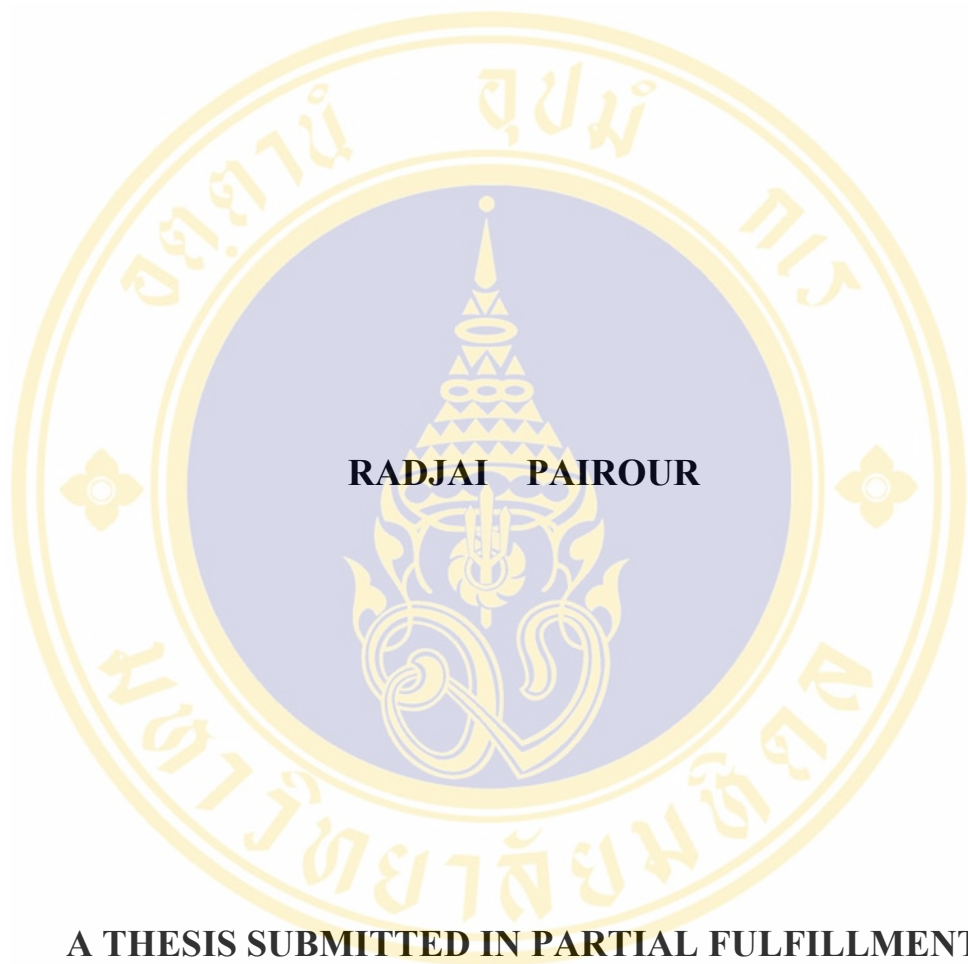


**THE INFLUENCE OF LEARNED RESOURCEFULNESS ON
FASTING PLASMA GLUCOSE LEVEL BY MEDIATING EFFECT
OF DIABETIC CONTROLLED BEHAVIORS
OF DIABETIC TYPE 2 PERSONS**



**A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF NURSING SCIENCE
(ADULT NURSING)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY**

2003

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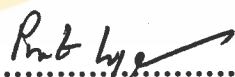
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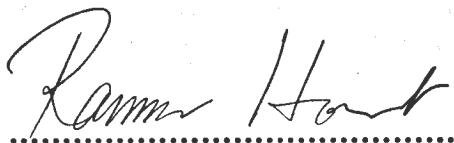
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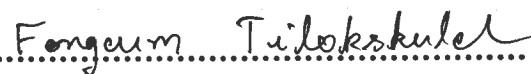
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was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Master of Nursing Science (Adult Nursing)

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Radjai Pairour

**THE INFLUENCE OF LEARNED RESOURCEFULNESS ON FASTING PLASMA
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ABSTRACT

This descriptive correlational study aimed at examining the influences of learned resourcefulness on fasting plasma glucose through diabetic controlled behaviors among diabetes mellitus type 2 individuals. Eighty-four diabetes mellitus type 2 individuals voluntarily participated in this study. They were recruited from the Diabetic Clinic, Out-patient Department of Wang-Num-Yen Hospital at Sa-Kaew Province. The data were collected from June to July 2003. The data were analyzed by using descriptive statistics and path analysis. To do path analysis, Lindley & Walker's causal model testing was used through performing a set of multiple regression.

The majority of the samples were female (81%) with the mean age of 56.9 years. Sixty-one percent of them have been diagnosed as a diabetes mellitus type 2 for less than 5 years. Fifty-seven percent out of 67 % of those who reported they have health complication or comorbidity along with diabetes mellitus had hypertension. The means score of learned resourcefulness was marginally moderate (Mean = 121.39, S.D = 17.4), fasting plasma glucose was marginally above controllable level (Mean = 142.23, S.D = 28.64), and diabetic controlled behaviors was nearly at a good level of practice (Mean = 2.99, S.D = 0.30). The findings indicated that learned resourcefulness has both a direct effect on fasting plasma glucose ($F_{(2,84)}=14.32, p<.01$) and partially indirect effect on fasting plasma glucose through diabetic controlled behaviors ($F_{(2,84)}=17.25, p<.05$).

The findings suggest that nurses should primarily assess an individual personal learned skill. Additionally, nurses should conduct a program for promoting resourcefulness skills through teaching or training skill program for Diabetic type 2 persons to improve diabetic controlled behaviors and FPG.

