of exercise according to Franz's guidelines for exercise for individuals with type 1 diabetes (1992 : 181)

3.3.1 Stremuous exercise

This group comprised one basketball player, one volleyball player and one football player. Two of them were athletes of their college. These sportsmen with diabetes said :

> 'I have a volleyball training everyday in the evening after I finish class, it takes about 2-3 hours for training and I always develop hypoglycemia during the game which all members in the team call that symptom as 'Pee-khao' or to be possessed by a spirit or ghost' said a 18-year-male volleyball player.

> 'I play football everyday in the evening and also on holiday, it takes around 1-2 hours per match. I never have any abnormal symptoms such as hypoglycemia' a 17-year-old football player said

> As well as a 16-year-old student who told that 'I love to play basketball and usually play it every evening for about 2 hours even on holiday. During the game I never have something wrong with me, but after that I feel very hungry which makes me have 4 main meals daily'

3.3.2 Moderate intensity exercise.

One sample who was a 25-year-old man chose to exercise by weight lifting. He said that:

> 'I lift a half kilogram dumbbell everyday 1 hour after having dinner. I spend 20 minutes for weight lifting.'

3.3.3 Low intensity exercise

One sample had regular exercise of low intensity as she said that

> 'I have a walk for 40 minutes before my evening insulin injection every day'.

The regularity of physical exercise of adolescents and young adults in this study could be summarized in Table 8.

Table 8 Number and percentage of the samples categorized according to the regularity of physical exercise.

Regularity of physical exercise	Number	Percentage
None	19	63.3
Sometimes	6	20.0
Regular	5	16.7

4 Self-monitoring of blood glucose

The majority of the samples (20 samples or 66.7%) had the device for blood glucose monitoring, that were 2 types: blood glucose meter and blood glucose testing strip. Eighteen samples had a blood glucose meter with an automatic-finger-stick device that could read the result after the recommended time interval that gave very precise readings and was very fast. Many samples received them from the company or they may be lent by the diabetic clinic with no expense incurred except the strips and lancets. Two samples of this group did not have the glucose meter, they could only bought the blood glucose testing strips and lancets for monitored their blood glucose. They got the result from visually compared the result with the color chart on the side of the blood glucose strip container.

Information from the interview related to frequency of self-monitoring of blood glucose can be classified into 3 categories as follow:

4.1 Monitored daily

Only 3 samples (15 %) of this group monitored daily. As one newly diabetic said:

> 'My doctor allow me to adjust insulin dose by myself, so then I make the effort to monitor 2-4 times daily, I always take the meter with me even when I go to work'

> 'In general, I didn't monitor frequently like this only once in 3-4 days but now I am pregnant so the doctor tells me to have 4 blood tests daily, I can do it well although I get sore and cracked fingers but I must endure.. for my baby...'

4.2 Monitored every 2-3 days.

There were 8 samples (40 %) of this group monitored their blood glucose every 2-3 days such as:

> 'If my doctor tells me to monitor frequently I'll check everyday but in general I usually monitor every two or three '

4.3 Do not monitor

In spite of having blood glucose monitoring device, the majority of the samples (9 samples or 45 %) did not test their blood glucose for a period of one month or more.

> 'In the beginning of my diabetes I used to check my blood glucose frequently, but now I never check it until I forgot how to use this blood glucose meter'

> 'I seldom have my blood glucose tested, about 4-5 tests and present the results to the doctor when I come for the follow up here, beside that I never check my
> blood any more'

> 'Nowadays I don't have blood testing but I try to observe from my symptoms whether my glucose is low or high'

Furthermore, there were 10 samples (33.3%) that did not have the device for blood glucose monitoring. Observing the abnormal symptoms was the method of assessing their blood glucose.

Eight samples of this group assessed their blood glucose from the following symptoms:

> 'If I have polyurea both daytime and night time I am sure that my blood glucose is more than 300'
>
> 'When somebody says that I have emaciated cheeks. I really know that my blood sugar is more than 300'
>
> 'I noticed that when I feel very hungry it is hypoglycemia! But if I have polyurea and I am very thirsty... that is hyperglycemia'
>
> 'Feeling hungry and having palpitations is hypoglycemia'
>
> 'If I have too low blood glucose I will have palpitation, sweating, and my hands are pale and trembling'

However, there were 2 samples of this group did not sure whether their assessments were correct or not. One teen said:

> 'I don't have abnormal symptoms so I can't distinguish whether my blood glucose is high or low now. After school in the evening I always feel so hungry so I must have a bowl of noodles, but I'm not sure whether that symptom is hypoglycemia or not'
>
> 'I'm not sure that a symptom of itching in my vagina is related to hypoglycemia or not but I noticed that it will occur when I have polyurea and I am very thirsty'

The frequency of blood glucose monitoring of the samples can be summarized in Table 9

Table 9 Number and percentage of the samples categorized according to the frequency of self-monitoring of blood glucose.(n=20)

Frequency of self-monitoring of blood glucose	Number	Percentage
Monitored daily	3	15.0
Monitored every 2-3 days	8	40.0
Did not monitor	9	45.0

Part 3 The Obstacles to Diabetic Control of the Samples.

Factors influenced diabetic control of adolescents and young adults in this study would be illustrated in each aspect of the diabetic control which included: 1) the obstacles to insulin administration, 2) the obstacles to dietary management, 3) the obstacles to regular exercise, and 4) the obstacles to self monitoring of blood glucose, respectively.

1. The obstacles to insulin administration.

Six categories emerged from the variety of obstacles to insulin administration. These categories were labeled : 1) management problems, 2) inadequate realization about diabetic complications, 3) pain intolerance, 4) over confidence, 5) fear of hypoglycemia, 6) inadequate knowledge of insulin administration, and 7) economic problem.

1.1 Management problems

All of the samples in this study (30 samples or 100%) did not have any good plan for insulin injection because of management problems that could be categorized into 2 categories: 1) time conflict , and 2) inappropriate place

1.1.1 Time conflict

The majority in this group (25 samples) lacked of time management for insulin injection. Data related to this category were presented below.

'My time management is too indulgent, it seems that I do not love myself'

'I think the point is me! Normally my work is finished at uncertain times. When it is very busy I always think that 'umh... never mind , I have no time for injection so then I will skip to the next dose'

'When I go out I cannot estimate what time I will arrive home'

'For my work, I must finish my work first and the time for injection must come later'

1.1.2 Appropriate place

Five samples in this group did not plan to find an appropriate place for insulin injection. Content related to this category is presented below.