**KEY WORDS: LEARNED RESOURCEFULNESS /FASTING PLASMA GLUCOSE /
DIABETIC CONTROLLED BEHAVIORS / DIABETIC TYPE 2
PERSONS**

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อิทธิพลของแหล่งทักษะภายในตนเองต่อระดับน้ำตาลในเลือด โดยส่งผ่านการปฏิบัติตนในการควบคุมเบาหวานของผู้เป็นเบาหวานชนิดที่ 2 (THE INFLUENCE OF LEARNED RESOURCEFULNESS ON FASTING PLASMA GLUCOSE LEVEL BY MEDIATING EFFECT OF DIABETIC CONTROLLED BEHAVIORS OF DIABETIC TYPE 2 PERSONS)

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บทคัดย่อ

การวิจัยครั้งนี้เป็นการวิจัยเชิงบรรยาย เพื่อศึกษาอิทธิพลของแหล่งทักษะภายในตนเอง ต่อระดับน้ำตาลในเลือด โดยส่งผ่านการปฏิบัติตนในการควบคุมเบาหวานของผู้เป็นเบาหวานชนิดที่ 2 กลุ่มตัวอย่างคือผู้เป็นเบาหวานชนิดที่ 2 ที่มารับการตรวจที่คลินิกเบาหวานโรงพยาบาลวังน้ำเย็น จังหวัดสระแก้ว ตั้งแต่เดือนมิถุนายน ถึงเดือนกรกฎาคม 2546 จำนวน 84 ราย เก็บรวบรวมข้อมูลโดยการสัมภาษณ์ วิเคราะห์ข้อมูลโดยใช้สถิติพรรณนาและการวิเคราะห์แบบเชิงเส้น และการวิเคราะห์หาคออยแบบเส้นตรงพหุคูณ ตามขั้นตอนของการทดสอบ Mediating function ของ Lindley & Walker (1993)

ผลการศึกษาพบว่าผู้เป็นเบาหวานชนิดที่ 2 ส่วนใหญ่เป็นเพศหญิง (81%) มีระยะเวลาเป็นโรค ≤ 5 ปี (60.7%) ส่วนใหญ่มีภาวะแทรกซ้อนหรือโรคร่วม (66.7%) และโรคความดันโลหิตสูงเป็นโรคที่พบมากที่สุด (57.1 %) กลุ่มตัวอย่างมีแหล่งทักษะภายในตนเองโดยเฉลี่ยอยู่ในระดับปานกลาง (Mean =121.39, S.D= 17.4) มีค่าเฉลี่ยระดับน้ำตาลในเลือดใกล้เคียงปกติกับค่าที่สามารถควบคุมระดับน้ำตาลในเลือดได้ (Mean =142.23, SD=28.64) มีค่าเฉลี่ยการปฏิบัติตนในการควบคุมเบาหวานโดยรวมอยู่ในระดับค่อนข้างดี (Mean = 2.99, S.D = 0.30) และพบว่าแหล่งทักษะภายในตนเองมีผลต่อระดับน้ำตาลในเลือด ทั้งทางตรง ($F_{(2,84)}=14.32, p<.01$) และมีผลทางอ้อม โดยส่งผ่านการปฏิบัติตนในการควบคุมเบาหวาน ($F_{(2,84)} , p<.05$)

จากผลการวิจัยมีข้อเสนอแนะว่าพยาบาลควรให้ความสำคัญในการประเมินทักษะภายในตนเอง รวมทั้งหาแนวทางพัฒนาโปรแกรมโดยอาจเป็นการสอนหรือฝึกเพื่อส่งเสริมแหล่งทักษะภายในตนเองให้กับผู้เป็นเบาหวานชนิดที่ 2 เพื่อสนับสนุนให้มีการปฏิบัติตนในการควบคุมเบาหวานและมีระดับน้ำตาลในเลือดที่ดีขึ้นด้วย

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CHAPTER I

INTRODUCTION

Background and Significance of the Study

Diabetes Mellitus is a chronic disease causing health problem that the global public health is seriously concerned to diminish the diabetic phenomena and its increased annual frequency, particularly the diabetic type 2 persons increasing in the developing countries. Thailand was estimated to have 863,000 diabetes in 1995 and the diabetes rate will be double in the year of 2020 (WHO, 2001) with 99% of the diabetic type 2 persons (Tanasukarn, C., 1999: 1). The illness rate of diabetes mellitus causing admission was 257.59 diabetes: 100,000 populations in 2000 that was increased as 183.38% from 1994 (Chupraphawan, J., (Ed.), 2000: 78). The increased admission rate indicated poor controlled diabetes behavior or failed health management that could lead severe symptoms and admission. Rachatanawin, R., et al.(1987) addressed that 140 diabetic types 2 persons who were treated at Ramathibordee Hospital had poor diabetic controlled behavior as 89.3% and 41.4% gained complications such as hypertension, degenerated retina, nephritis and Coronary-artery diseases (Sirivejchadarak, P., 1996: 377-385). A major cause of complications was uncontrollable plasma glucose level (Lam, et al., 1995: 6-11). The protection and the decrease of acute and chronic complications enhance better quality of life (Samart, W., 1999: 156) and the risk of death. A major purpose of caring diabetes was to control plasma glucose level as immediate normal level (Diabetes control and complications trial research group, 1993: 977). There were main concepts of diabetic controlled behaviors aiming to keep plasma glucose level in good shape as diet control, exercise, drug administration and health-concern with proper following-up activities (American Diabetes Association, 2000). Those were difficult to do and have effects on diabetic patients' lives requiring to the adaptation of their lifestyles (Toljamo & Hentinen, 2001: 780). The success of controlling plasma glucose level

significantly depends on patient behaviors. As the previous studies, diabetic patients failed to control their proper diabetic behaviors and daily lifestyles that promoted their health such as diet control, daily exercise, and drug administration. Those were confirmed from many diabetic patients gained higher plasma glucose level and some had other complications leading to have some following effects to patients and families (Rachatanawin, R., et al., 1987: 183-215; Ary, et al., 1986: 168-172; Hentinen & Kyngas, 1992: 530-536; Wara-ausawapati, S., 1993: a).

Several studies stated that diabetic patients failed to control their fasting plasma glucose level because they lacked of knowledge. Consequently, most studies highlighted the efficiency of acknowledgement in diabetes mellitus, proper diabetic behaviors relating to positive controlled plasma glucose level and metabolism. The study on Meta-Analysis of Meenethtip, S. (1998) and Brown (1990) expressed that the efficiency of acknowledgement in diabetes mellitus and proper diabetic behaviors influenced to the capability of metabolism and control on plasma glucose level. That meant more proper acknowledgement was, better diabetic behaviors were. On the other hand, there are many researches against on the presented result e.g. Tuntayothai, W. (1982), Siritharangsee, B. (1984), Lertprapai, K. (1996), Arunneth, P. (1998), Brown (1990), Dunn, et al. (1990), and Navicharern, R. (1999) their studies demonstrated only knowledge in disease and proper diabetic behavior was not enough to guarantee good diabetic behavior and the success of controlling the plasma glucose level (Coats & Boore, 1998: 534).

Consequently, many factors influenced to the diabetic self-care or controlling plasma glucose level, particularly psychosocial factor relating to health belief, locus of control, and self-esteem. Those studies exhibited those factors earned low-to-medium level of the positive relation with the diabetic behavior in self-practice and self-care to control plasma glucose level with the statistic level of significance (Kainil, G., 1994; Siritharangsee, B., 1990; Kaewpralome, S., 1995; Yainontad, K., 1999). Those results confirmed that positive results in self-practice should begin with their believes in their efficacy and themselves. However only the psychosocial efficacy may not assure the highest efficacy and the success of self-control in plasma glucose level. Pokaratanasiri, V., et al. (1995) studied on the relation between the self-efficacy and the control of plasma glucose level. The result showed that self-efficacy

had no relation with the control of plasma glucose level with the statistic level of significance because proper diabetic behavior disturbed diabetic patient's previous lifestyles. The integrated learned resourcefulness would enhance diabetic patients to have well management with current circumstance and good attitude to adapt themselves with proper diabetic behavior and high caution (Rosenbaum, 1989: 251).

The theory of Learned Resourcefulness (LR) is the theory relating to the integration of skills e.g. self-control skills, problem-solving skills, self-efficacy and delay immediate gratification that those should be pursuant to constantly practice for the highest desirable results. Those skills performed well together initially promoting self-control behaviors and the target or adaptive behavior, finally leading to good quality of life (Rosenbaum, 1983: 1990). Hence, the success or failure of self-control aiming to control good plasma glucose level may relate to the learned resourcefulness of diabetic patients.

As the literature review associating with the learned resourcefulness and diabetic practice behavior regarding to the treatments or self-care for the responses of self-control in diabetes mellitus in normal people (Zauszniewski, et al., 2001: 490-503) and chronic diabetic patients (Aiken, et al., 1992: 113-118; Braden, 1990: 42-46, 1991: 158-166; 1993: 38-44) that the learned resourcefulness exhibited the positive relation and was an influence of diabetic practice behavior or self-control with the statistic level of significance. Beside Aiken, et al.(1992: 116) stated that the learned resourcefulness related to the self-control behavior in diabetic patients and had a positive relation with the plasma glucose level with the statistic level of significance, but this study were the context studies in diabetic type 1 persons in foreign countries that should differ from the context study in diabetic type 2 persons in Thailand.

Consequently, the researcher was interested in the study on the influence of the learned resourcefulness (LR) on fasting plasma glucose level by mediating effect of diabetic controlled behaviors of diabetic type 2 persons with the conceptual framework as in the diagram 2. The expected research results will be beneficial to establish the proper guideline of nursing care for diabetic type 2 patients in self-control behavior aiming to have normal or immediate normal plasma glucose level and pleasant lifestyles.

Research Question

Have the influence of learned resourcefulness to fasting plasma glucose level by mediating effect of diabetic controlled behaviors of diabetic type 2 persons?

Purpose of the Study

1. To examine learned resourcefulness, diabetic controlled behaviors, and fasting plasma glucose level of diabetic type 2 persons.
2. To examine the influence of learned resourcefulness to fasting plasma glucose level by mediating effect of diabetic controlled behaviors of diabetic type 2 persons

Conceptual Framework

This study employs the theory of learned resourcefulness by Rosenbaum (1983, 1990) to be the conceptual framework. In regular basis, human beings have their own learned resourcefulness. The crisis circumstance that invaded their daily lifestyles or disturbed their perception causes the stress. An intrinsic physical mechanism begins to percept and to evaluate the situation: may harm or not harm to their lives. If it is harmless, they will ignore it and keep going what their lives. As the same time, if it is harm to their lives, they have to eliminate the harmful situation. Their learned resourcefulness will be retrieved to deal with those harmful events by mediating the proper combined skills. For instance self-control skills that assisted people to minimize and eliminate previous stress or unpleasant feelings enhancing active capability. Redressed self-control is to keep inner balance. Problem-solving skills refer to the strategy of utilizing problem-solving skills to promote self-control such definition of problems, planning, analysis, and determination of solutions including expected results. Self-efficacy is self-belief for managing problems or events with peak performance. Delay immediate gratification is individual capability

of patience for the constant proper practice behavior that is not automatic but needs an attention and passes the process regulating cognition to have the order of self-control behavior, the creative behavior achieving target behavior and happiness.

To be acknowledged with the diagnosis of diabetic mellitus, a chronic disease as uncured disease, seems like a thunderbolt or threat of anyone life that influences those people to change their regular lifestyles such as diabetic controlled behaviors in diet control, exercise, drug administration and treatment follow-up. Diabetic controlled behaviors promote normal or immediate plasma glucose level and protect from possible complications. Those practices regarding to the diabetic controlled behaviors create the stress and difficulty because diabetic mellitus itself produces several life-threat complications. Hence, the process regulating cognition of diabetic patients reacts to eliminate the life threat–diabetic mellitus by utilizing the learned resourcefulness in the diabetic self-control behavior leading to have normal or immediate plasma glucose level.