'In the past since I used a syringe for injection it was more difficult than today. However even though I use an insulin pen for injection nowadays, I face the problem that I must search for a suitable place where I can have an injection privately such as in the rest room or the food shop that has a rather high table so that I can hide the injection. That reason makes me late for half an hour to one hour for injection'.

'I used to inject in the toilet when I went shopping with my gang of friends and it was very funny. I dropped the syringe on the floor unintended and it rebounded out of the toilet which made me very ashamed because many people were standing in front of the toilet. After that I will not have insulin injection if I cannot find a suitable place for the injection.'

1.2 Inadequate knowledge of diabetic complications

Sixteen samples (53.3%) of this study did not inject their insulin regularly because they did not realize the hazard of long term complications of diabetes. These following statements are included in this category.

> 'I know all of the complications of diabetes, but at the present time I can't see them, so I am not afraid. If it's results are clearly seen then I will be scared'.
>
> 'Tight diabetic control... it cannot be seen at this time but it will appear in very long term which I cannot wait for, so then I will do everything which can be seen today'
>
> 'I'm not scared..., but if a doctor tell me how patients with diabetes have their legs amputated or have renal failure get torments I will be scared and submit to injection, however, as time goes by I will not be scared again and omit to inject.'
>
> 'Omitting insulin one or two times made no difference, nothing happened to me'
>
> 'I don't have the negative result from omitting insulin so then I am not scared'.

1.3 Pain intolerance

Nine samples (30%) of the samples had insulin misused because they were unable to tolerate suffering from insulin injection through their lives. Statements related to this category were revealed below:

> 'Why not an other relative, why me !. I'm very bored..., injection hurts me so much. I am altogether bored, dispirited and in pain. Some days I cannot tolerate it and want to omit insulin for a while '
>
> 'It's so dispiriting, since the doctor told me to inject four times daily, I begin to be dishearten and neglect my insulin'
>
> 'I don't want to live anymore, I don't want to be tortured. I'm unable to take my insulin injection through my life'

'I used to try suicide by injecting overdose of insulin but it was not successful. It just made me develop severe hypoglycemia until I must creep to search for sugar or syrup to help me recover from the big pain'

' I ever neglected to inject for several months because I don't want to live with diabetes '

1.6 Over confidence

Eight samples (26.7%) of this study had high self-confidence in insulin manipulation by themselves. The following findings were related to this category.

'I frankly say that the adjustment of insulin is up to the patient more than the doctor. The dosage, which he ordered, was impossible for a patient to follow. We (diabetic patients) must manipulate it by ourselves. I .... Who have had diabetes for nearly 20 years never have injected the same amount of insulin as the doctor had ordered'

'I don't care how much insulin he (diabetologist) prescribed for me, because I will get hypoglycemic episodes if I use his prescribe dosage.'

1.7 Fear of hypoglycemia

Seven samples (23.3%) of this study demonstrated that they reduced their insulin dosage because they did not want to have hypoglycemia when they were working. These following sentences were concerned with this category:

'I didn't tell the doctor that I reduced the insulin dose to half of that he (doctor) ordered because it always made me develop hypoglycemia during my work , and I don't like to have snacks when I 'm working'

'If I take insulin in the same dose as the doctor prescribed I'll have hypoglycemia , although at only a mild level but it make me have to increase my eating which I don't like'

1.6 Inadequate knowledge of insulin administration

Five samples (16.7%) in this study had inadequate knowledge of insulin administration, as the sayings indicated below.

'I usually inject at my forearm because I saw the nurse always injected at my forearm when I was admitted in the hospital'

'Inconsistency in timing of injection, does it have any effect?'

'I usually cleaned the needle with cotton ball in alcohol . I didn't know that there is some lubricant on it as you just said'

1.7 Economic problem

Two samples (6.7%) in this study had no money to buy insulin for injection continuously. They said:

'My father has died for several years and my mother is unemployed. I have got money to buy insulin from my younger uncle. But lately, he is in a bad financial situation and he cannot support me anymore. Then my grandmother gave me a hand by giving me money when I went to hospital. But she just passed away two weeks ago so I have nobody to support me now. I have omitted to inject injection for one week because I don't have any money to buy it.'

'I will beg for money from the abbot (who I lived with for a long time) when I have to come to hospital. But sometimes he didn't give me any or not enough money to buy medicine and the help from the social workers begin less than before. Last time when I went to hospital I didn't get the insulin because I didn't have any money'

Several obstacles to insulin administration of adolescents and young adults of this study were summarized in Table 10.

Table 10 Number and percentage of the samples categorized according to the obstacles to insulin administration.(each sample may has more than 1 obstacles)

Obstacles to insulin administration	Number	Percentage
Management problems	30	100
time conflict	25	
appropriate place	5	
Inadequate realization of diabetic complications	16	53.3
Pain intolerance	9	30
Over confidence	8	26.7
Fear of hypoglycemia	7	23.3
Inadequate knowledge of insulin administration	5	16.7
Economic problem	2	6.7

2 The obstacles to dietary management

Eight categories evolved from the variety of obstacles to dietary management. These categories were labeled: 1) lack of self control, 2) inconvenience, 3) lack of knowledge, 4) lack of family support, 5) deviation from group norm, 6) misbelief, 7) anti-parents feeling, and 8) diabetic complication

2.1 Lack of self control

The majority of the samples (25 samples or 53.5%) demonstrated that they could not exercise self-denial in their eating which is one of the obstacle to dietary management. Data related to this category were presented below:

'I'm annoyed, lazy about choosing and remembering how much I can eat in each meal'

'I cannot exert self-denial in eating as it's the most difficult thing for diabetics.'

'I'm bored to control my eating because I must do it for my whole life'

'Sometimes in the evening, my older sister comes back from her work with many bags of dessert and we eat them together, including me and my mother who has diabetes, too.'

'When I went out with a gang of friends and saw them eating ice-cream, I always lost control of self-denial and ate it as my friends did.'

2.2 Inconvenience

Seventeen samples (56%) of this study indicated that one of the obstacles to dietary management was inconvenience in choosing appropriate food when eating out. The following data were presented in this category.

'When eating out I am unable to choose appropriate food, as it's difficult to find what we want'.

'Food shops at my school? Just walk to look..., ! They sell few kinds of food. There are only one kind that I can eat, so I usually eat what is sold there.'