As the theoretical conceptual framework of Rosenbaum (1983, 1990) in this study, the researcher applied it with the concept of Fawcett and Down (1992: 101-115) that was the conceptual-theoretical-empirical having the self-control behaviors as the structural variable and diabetic self-control as the connected variable from self-control behaviors. The created questionnaires regarding to the concept of self-control diabetic mellitus by the researcher was used to interview diabetic type 2 persons about their current diabetic self-controlled behaviors in diet control, exercise, drug administration and treatment follow-up. Personality repertoires were the structural variables being definite as a learned resourcefulness and being studied by measuring variable with the Self-Control Schedule of Rosembaum (1983). The concept of target behavior that was connected to be glycemic-control behavior was studied as a variable level by recording the morning fasting plasma glucose level (FPG), 3 constant time within 3 months and bringing those FPG to compute the means (mg/dl.). The overview of connected concept of the conceptual-theoretical-empirical is in figure 1.

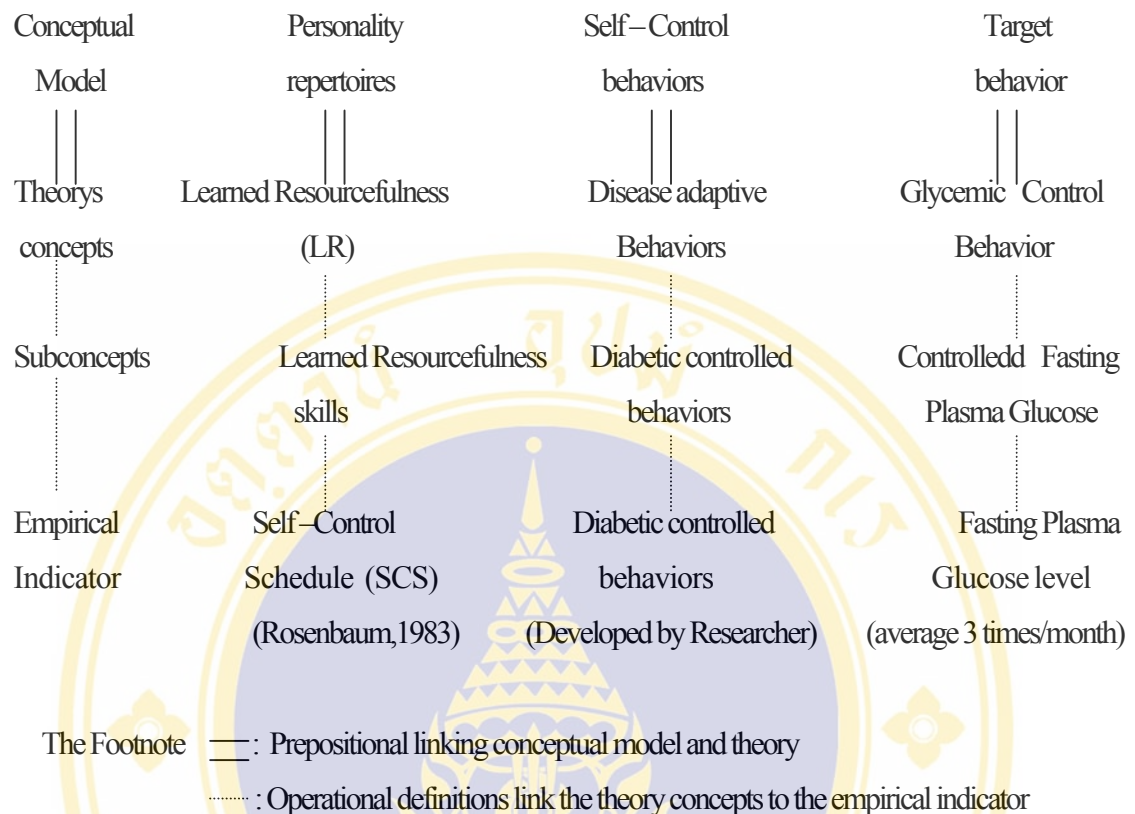


Figure 1: Conceptual Framework of the Connected Concept in Learned Resourcefulness Theory with variables and the conceptual-theoretical-empirical (modified regarding to the concept of Fawcett & Down, 1992: 106)

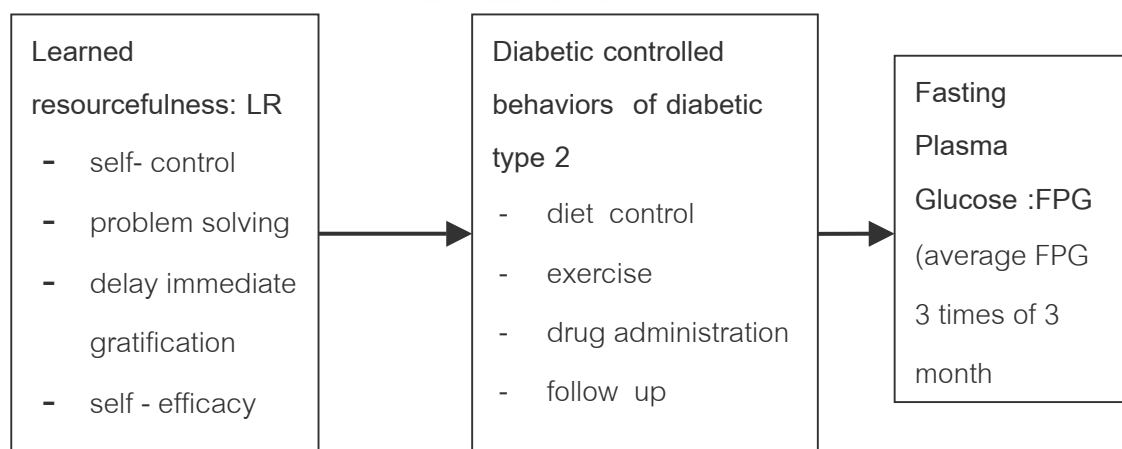


Figure 2: Conceptual framework presenting the relationship among variables in the study

Hypothesis of the Study

Learned resourcefulness has the influence to fasting plasma glucose level by mediating effect of diabetic controlled behaviors of diabetic type 2 persons

Scope of the Study

This study was a descriptive study, which aimed to examine the influence of learned resourcefulness to fasting plasma glucose level by mediating effect of diabetic controlled behaviors of diabetic type 2 persons that attended on diabetic clinic at Wang-Num-Yen Hospital, Sakeaw province.

Expected Outcomes and Benefits

1. Nursing practice: to be clues of nurses or health-care professionals or relatives of diabetic patients having well understanding and realizing the significance of controlled fasting plasma glucose level in diabetic type 2 persons. Also, it was expected that the results of this study could be used as data for evaluating learned resourcefulness in diabetic type 2 persons for effective developing plans of proper diabetic-controlled behaviors.

2. Further researches: to be a basic information for any further researches relating to learned resourcefulness, diabetic controlled behaviors and other topics of fasting plasma glucose level of diabetic type 2 persons.

Assumption of the Study

Every diabetic type 2 patient gains stress from diabetic mellitus and changed daily behaviors for self-control plasma glucose level.

Definition of Terms

Learned Resourcefulness: in this study referred to cognitive skills relating to self-control, problem solving, self-efficacy and delay immediate gratification for the target behaviors and happiness in lives that diabetic patients can employ to be beneficial for controlling fasting plasma glucose level.

In this study, it was measured by the Self-Control Schedule of Rosenbaum (1980), translated by Panitrat, R., (2001). Details are as the followings:

1. Self-control skills were the skills that enhanced people to diminish or eliminate disturbed thinking or feelings leading to effective performance.
2. Problem-solving skills were the strategies of problem solving to control themselves such as definition of problem, planning, analysis, consideration of alternatives and expected results.
3. Self-efficacy was the self-belief of effective managing problems or occasions and achieving the success even if encountered with the difficulty.
4. Delay immediate gratification was a belief in individual capability of patience although those practices were undesirable and prolonged.

Diabetic Controlled Behaviors: in this study referred to behaviors of diabetic patients to control plasma glucose level regarding to the advice of physicians and nurses in proper diet, exercise, drug administration and following-up treatments.

This study, it was measured by diabetic controlled behaviors questionnaire which was developed by the researcher. The questionnaires were emphasized the following details as:

1. Diet control was the practice aiming to control plasma glucose level by stop eating sweet foods and beverages; avoiding or diminishing carbohydrate or animal fat by consuming more vegetables; avoiding snacks and junk foods between meals; and no alcohol drink.
2. Exercise to control plasma glucose level could be any 30-minute constant physical exercises or sweaty housework. It included self-care for determining possible abnormalities during the exercise.

3. Drug administration aimed to control plasma glucose level regarding to the treatments of physicians with the right doses and the right time.

4. Follow-up of the treatments involved with attentive appointments with the follow-up of the fasting plasma glucose level, blood pressure and body weight purposing to be a clue of proper diabetic behavior.

Fasting Plasma Glucose Level: in this study referred to the numeric mean of fasting plasma glucose level (mg/dl.), 3 times in 3 month.

This study, the fasting plasma glucose level in sampling group would be tested by Enzymatic Colorimetric Test (GOD-PAP Method), manual and Spectrophotometer.



CHAPTER II

LITERATURE REVIEW

This study aims to investigate the influence of learned resourcefulness on fasting plasma level by mediating effect of diabetic controlled behaviors of diabetic type 2 persons. Scopes of the research are as follow:

1. Type 2 diabetes mellitus
 - 1.1 Meaning and characteristics of the disease
 - 1.2 Impacts of type 2 diabetes mellitus
 - 1.3 Objective of type 2 diabetes mellitus's treatment
 - 1.4 Fasting plasma glucose as a screening test
 - Significance of the fasting plasma glucose laboratory test
 - Method of fasting plasma glucose
 - 1.5 Diabetic controlled behaviors for control plasma glucose of type 2 diabetic persons; diet control, exercise, drug administration, and follow- up
2. Concept of Learned resourcefulness
 - 2.1 Meaning and characteristics of the Learned resourcefulness' concept
 - 2.2 Components of the Learned resourcefulness' concept
 - 2.3 Evaluation of the Learned resourcefulness' concept
 - 2.4 Effectiveness of learned resourcefulness on chronic illness patients and non disease persons
3. Correlation of the variables
 - 3.1 Correlation between the Learned resourcefulness and plasma glucose level
 - 3.2 Correlation between the diabetic controlled behaviors and plasma glucose level
 - 3.3 Correlation between the Learned resourcefulness and diabetic controlled behaviors
 - 3.4 Correlation among the learned resourcefulness and plasma glucose level and the diabetic controlled behaviors of diabetic type 2 persons
4. Conclusion

1. Type 2 Diabetes Mellitus or Non-Insulin-Dependent Diabetes Mellitus

1.1 Meaning and characteristics of the disease

Type 2 diabetes mellitus or non-insulin-dependent diabetes mellitus is characterized by 2 major abnormalities: insulin resistance of some organs such as muscle, liver, or adipose tissue resulting in defective insulin action (Yki-Jarvinen, 1994: 91-95) and insulin deficiency which caused defective metabolism of carbohydrate, protein, and fat resulting in hyperglycemia (Beare & Mayer, 1994: 1714; Luckman & Sorensen, 1993: 1775; Will & Eighmy, 1998: 304; Sunthornyothin, S., 2000: 26). Thus, the patients will show diabetic clinical manifestations e.g. polyuria, polydipsia, weight loss, and polyphagia. Type 2 diabetes mellitus typically develops in elderly, female, and obese persons (Bloomgarden, 1998: 1024). This type of DM occurs not only from genetic factor, but also from environmental factor which comes from social, traditional, economic, and technology changes resulting in changing of life-style especially increasing high-fat consuming that leads to obesity. Sedentary life-style and lacking of exercise are also the risk factors of this disease (Haffner, 1995: 73s-76s; Lue-Ran, 1999:1; Skarfors, et al., 1991: 755-759; Chantharaprasert, S., 1996:486). When the patients developed diabetes mellitus, the consequences are physical, mental, economic and social impacts.