2.3 Lack of knowledge

Ten samples (33.3%) of this study demonstrated that one of the obstacles to dietary management was inadequate knowledge about diabetic diet. These following sentences were related to this category.

'My mother makes a high effort in preparing the appropriate food for me to eat at school, but the problem is we don't know what I can or cannot eat. For example, the last visit my blood sugar was raised to more than 400 and I just knew from you that it is because I ate so many ground nuts everyday'

'I do not know before how much fruit I can eat at a time which will not make my blood sugar rise.'

'I usually control my eating, no snacks, no desserts, I only eat one or two guava after lunch'

2.4 Lack of family support

Eight samples (26.7%) in this study stated that lack of support from their family was one of the obstacle to dietary management. These statements were shown below:

'My family usually eat E-san food (northeastern food) which always has sticky rice, one deep-fried fish and one cup of 'Cheaw (northeastern meat sauce) that everyone eats altogether. Sticky rice is the main food of my family. Sometimes I felt heart-sore because my mother didn't pay attention to me. Sticky rice makes my blood sugar rise rapidly, I used to eat it with tears on my face, speech less....'

'My mother sells several desserts in front of home, when I came back home with a warn out body from work, they (desserts) made me lose control about eating when I saw them'.

'My mother loves to fry all vegetable with oyster sauce and I love to eat them too. Nowadays my mother still fries them everyday'

2.5 Deviation from group norm

Four samples (13.3%) in this study said that being different from other peers was one obstacle in their dietary management. Data allied to this category were as follow:

'I've stayed with my friends at the dormitory. I have to do everything like the others including eating. Saying that I can't eat this or that will make them (my friends) unpleasant and blame me that I am so fussy'

'I want to make my life normal, I don't want to make anyone feel that diabetes is serious...!. These you can't eat and those also...'

'I want to make myself the same as others who are normal. I don't want to hear anyone ask me with this question '...can you eat this... I think you cannot eat this...', I want to be a normal person in the sight of others.'

2.6 Misbelief

Three samples (10%) of this group had incorrect beliefs about dietary management for diabetes which was one of the obstacles in this aspect. Data related to this category were revealed below.

> 'I think that blood sugar control depends exactly on insulin injection. If I inject it regularly my blood sugar will stay in good control, diet control has no effect'

> 'The manner that someone sits to calculate how many calories they eat in each meal, I don't have enough time to do like that, and in my opinion, I get mad if someone do such a thing'

2.7 Anti-parents feeling

One sample (3.3%) in this study demonstrated that she wanted to act against her parents who always criticized her eating which was one obstacle in her dietary management, as she said...

> 'When I eat too much fruit my parents always blame me, such as ...eat..eat..eat.. it's so sweet, do not eat it!.. , such words made me feel that when they want to eat something they can eat it, but they don't think that I want to eat too... they should give me some pity ... that even made me angry, then I intend to eat all of them apparently'

2.8 Diabetic complication

There was one sample (3.3%) who had a complication which meant she could not manage her eating appropriately and that is one of the obstacles to dietary management, as she said:

> 'At the present time I feel that my stomach cannot work well, I always have distension of my abdomen. When it's snack time I still feel discomfort and I am unable to eat anything even one orange'

Several obstacles to dietary management of adolescents and young adults in this study are summarized in Table 11

Table 11 Number and percentage of the samples categorized according to the obstacles to dietary management.(one sample may has more than 1 obstacles)

Obstacles to dietary management	Number	Percentage
Lack of self control	25	83.3
Inconvenience	17	56.7
Lack of knowledge	10	33.3
Lack of family support	8	26.7
Deviation from group norm	4	13.3
Misbelief	3	10.0
Anti-parents feeling	1	3.3
Diabetic complication	1	3.3

3. The obstacles to exercise

Seven categories emerged from the various types of obstacles to physical exercise. These categories were labeled : 1) lack of a companion, 2) dislike, 3) diabetic complications, 4) lack of time, 5) lack of proper knowledge, 6) misconception, and 7) emotions.

3.1 Lack of a companion

Ten samples (33.3%) of this study stated that they had nobody to exercise with them, which was an obstacle to exercise. Statements related to this category were below:

> 'My gang of friends that played with me are all married so then I have no friend to exercise with me'
>
> 'Indeed, I prefer jogging but I don't have any friends to jog with me'
> 'In my gang of friends there is no one who likes to exercise or play sport'

'At home there is nobody to play badminton with me, my older sister usually finished her work and came back home in the dusk'
'Exercise alone is too boring'

3.2 Dislike

Nine samples (30%) in this study disliked to exercise. Data related to this category are as follows:

'I really dislike to exercise'
'I'm lazy, it's very boring'
'There are other hobbies which interested me more than exercise'

3.3 Diabetic complications

Nine samples (30%) in this group had chronic complications that were the limitations for physical exercise. Data allied to this category were shown below:

'Since I have had renal failure I get easily tired. I fear to have fainting so I dare not to exercise'

'I have a problem with my eyes, my doctor told me I cannot exercise'

'I have poor vision and don't want to be a burden for others'

'My legs are insensitive and I often have a cramp then I cannot do any exercise'

3.4 Lack of time

Seven samples (23.3%) of this study demonstrated that they did not have any time to plan for exercise in their daily lives. Data related to this category were as follows:

'I think that it is me who has poor time management, after work when I reach home, I always eat and sleep but do not do any exercise'

'I have finished my work quite late at night so I have no time for exercise'

'My work starts in the evening and finishes about 2 a.m., how will I get anytime for exercise?'