1.2 Impacts of type 2 diabetes mellitus

Diabetes mellitus can cause the persons lower life quality than normal people with statistical significance (Samart, W., 1999: 156). The severity of physical, mental, economic and social impacts will be increased with the developing of complications, both acute and chronic (Luckman & Sorensen, 1993: 1776; William, 1991: 2028; Tuntayothai, W. and Songdee, A., 1995: 251-253). The physical impact can be shown as hyperglycemia and nonketotic hyperosmolar coma. Prolonged hyperglycemia can cause defects or dysfunction of various organ systems: cardio-vascular system,

neurological system, ophthalmic system, and glomerulo-urinary tract system. For example, coronary-artery disease which has high incident rate and is the primary cause of death at 65% (Wilson, et al., 1998: 1837-1847), diabetic neuropathy which make the persons prone to ulcers and increase 15 times of risk to lower extremity amputations if exacerbated by infections (Himatongkham, T., 1996: 58-64; Moss, 1992: 610-616), visual defect caused by retinopathy, hypertension which caused headache and physical discomforts (Lawang, W., 1999: v). When the persons experienced illness, suffering and worrying will come to their mind as the consequences that have the greater impacts in some cases. According to Lawang, W. (1999: v), most of the diabetic patients, especially women, had mental problems because this illness cannot be cured and contains many permanent limitations in daily life practicing: dietary control, exercise, and good medication control that can cause them to be discouraged, tired, and low self-esteem (Intrasombat, P., 1994: 141-142; Suwannakote, K., 1986: 120-129). As a result, the patients cannot work efficiently and expenses together with treatment cost will be increased because they have to pay 3 times as much as usual when the complications developed. The treatment cost for each hospital admission is average 1670.09 bath per person (Division of Provincial Hospital, 1997 in Churapawan, J., (Ed.), 2000: 248). Comparing with the other patients, diabetic patients have to pay 127 times as much as the normal do, which is the domestic and national lost (Puthsook, P., 1999: d). Therefore, it is a responsible of the patients and the public health officers to prevent the serious illness caused by complications.

1.3 Goal of type 2 diabetes mellitus's treatment

The treatment aims to help patients to live their lives without problems from hyperglycemia, to fix and control plasma glucose level together with other metabolisms as much as possible and maintain this balance for the rest of their lives, and to prevent the complications, especially the chronic ones, which enable them to have normal or almost normal daily lives in society (Chantharaprasert, S., 1996: 45). To achieve these goals, the main idea of the treatment is to control the plasma glucose level as close to normal as possible (Luckman & Sorensen, 1980: 1549; Rattanasam, C.,

1997: 4; Himatongkham, T., 1996: 18; Nittiyanant, W., 1992: 1). The best way to examine plasma glucose level is the laboratory test for plasma glucose.

1.4 Examining of plasma glucose level

1.4.1 Significance of the laboratory test for plasma glucose:

Plasma glucose examination is the laboratory test, which shows the level of glycemia using in diagnosis and diabetic or glycemic evaluation. Hence, it is an important indicator to state how good the patients can control the diabetes or the plasma glucose level. At the same time, it is a certain indicator used in adjusting the effective treatment for each condition to carefully maintain the patient's plasma glucose level as close to normal as possible, as well as to prevent or diminish the complications (Soonthornyothin, S., in Sridama, W., (Ed.), 2000: 258). Recently, the famous examination is fasting plasma glucose (FPG), which can be used to evaluate the sugar control of the type 2 diabetic patients (Holman & Turner, 1981: 275-276). However, the levels of glycemia in each day are not much different and FPG has correlation with average plasma glucose level during the day and HbA1C (McCance, et al., 1988: 512). One FPG can only evaluate sugar control at a certain period of time but not the continuation of control. One satisfying FPG may come from patient's intention to control the plasma glucose level at the appointment period only (Niranapakorn, W., in Sridama, W., (Ed.), 1998: 193). Therefore, the average of 3 months FPG, which has higher correlation with HbA1C than one time FPG (Lev-Ran, 1981: 747-749; Mira, et al., 1985: 142-147; Suwanwalaikorn, S., in Sridama, W., (Ed.), 1998: 66), is more reliable as a long term evaluation of diabetic or glycemic control. The average of 3 months FPG ≤ 140 means effective control the plasma glucose and FPG > 140 mean ineffective control the plasma glucose (Endocrine Society of Thailand, 2000). This study uses the average of 3 times FPG in the past 3 months as an indicator for plasma glucose level of diabetic patients.

1.4.2 Method of fasting plasma glucose examination:

Fasting plasma glucose examination is a famous, accurate, simple clinical practice, inexpensive, and convenient test (Wongthavarawat, W. and Sridama, W., 2000: 3). The enzymatic colorimetric test (GOD-PAP method) uses manual

procedure, then reads the spectrum using spectrophotometer to indicate the plasma glucose level (mg./dl.) (Pasatrat, S., et al., in Sridama, W., (Ed.), 2000: 313). This is the same process used in Wang-Nam-Yen Hospital, the data collection place in this study, to find glycemic evaluation of the diabetic control of all diabetic cases that come to the hospital.