3.5 Lack of proper knowledge

Six samples (20%) of this study demonstrated that they had inadequate knowledge for safe exercise. The following sentences were in this category:

> 'The doctor tell me that I should have snacks before I play volleyball but I don't know how I should have a snack; what type; what amount, and I fear that I will have colic during the game. He also doesn't allow me to reduce the dose of insulin except when necessary such as an important match'

> 'I never know before that I should reduce insulin dose or have snacks before I engage in intense sport'

> 'In the past I had some exercise but since I have had diabetes I dare not to exercise because I don't know what to do when I have some trouble such as hypoglycemia or shock'

3.6 Misconception

Three samples (10%) of this study did not perform physical exercise because they had misconceptions about exercise. Exemplary statements were presented below:

> 'At work I always lift the air conditioner that is rather heavy. It's the work which uses so much energy and makes me tired from working so I think that I have some daily exercise from working'

> 'I'm a primary school teacher, I am always standing and walking around the class all day because my students are very naughty. They make me unable to sit down for a minute... so I think that it is exercise for me'

3.7 Emotions

Three samples (10%) in this study stated that emotion was an obstacle for them to performed physical exercise regularly. Data related to this category were shown below:

> 'When I was so discouraged I didn't want to exercise anymore, just eat and sleep and not do anything'

> 'I'm very bored and dejected... don't want to live... so I do not think about exercise'

'I am so bored, when I'm in bad temper I will not exercise'

'I exercise inconsistently, it's up to my mood'

Various obstacles to exercise of adolescents and young adults in this study were summarized in Table 12

Table 12 Number and percentage of the samples categorized according to the obstacles to physical exercise.(One sample may have more than 1 obstacle)

Obstacles to physical exercise	Number	Percentage
Lack of a companion	10	33.3
Dislike	9	30.0
Diabetic complications	9	30.0
Lack of time	7	23.3
Lack of proper knowledge	6	20.0
Misconception	3	10.0
Emotions	3	10.0

4. The obstacles to self-monitoring of blood glucose

Nine categories emerged from the variety of obstacles to self-monitoring of blood glucose. These categories were labeled : 1) inconvenience, 2) pain intolerance, 3) financial problem, 4) discouragement, 5) non-recognition of the benefits of testing, 6) embarrassment.

4.1 Inconvenience

Nineteen samples (63.3 %) of the samples did not monitor their blood glucose everyday because they thought that it was inconvenient to do so. Data related to this category were below:

'It's a troublesome and inconvenient to monitor everyday'
'Bringing the meter to school is inconvenient'
'I'm annoyed'
'I rarely monitor at lunch because I'm on duty'

One sample of this category monitored his blood glucose rarely because he always played volleyball everyday and monitoring meant he got a problem when playing volleyball, he said that:

'My position is a setter, if I strike my finger for monitoring it will get painful and make me play volleyball unadroitly'

4.2 Pain intolerance

Thirteen samples (43.3%) of the samples indicated that they did not have daily monitoring because they could not accept the pain from striking their fingers. The following statements were involved with this category:

'It hurts if I must monitor everyday so I think I cannot'

'Four-times a day for injection is very painful... don't force me to have daily monitoring anymore'

'Injection four-times a day is so bad for me, I don't want to have more pain than this'

4.3 Financial problem

Twelve samples (40%) of this group said that blood glucose monitoring devices were too expensive, which meant they could not monitor everyday. Relevant data were presented below:

'I must use them (strips) economically, I cannot monitor everyday because I'm unemployed, I have no income'

'The strips are expensive, then I must work harder by working overtime job in the evening to earn money for buying the strips'

'Even though the hospital lent me a glucometer, I am still unable to buy the strips to monitor everyday'

'Just having money to buy insulin for injection is good enough for me, don't mention the glucometer... it's impossible..!'

'I can remember the day when a doctor told me to buy a glucometer for monitoring my blood glucose everyday, which was about five thousand Bath. I remember that I went home suddenly without buying insulin and other drugs and never come for the follow up for about one year. I though that the doctor said such a funny word because it was impossible for me'

'The glucometer cannot be claimed from social security, then I cannot buy it now, I have to collect the money to buy it later'

4.4 Discouragement

Three samples (10%) of this study stated that they were discouraged to monitor their blood glucose. Data related to this category were presented below:

'I'm so discouraged..., monitoring doesn't make you better. You must take insulin through your life, however!'

'I even though that I controlled my blood sugar quite well, but when I monitored my blood, sugar was too high and it made me heart-sick, guilty and discouraged so I don't want to monitor anymore'

'Diabetes is an incurable disease, it will be worse and worse, why must I tolerate pain day by day. Since the doctor told me to inject four times a day, I never monitored my blood glucose anymore...'

4.5 Non-recognition of the benefit of testing

Two samples of the samples did not monitor their blood glucose because they thought that their doctor did not pay any attention to their blood glucose record, such as the following data:

'I don't know what's the benefit of monitoring blood glucose everyday, if I know the benefit I will do it often'

'I think that there is no advantage because I always know my sugar level from my symptoms. The doctor just see the result of a blood test on the day he meets a patient'

One sample in this study did not monitor her blood glucose at home because her parents did not see the advantage of self-monitoring of blood glucose, she said :

'My mother does not buy a glucometer for me. She says that going to see the doctor every visit is enough. It is unnecessary to monitor the blood glucose everyday'

4.6 Embarrassment

One sample of this study stated that she did not monitor her blood glucose everyday because she felt ashamed by her peer group at her school, for example:

'I will monitor only when I stay home on holiday. I never monitor the day I go to school because I feel ashamed. I don't want to let anyone at school know that I'm a diabetes except my teacher and my close friends'

The variety of the obstacles to self-monitoring of blood glucose of adolescents and young adults in this study were summarized in Table 13

Table 13 Number and percentage of the samples categorized according to the obstacles to self-monitoring of blood glucose. (one sample may have more than 1 obstacle) (n=30)

Obstacles to self-monitoring of blood glucose	Number	Percentage
Inconvenience	18	60.0
Pain intolerance	13	43.3
Financial problem	12	40.0
Discouragement	3	10.0
Non-recognition of the benefit of testing	3	10.0
Embarrassment	1	3.3

The results of obstacles to diabetic control of the samples could be devided according to type of obstacle as shown below:

Intrinsic obstacles

There were 4 categories of intrinsic obstacles derived from the results of the study as shown as follows:

1). Psychosocial issues.

This category included: pain intolerance, lack of self control, deviation from group norm, fear of hypoglycemia, over confidence, emotions, discouragement, embarrassment , dislike, and anti-parents feeling.

2). Management problems

This category included: inconvenience, time conflict, and lack of appropriate place management.

3) Diabetic complications

4) Inadequate knowledge

This category included inadequate knowledge about insulin administration, diabetic diets, diabetic complications, and physical exercise.

5). Misbeliefs

This category included: non-recognition of the benefits of blood glucose monitoring, had incorrect beliefs about dietary management and physical exercise.

Extrinsic obstacles

There were 2 categories of extrinsic obstacles derived from the results of the study as shown in the following:

1). Poor social support

This category included : lack of a companion for exercise, and lack of family support in diabetic diet eating.

2). Financial problem

This category included: insufficient money to buy insulin, strips and a glucometer.

CHAPTER V

DISCUSSION

The findings from the study of the diabetic control and the obstacles to diabetic control of adolescents and young adults with type 1 diabetes can be discussed simultaneously regarding the diabetic control and the obstacles to diabetic control in the following aspects:

1. Insulin administration and the obstacles to insulin administration.
2. Dietary management and the obstacles to dietary management.
3. Physical exercise and the obstacles to physical exercise.
4. Self-monitoring of blood glucose and the obstacles to self-monitoring of blood glucose.

1. Insulin administration and the obstacles to insulin administration

The study revealed that the majority of the samples took insulin at the different time (93.3%), and took insulin less than 30 minutes before meals (88%)(Table 6), while the important obstacle obtained from all the samples (100%) was management problems (Table 10).

It was obvious from the study that the majority of the samples were young adults (60%) (Table 3), most of whom were still studying and working (70%) (Table 4). Therefore, when these youngsters had an illness with type 1 diabetes, which is an incurable disease, and needed day-to-day insulin injection, they then always had a problem with time management for taking their insulin injection. As a 24-year-old

man said "I give priority in working which is more important than insulin injections, because if I start with a good job in my early life I will get well-being in the middle of my life, then the time for injection may be late sometimes." This explanation is in accordance with the opinion of Fain and D'Eramo-Malkus (1996:729,731) who said that the period of young adulthood is a time when one searches for a place in society. Finding a mate, establishing a family, and initiating a career are major tasks to be accomplished. Young adults encounter another type of risk to health : the pressure of achievement oriented stress that often causes "workaholic" habits, including lack of sleep and omission of meals.

When considering time to injection that was less than 30 minutes before meals it was found that most of the samples in this category were adolescents. This finding can be explained because although adolescents began to have responsibility for themselves, by trying to take their insulin correctly, on the other hand they did not let anybody know that they are diabetes and did not want to be different from their peer group, so it was always found that the adolescents usually take their insulin and have breakfast at home at the same time, as they are worrying about going to school late. This explanation is in the same perspective as Daneman and Frank (1996:694) who has said that diabetes management requires a degree of responsibility and behavior control which is contrary to the characteristic of adolescents. The daily demands of diabetes has an impact on the personal and public lives of adolescents, and interaction with vital development tasks such as independence, body image, identity, sexuality, and responsibility .

It was manifest from the study that 50 % of the samples had self-adjusted of insulin dosage(Table 6). When determined the obstacles for this issue it was found that

26.7% of the samples had over confidence in manipulating their insulin dose and 23.3% of the samples feared of hypoglycemia (Table 10) which was accompanied with not wanting to be overweight . This corresponds to the study findings of Bryden, et al. (1999:58) which indicated that 30% of adolescents had intentionally reduced their insulin dosage to control their weight. Furthermore, it is in accordance with the result of a study by Morris ,et al. (1997) who studied young persons with type 1 diabetes and found that the majority of the samples did not inject their insulin in the same dose as their doctor had prescribed, and this was the major cause of glycemic control. It is important that the samples had a mean duration of diabetes for 8 years which is nearly the same time as in this study.

This finding can be explained because the more the duration of illness increased the more development in self-confidence in adjust in their insulin dose. Most importantly, fear of hypoglycemia episodes should be considered in this study because hypoglycemia is an important barrier to the daily lifestyle of adolescents and young adults who always spend their lives outside their homes, such as studying, working, playing sports or taking leisure time with gang of friends. In addition, body image is the most important concern of young adults both male and female, unfortunately, the benefits of insulin therapy are accompanied by an increased risk for adverse events which includes hypoglycemia and became overweight (DCCT.,1993:14). Thus it is always found that patients with type 1 diabetes who are in adolescence and young adulthood usually reduce or underuse their insulin intentionally.

In the item of continuity of insulin injection, it was appeared that 23.3% of the samples took insulin irregularly, and 13.3% of the samples did not inject insulin for more than one month (Table 6), and the reasons were they had inadequate knowledge

about diabetic complications (53.3%) and pain intolerance (30%)(Table 10). These findings can be explained because the therapeutic regimen in most patients with type 1 diabetes is demanding and highly intrusive into normal lifestyle. Further, they learn that when they occasionally omit the daily insulin injection there is nothing untoward happens (Drash & Becker, 1991:927).

2. Dietary management and the obstacles to dietary management.

The majority of the samples agreed that dietary management was the most difficult aspect for them. 46% of the samples had bad control in their eating and also found that they preferred high fat and high carbohydrate diet(Table 7). This was in accordance with the study results of Uruwan Yamborisuth (B.E.2536:759) which indicated that fried food was the favorite food choice of schoolchildren in Bangkok. It was also revealed in this study that 30% of the samples had moderate control in their eating (Table 7). But it was found that ice cream is the kind of food which many samples said was difficult to exert self-restraint. This is in harmony with the study of Saovaros Meekusol (1999:59) which indicated that ice cream is another favorite food choice of adolescents particularly the tasty, foreign-formulated ice creams.

In the part of the obstacles to dietary management it was revealed that lack of self-control in eating was the major obstacle for this aspect (83.3%) and the next was inconvenient to choose appropriate food when eating out which represented 56.7% (Table 11). These findings can be explained that even though adolescents had increased emotional maturity, but was accompanied by peer conformity and experimentation. The presence of diabetes which is demanding in dietary control will make them be unable to exert self-denial or self-restraint in their eating (Daneman &

Frank, 1996:686). In addition, high fat and sugary food or beverages are accessible in every school, college, office and department store in Bangkok, further, they have an attractive appearance and taste, and people are influenced by advertisements also.

It was found that 10% of the samples in this study had strict control in dietary management (Table 7) and also found that all of them are females, both adolescents and young adults. They gave the reason that they did not want to be obese and this was the leading reason for underuse of insulin because they always develop hypoglycemia from extreme dietary constraints. This is in harmony with Daneman and Frank's conclusion that subclinical eating disorders may be more common in teenage girls with type 1 diabetes and poor metabolic control may be the result of binge eating and insulin omission as common features (1996:714).

3. Physical exercise and obstacles to physical exercise

The majority of the samples did not perform any physical exercise (63.3%), about 20% of the samples exercised irregularly, and only 16.7% of the samples had regular exercise (Table 8), whereas lack of a companion represented the most common obstacle to perform exercise regularly (33.3%)(Table12). This finding can be explained because people living in Bangkok seldom had physical exercise because of lack of suitable places for exercise or sport and the congestion of traffic in this city is a common barrier to travel. So there are only a few people who had regular physical exercise . Thus it was a major reason for lacking a companion for exercise of the samples in this study. This study result is in accordance to the study of Monthicha Anukoolwuthipong (B.E.2540:73,74) which indicated that the adolescents in Bangkok

lacked exercise and the most common barriers were having no time and lack of suitable places or materials for exercise and sport .