The objectives to have diabetic or glycemic control are attained when the blood sugar level is within or as close as possible to the normal range. The major diabetic controlled behaviors are diet control, exercise, drug administration, and following up (Siritharungsri, B., 1995: 28-29)

1.5 Diabetic controlled behaviors for control the plasma glucose level in various dimensions are as follow:

1.5.1 Dietary control: It is necessary for the diabetic patients to have dietary control although they had medicinal treatment because the intake nutrition is directly involved with insulin metabolism. Therefore, how much the plasma level will increase depends mainly on the dietary control (Punpae, S., et al., 1998: 18). There was a study showed that 12% of the non-insulin-dependent diabetic patients were able to control the plasma glucose level very well using dietary control alone (Bloomgarden, 1996: 906). The dietary control aims not only to enable the patients to control the plasma glucose level as close to normal as possible, but also to prevent overweight or underweight which affects insulin action. The patients must receive appropriate and enough calories to prevent and delay the complications (American Diabetes Association, 1997: s14; Nittiyant, W., et al., 1987: 252-253; Intarumpan, W., 1994: 35; Tuntayothai, W. and Songdee, A., 1995: 257).

Diabetic patients must choose the appropriate foods because each type of them gives different kinds of sugar and calorie levels. For example, rice or grains which are the complex carbohydrate, after metabolism, will give slower rising of the plasma glucose level than sugar that immediately increase plasma glucose level over the renal threshold. They should avoid sweet foods, desserts, sweet fruits, soda, and caffeine drinks (Suthapreeyasri, D., 1991: 16; Panpae, S., et al., 1998: 18). Fat should be unsaturated fat from plants such as corn, Safflowers, and soybean. Saturated fat,

coconut oil and animal oil, should be avoided because they will be collected and caused obesity or hypercholesterolemia and hypertriglyceridemia resulting in complications at coronary artery: atherosclerosis and ischemic heart disease (Tanthanan, S., et al., 1992: 7). These complication must be prevented by eating all kinds of green vegetables such as cabbage, Chinese broccoli, morning glory, and cow pea because they contain high fiber which can delay sugar absorption and diminish plasma glucose level after meal (Miranda & Horwitz, 1978: 482-486). In addition, 3 meals should be taken on time with nothing during the meals because the diabetic patients have to take oral hypoglycemic drug, which can cause hypoglycemia if they have not taken enough food. Smoking and alcohol drinking should be avoided because alcohol inhibits glycogenesis from other foods than carbohydrate, therefore, the patients are risk to hypoglycemia when drinking alcohol with not enough food (Cassmayer, 1987: 601-604; Jiraratsthit, J. and Kaewplung, M., 1991: 20).

The study of Nampraditkul, P. (1993: 83) showed that the dietary control had significant correlation with glycemic control of non-insulin-dependent diabetic patients ($p=5.86 \times 10^{-4}$). The investigation of influential factors of the glycemic control among diabetic patients in Sappasithiprasong, Ubonratchathani by Hiranwan, S. (1995: 98) also showed that the good glycemic controlled patients had dietary control better than the poor controlled ones. They were different with the significant level ($p<0.001$). According to the study of Sornnarin, K. (1997: 60) about influential factors of the glycemic decreasing in diabetic patients who have continual treatment from Banlad Hospital, Petchaburi Province, the sample group with good practice in dietary control had glycemic decreasing 31.8% with statistical significance at 0.05. The study of Pokaratsiri, V., et al. (1993) also found that the ability to choose appropriate food of the diabetic patients had significant correlation with the glycemic control. These studies showed that the dietary control affects the glycemic control. However, it is found that the patients practically cannot control themselves to avoid foods, high-sweet fruits, rice, sticky rice, bread sticks, Ovaltin and coffee which will increase plasma glucose level. Moreover, they don't control the amount of food, times to eat, obesity, and cooking to their appropriate taste (Klinsreesuk, R., 1997: 80; Prasarnpran, K., 1992: 55; Pothidara, Y., et al., 1995; Somsap, Y., 2000: 59). This means the diabetic patients still have problems in dietary control.

1.5.2 Exercise: Consistent exercise of suitable kinds can affect the patients' plasma glucose levels (Brostoff & Bliecher, 1982: 190; Luckman & Sorensen, 1987: 1425; Robertson, 1984: 61; Nittayanant, W., et al., 1987: 56-57) by reducing them because it can enhance glucose metabolism to produce energy and increase glucose utilizing in muscle. Consistent exercise can also reduce lipidemia, blood cholesterol and triglyceride, resulting in weight loss, enhancing glycemic control, and diminishing risk factors of many complications (Banchuen, K., 1992: 12; Sirithrungsee, B., 1996: 60). In addition, it can decrease pain, stress, and insomnia, which promote the better glycemic control (Jiraratstitt, J. and Kaewplung, M., 1991: 60).

Exercise can be chosen to suit each patient, such as walking, aerobics, jogging, swimming, or biking. The core is it should have continuation for 20-30 minutes a time, every day or at least 3 times a week. It should be done 1 hour after meal, not before meal for hypoglycemia might occur until syncope, or consult with physician before start any exercise (American Diabetes Association, 1995: 28; Banchuen, K., 1992: 6-11). From literature review that showed the effectiveness of exercise on the patients' glycemia level, the study of Nampraditkul, P. (1993: 85) found that exercise had significant correlation with the glycemic control ($p=0.041$). The study of Sornnarin, K. (1997: 62) about influential factors of the glycemic decreasing in diabetic patients who have continual treatment from Banlad Hospital, Petchaburi Province, also found that the sample group with good practice in exercise had reducing plasma glucose level at 32.9% with statistical significance 0.05. The study of Wannasiri, T. (1989: 75) about changes in diabetic patients' plasma glucose level after exercise stress test found that the plasma glucose level was between 104-349 mg/dl after exercise, average decreasing of 24.65 ± 27.52 mg/dl with statistical significance .01. The study of Ratanapitak, U., et al. (1991), comparing the difference between plasma glucose level of exercise and non-exercise diabetic patients, showed that the plasma glucose level of the exercise group was different from the non-exercise group with the significant level at 0.05 in the first 3-5 weeks and 0.01 in the 5th week. In conclusion, exercise can reduce plasma glucose level in diabetic patients and gives them healthfulness, for example, decreasing numbness on lower extremities, and a little weight loss. In addition, Chi-Kong can also reduce glucose in red blood cell with