It is also manifested from this study that 30% of the samples disliked to exercise which was a reason for refusing to exercise(Table 12). This finding can be explained, in addition to the less physical exercise of people living in Bangkok There was a leading cause of having no role model to perform physical exercise and then the habit formed of disliking to perform exercise for youngsters. Furthermore, nowadays there are varieties of interesting recreations , especially computer games that is also a common cause for lack of exercise of young people . In addition , the study also showed that 30% of the samples had diabetic complications that were the obstacle to perform exercise(Table 12). This finding corresponds to the study of Ary, et al. (1986:170) which indicated that the most common barrier to exercise is negative physical reaction (34%) .Furthermore, the demographic findings of the samples shown that 23.3 % of the samples in this study have had diabetes for more than 10 years (Table 3) and the most chronic complication most occurred in the samples were retinopathy (Table 5). These findings can be explained that the variety of chronic complications from diabetes will occur when patients have had diabetes for more than 10 years. In addition, worsening of retinopathy has been reported in patient who has engaged in vigorous exercise (Horton, 1988:201).

Further, one half of the samples who performed physical exercise regularly in this study always had hypoglycemic episodes during and after exercise which was due to having inadequate knowledge for safe exercise. According to Allan and Beker's suggestion ; ' the insulin-treated patient also requires adequate knowledge of both

insulin administration and the integration of dietary intake to ensure that hypoglycemia is prevented during intervals of vigorous exercise' (1991:923).

4. Self-monitoring of blood glucose and the obstacles to self-monitoring of blood glucose.

The majority of the samples in this study had a device for self-monitoring of blood glucose (66.7%) but most of them did not monitor blood glucose (45%), only 15% of the samples monitored their blood glucose daily(Table 9). The major obstacle in this issue was inconvenient (60%), pain intolerance (43.3%) and financial problem (40%)(Table 13).

This finding can be explained because the therapeutic regimen for diabetic control in patients with type 1 diabetes is complex, demanding and highly intrusive into normal lifestyle especially in young people's lifestyle. Further the regimens are always invasive, for example insulin injection 2-4 times daily, plus striking the fingers for monitoring blood glucose 2-4 times daily also. Thus both aspects are more likely to be avoided. However, insulin injection is generally accepted as essential for their life, so few patients will regularly omit insulin injections. On the other hand, many patient find it easy to avoid monitoring blood glucose which is in accordance with Friedman ,et al.(1992:158) who concluded that in many patients the enthusiasm for daily self-monitoring of blood glucose gradually wanes and eventually they stop measuring blood sugar levels completely. Furthermore, it also corresponds with the American Diabetes Association (1999:S77) which concluded much data indicating that only a minority of people perform self-monitoring of blood glucose regularly. Barriers to increased use of self-monitoring of blood glucose included cost of testing, inadequate

understanding by both health care providers and patients about the health benefits and proper use of blood glucose results, patient's psychological and physical discomfort associated with finger-prick blood sampling and inconvenience of testing in terms of time requirements.

It can be concluded from this study that the most common obstacles to each aspect of diabetic control were intrinsic obstacles which included psychosocial issues, management problems, diabetic complications, inadequate knowledge, and misbelief. Moreover, extrinsic obstacles that included poor social support and economic problem also played a role in diabetic control of the samples. The results from this study is in accordance with the findings of Wdowick, et al.(1997:560) which indicated that barriers to successful diabetes management of college students with diabetes were time management, stress hypoglycemic reaction, diet management constraints, and inadequate finances.

CHAPTER VI

CONCLUSION

Summary of the Study

This study is a descriptive research, aimed to examine the diabetic control and the obstacles to diabetic control of adolescents and young adults with type 1 diabetes . The samples in this study comprised 30 adolescents and young adults with poorly control of type 1 diabetes who attending the diabetic clinic at King Chulalongkorn Memorial Hospital during February to March ,2000.

The instruments of this study consisted of 1). the interviews " *the diabetic control and the obstacles to diabetic control of adolescents and young adults with type 1 diabetes* " , 2). logbook for recording dietary recall and insulin injection, and 3). the diabetic control manual for patient with type 1 diabetes . The obtained data were analyzed by content analysis.Findings of the study can be summarized as follows :

1. Characteristics of adolescents and young adults with type 1 diabetes.

The samples consisted of 60% of young adults, about 30% of the samples were employees equal to unemployed and 27% of them were students. The household economics were in adequate level, with some savings which representing 47% of the sample group. Most of them had duration of diabetes in the range of 1-5 years which representing 40%. The glycosylated hemoglobin (HbA1c) of the samples was in the range of 9.0-10% representing 47% of the sample group.

2. The diabetic control of adolescents and young adults with type 1 diabetes.

For insulin administration, the study results shown that 93.3% of the samples took insulin at different time, and 88% of the samples took their insulin less than 30 minutes before mealtimes.

For dietary management, it was found from the study that the majority of the samples had bad control (53.3%). It was also shown from the study that the samples preferred high fat and carbohydrate diet.

For physical exercise, it was obvious from the study that the majority of the samples did not perform any physical exercise (63.3%), whereas only 16.7% of the samples performed exercise regularly.

For self-monitoring of blood glucose, the findings revealed that the majority of the samples had the device for self-monitoring of blood glucose which stand for 66.7% but most of them did not monitor their blood glucose (45%).

3. The obstacles to diabetic control of adolescents and young adults with type 1 diabetes.

For insulin administration, the most common of obstacle to insulin administration was management problems (83%).

For dietary management, lack of self-control and inconvenient to choose appropriate food when eating out were considered the most obstacles to dietary management (83.3% and 56.7%, respectively).

For physical exercise, the findings revealed that lack of a companion, dislike, and diabetic complications were being the most obstacles to performed physical exercise regularly which stand for 33.3%, 30% and 30% respectively.

For self-monitoring of blood glucose, it was shown from the study that inconvenience and pain intolerance were the reasons given for did not monitor their blood glucose regularly, which represent 60% and 43.3%, respectively.

The results from this study can be concluded that the majority of obstacles to diabetic control of adolescents and young adults with type 1 diabetes were intrinsic obstacles, which included psychosocial issues, management problems, diabetic complications, lack of knowledge, and misbeliefs about diabetic control. There were some extrinsic obstacles that also affected their diabetic control, which included poor social support and financial problem.

Implications and Recommendations

The proposed recommendations resulting from this study are as follow :

1. The results of the study indicated that the most common obstacle to diabetic control of adolescents and young adults with 1 diabetes are psychosocial issues. To promote good diabetic control for the patients in this age group, health service should implement:

1.1 Establishing a self-help group especially for the adolescent and young adult group should be considered, because it will help the patients learn from experience of the others, both mistakes in diabetes management and health benefits from good diabetic control. In addition, it will help the patients to share and support each other in increased willingness to control their diabetes.

1.2 The diabetes team should also include psychologists to care for adolescents and young adults with type 1 diabetes and their families who face psychoemotional problems.

2. The results from the study also indicated that another obstacle to diabetic control was lack of knowledge of diabetic management. To contribute to diabetes knowledge, the nurses should understand the development of adolescence and the young adulthood period, in order to provide education about diabetes care and management that matched with their daily life-styles or their activities.

3. The finding of this study indicated that poor social support was one of the obstacles to diabetic control. To promote social support of the patients, the family or peer group must be knowledgeable about diabetes, and the nurse should collaborate with the family or peer group to facilitate adherence to diabetic control.

4. The results of this study shown that the majority of adolescents and young adults with type 1 diabetes took insulin incorrectly. To promote correct insulin administration, nurses should not only provide education about insulin injection techniques but they should also teach patients the skills to integrate insulin administration and preparation meal times in their daily activities.

5. The diabetic education teams should be trained to have depth knowledge and skill in the diabetic management and control, and also the teaching and counseling method. The Team should consist of diabetologist, nurses, dietitian, psychologist, and social workers

Implications for future studies

1. In future studies of the diabetic control of adolescents and young adults with type 1 diabetes the techniques of indepth interviews should be considered to explore more details of diabetic control.

2. Future studies are needed to develop coping strategies resulting in overcoming barriers to poor diabetic control.

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APPENDIX

APPENDIX A

List of Experts

Appendix A.
List of Experts

There are two experts who have validated ' the interview diabetic control and the obstacles to diabetic control of adolescents and young adults with type 1 diabetes ' They are :

1. Sompongse Suwanwalaikorn, M.D.
   Assistant Professor
   Division of Endocrinology and Metabolism
   Department of Medicine,
   Faculty of Medicine,
   Chulalongkorn University.

2. Manee Ouichareonpong, R.N.
   Nurse Specialist Level 7
   Ambulatory Care Unit
   Nursing Department,
   King Chulalongkorn Memorial Hospital.

There is one expert who has validated ' The diabetic control manual for patients with type 1 diabetes '. He is :

1. Sompongse Suwanwalaikorn, M.D.
   Assistant Professor
   Division of Endocrinology and Metabolism
   Department of Medicine,
   Faculty of Medicine,
   Chulalongkorn University.

APPENDIX B

Information Consent Form

Appendix B.

Consent Form For Adolescent and Young Adult with Type 1 Diabetes

My name is Sholaosri Sangeam. I am a nurse working at King Chulalongkorn Memorial Hospital. I am also a master degree student at the Faculty of Nursing (Siriraj), Mahidol University. I am studying about diabetic control of adolescents and young adult with type 1 diabetes. You are invited to participated in the study because your data is interesting.

The study involves an interview about your diabetic control and the obstacles to your diabetic control, which will take approximately 45-60 minutes. The interview will take place here or at your home as you prefer. The information from the study will help nurses and other health care provider provide better care for adolescents and young adult with type 1 diabetes. The interview will be audio taped for data analyzing. Any information that is obtained from this study that can identify you will be kept confidential, and you will be not personally identified in any reports about this study. You can free to withdraw at any time. Your care at this clinic will not be affected by your decision to either participate or not in this study.

If you have any questions now or at any time during this study, please ask or discuss them with me. You can contact me at the following address:

Miss Shalaosri Sangeam.
Ambulatory Care Unit, King Chulalongkorn Memorial Hospital.
Tel : 2565416 or 01-6184668

This study information has been explained and I voluntary agree to consent to participate in this study.

.....
(Signature of the participant)
Date.....

THAI TRANSLATION FORM

Consent Form for Adolescent and Young Adult with Type 1 Diabetes

ดิฉัน นางสาว เฉลาศรี เสงี่ยม เป็นพยาบาลประจำการที่โรงพยาบาลจุฬาลงกรณ์ ดิฉันเป็นนักศึกษาปริญญาโท คณะพยาบาลศาสตร์ (ศิริราช) มหาวิทยาลัยมหิดล ดิฉันกำลังศึกษาเรื่องการควบคุมเบาหวานของวัยรุ่นและหนุ่มสาวที่เป็นโรคเบาหวานชนิดที่ 1 คุณได้รับการเชิญให้เข้าร่วมในการศึกษาครั้งนี้ เนื่องจากข้อมูลของคุณเป็นที่น่าสนใจ

การศึกษาครั้งนี้เป็นการสัมภาษณ์เกี่ยวกับ การควบคุมเบาหวานและอุปสรรคต่อการควบคุมเบาหวานของคุณ ซึ่งใช้เวลาประมาณ 45-60 นาที การสัมภาษณ์อาจกระทำที่นี่หรือที่บ้านของคุณแล้วแต่ความพอใจของคุณ ข้อมูลที่ได้จากการศึกษานี้จะช่วยให้พยาบาลและบุคลากรด้านสุขภาพต่างๆ ให้บริการที่ดีขึ้นแก่วัยรุ่นและหนุ่มสาวที่เป็นโรคเบาหวานชนิดที่ 1

การสัมภาษณ์ในครั้งนี้จะเป็นการบันทึกเสียงลงในเครื่องบันทึกเสียงเพื่อนำไปวิเคราะห์ข้อมูล ซึ่งข้อมูลที่สามารถบ่งบอกว่าคุณเป็นใครจะเป็นความลับและจะไม่ถูกนำเสนอลงในเอกสารใดๆของการศึกษานี้ คุณมีสิทธิ์ที่จะถอนตัวจากการศึกษาได้ทุกเวลาโดยไม่มีผลต่อการได้รับบริการจากคลินิกนี้ ไม่ว่าคุณจะตัดสินใจเข้าร่วมในการศึกษานี้หรือไม่ก็ตาม

หากคุณมีข้อสงสัยทั้งในขณะนี้หรือระหว่างการศึกษา กรุณาสอบถามหรือแสดงความเห็นกับดิฉันได้ คุณสามารถติดต่อดิฉันได้ดังที่อยู่ข้างล่างนี้

นางสาว เฉลาศรี เสงี่ยม
หน่วยพัฒนาสุขภาพ โรงพยาบาลจุฬาลงกรณ์
โทรศัพท์ 2565416 หรือ 01-6184668

ข้าพเจ้าได้รับการอธิบายตามรายละเอียดข้างต้น มีความเข้าใจและยินดีที่จะเข้าร่วมการศึกษาครั้งนี้

.....
(ลายมือชื่อผู้เข้าร่วมในการศึกษา)
วันที่.....

Appendix C

The instruments

Appendix C

The interview about diabetic control and the obstacle to diabetic control of adolescent and young adult with type 1 diabetes.

แบบสัมภาษณ์เลขที่.....

ส่วนที่ 1 : แบบสัมภาษณ์ข้อมูลส่วนบุคคลของวัยรุ่นและหนุ่มสาวที่เป็นโรคเบาหวานชนิดที่ 1

1. ชื่อ.....นามสกุล.....เลขที่ทั่วไป.....
2. อายุ.....ปี
3. เชื้อชาติ.....ศาสนา.....
4. สถานที่อยู่อาศัย.....

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13. โรคแทรกซ้อนเรื้อรังที่เกิดขึ้น.....

<u>ส่วนที่ 2</u> แบบสัมภาษณ์การควบคุมเบาหวาน และอุปสรรคต่อการควบคุมเบาหวานของวัยรุ่นและหนุ่มสาวที่เป็นโรคเบาหวานชนิดที่ 1

1. หมวดการฉีดอินสุลิน
   - ท่านเตรียมอินสุลินและฉีดอินสุลินได้ด้วยตนเองหรือไม่.....
   - ท่านฉีดอินสุลินตามปริมาณที่แพทย์กำหนดให้หรือไม่.....

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อุปสรรคต่อการฉีดอินสุลินที่ถูกต้อง

- ลักษณะการดำเนินชีวิตประจำวัน เช่น การเรียนหนังสือ การทำงาน การคบเพื่อน การมีกิจกรรมต่างๆกับเพื่อนฝูงหรือคนรอบข้าง เป็นอุปสรรคต่อการฉีดอินสุลินหรือไม่อย่างไร ?.....

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- นอกเหนือจากที่กล่าวมา ท่านคิดว่ามีอุปสรรคอื่นๆที่มีผลต่อการฉีดอินสุลินอีกหรือไม่ อย่างไร ?.....

2. หมวดการรับประทานอาหารที่เหมาะสม

โปรดบันทึกรายการอาหารและเครื่องดื่มที่ท่านรับประทานและดื่มในระยะเวลา 1 สัปดาห์ตามความเป็นจริง โดยระบุเวลาที่รับประทานและเวลาในการฉีดอินสุลินด้วย

.....

อุปสรรคต่อการรับประทานอาหารที่เหมาะสม

- ลักษณะการดำเนินชีวิตประจำวัน เช่น การเรียนหนังสือ การทำงาน การคบเพื่อน การมีกิจกรรมต่างๆกับเพื่อนฝูงหรือคนรอบข้าง เป็นอุปสรรคต่อการรับประทานอาหารที่เหมาะสมหรือไม่ อย่างไร ?.....

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3. หมวดการออกกำลังกายอย่างปลอดภัย

- ท่านออกกำลังกายหรือไม่?.....
- ท่านออกกำลังกายประเภทใด?.....
- ท่านออกกำลังกายกี่ครั้งใน 1 สัปดาห์ และใช้เวลานานเท่าใดในการออกกำลังกายแต่ละครั้ง?.....

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อุปสรรคต่อการออกกำลังกายที่ปลอดภัย

- ลักษณะการดำเนินชีวิตประจำวัน เช่น การเรียนหนังสือ การทำงาน การคบเพื่อน การมีกิจกรรมต่างๆกับเพื่อนฝูงหรือคนรอบข้าง เป็นอุปสรรคต่อการออกกำลังกายที่ปลอดภัยหรือไม่ อย่างไร ?

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4. การตรวจน้ำตาลในเลือดด้วยตนเอง

-ท่านตรวจน้ำตาลในเลือดด้วยตนเองหรือไม่?.....

-ท่านมีวิธีการตรวจน้ำตาลในเลือดอย่างไร และตรวจในเวลาใดบ้าง ?.....

อุปสรรคต่อการตรวจน้ำตาลในเลือดด้วยตนเอง

- ลักษณะการดำเนินชีวิตประจำวัน เช่น การเรียนหนังสือ การทำงาน การคบเพื่อน การมีกิจกรรมต่างๆกับเพื่อนฝูงหรือคนรอบข้าง เป็นอุปสรรคต่อการตรวจน้ำตาลในเลือดด้วยตนเอง หรือไม่ อย่างไร ?.....

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- นอกเหนือจากที่กล่าวมา ท่านคิดว่ามีอุปสรรคอื่นๆที่มีผลต่อการตรวจน้ำตาลในเลือดด้วยตนเองและการติดตามการควบคุมเบาหวานในระยะยาวอีกหรือหรือไม่ อย่างไร ?

.....

The logbook for recording dietary recall and insulin injection during one week.

ชื่อ.....นามสกุล.....

กรุณาบันทึกการรับประทานอาหาร-เครื่องดื่ม และการฉีดอินสุลิน ตามความเป็นจริงที่ท่านปฏิบัติในระยะเวลา 1 สัปดาห์

วันที่	เวลาที่ฉีดอินสุลิน	เวลาที่รับประทานอาหาร	รายการอาหารและเครื่องดื่ม	ปริมาณที่รับประทาน

BIOGRAPHY

NAME	Miss Shalaosri Sangeam
DATE OF BIRTH	4 January 1964
PLACE OF BIRTH	Bangkok, Thailand
INSTITUTION ATTENDED	Thai Red Cross college of Nursing, 1983-1987 Bachelor of Nursing Mahidol University, 1998 – 2000 Master of Nursing Science.
POSITION AND OFFICE	Registered Nurse at Medical Ward, 1987-1994. Registered Nurse at Ambulatory Care Unit, 1994-present.