the statistical significance at 0.01 (Prongpanom, U., 2002: 55). However, exercise needs continual exertion for several minutes and causes tiring. Most of the patients neglected the real exercise because they thought that they already exercise by doing daily activities and working, which is the informal exercise and not the right one for them. Some studies showed that diabetic patients still have problems with exercise (Jumnongphol, M., 1997: 74; Klinsresuk, 1997: 77; Manokulanant, P., 1992: b; Pumwiseth, A., 1994: 106; Somsup, Y., 2000; Sornnarin, K., 1997:67).

1.5.3 Drug administration: Taking medicine according to treatment plan is necessary for ineffective exercise and dietary control type 2 diabetic patients to control the plasma glucose level within or near the normal range, to prevent chronic complications and to enable them to live the normal life. The medicine in Sulfonylurea group will stimulate insulin secretion (Malaisse & Lebrun, 1990: 9-17), increase tissue's insulin reaction and decrease gluconeogenesis (Beck-Neilsen, et al., 1988: 613-620). The Biguanide group will reduce glucose absorption in gastrointestinal tract, increase glucose uptake by cell, stimulate glucose utilization in the tissue, and reduce hepatic gluconeogenesis (Baily, 1992: 755-772). These 2 groups of medicine are prescribed consistently to the sample group of diabetic patients. According to their actions, the plasma glucose level should be decreased if the patients continually take them in the right way, right dose at the right time and under doctor prescription. If herbs are taken as well, the doctor shall be informed for some of them can cause unusual hypoglycemia. The dose of medicine should not be adjusted or stopped without prior consulting with the doctor (Rewpaiboon, A., 1990: 1).

From the literature review about self-practice in utilizing the medicines that affect the plasma glucose level, the study of Nampraditkul, P. (1993:89) showed that medication control had significant correlation with the glycemic control in non-insulin-dependent diabetic patients ($p=0.017$). The study of Keawkerd, O. (2002: 67) also found that patients who did not adjust the dose of medicine by themselves had a significant correlation with the glycemic control and had a better control of plasma glucose level 2.9 times than the ones who adjusted by themselves (95% CI=1.04-8.13, $p=0.042$). The study of Hiranwan, S. (1995: 98) showed that the sample group that can control the plasma glucose level had the better medication control than the uncontrolled group with the significant different level ($p=0.002$). The study of

Sornnarin, K. (1997: 61) found that the sample group with poor medication control had no decreasing of glycemic level with statistical significant at 0.05. The study of Pokaratsiri, V., et al. (1995) showed that taking medicine on time had significant correlation with the glycemic control. However, the patients practically had the problems in medicine taking as shown in the study of Tuntayothai, W. (1982), which investigated the diabetic knowledge and control of the poor glycemic control patients, they still had poor diabetic control: intermittent medication and absence on following up, after systemic education and assistance. The study of Somsup, Y. (2000: 60) also found that although the patients knew that medicine was a way to reduce plasma glucose level, they still had fair medication control and most of them neglected to take medicine according to treatment plan (Hussey & Gilliland, 1989: 606; Keeratiyutawong, P., 1994: 60).

1.5.4 Following up: It is another influence factor of the diabetic patients' plasma glucose level. It consists of seeing doctor as appointed and checking major health conditions to evaluate the diabetic induced changes, such as plasma glucose level, blood pressure, and body weight. Seeing doctor as appointed is very important although they still have medicine left or no abnormal signs and symptoms because checking plasma glucose level monthly give doctor a chance to adjust the dose of medicine. Additionally, the patients can have their checkup consistently e.g. blood pressure, body weight, or examining for complications that can be recorded monthly with the plasma glucose level. If the glycemic control or health problems occurred, they can consult with doctors or nurses about appropriate self-practice to gain the acceptable plasma glucose level and to prevent the severe complications which diversely caused the plasma glucose level more difficult to control (Hiranwan, S., 1995: 38).

The study of Hiranwan, S. (1995: 98) found that the sample group with better following up was the successful glycemic controlled group, which was different from the unsuccessful controlled group with statistical significance ($p < 0.001$). According to Keawkerd, O. (2002: 68), the patients who came every time as appointed had 3.67 times better glycemic control than the ones who absent on appointment (95%CI=1.02-13.18, $p=0.042$). The study of O'corner, et al. (1987: 697-700) also

showed that the following up had correlation with the glycemic control of the non-insulin-dependent diabetic patients.

Diabetic controlled behaviors according to treatment plan is an important thing to have successful glycemic control, therefore, the patients should do their best to keep it up. However, there are many patients who fail to do so indicated by inappropriate controlled behaviors and hyperglycemia because this may be the situation or activator that comes to their life and causes stress and worrying. The usual management might not enough to control, therefore, they have to consider and try to change their self-practice to be more cautious. That is, they need the learned resourcefulness to cope with this situation (Rosenbaum, 1989: 251).

2. Concepts of Learned Resourcefulness

2.1 Meaning and characteristics of learned resourcefulness (LR)

According to his concept, Rosenbaum (1983) gave the meaning of learned resourcefulness as the behavioral skills and cognitive skills, which individual had learned and used together. They included problem solving skills, use of cognition and self-instruction or self-statement in physical and mental reaction control, ability to delay gratification, and a general believe in one's ability to self-regulate internal event or self efficacy in self-practice control or self-control behaviors to create target behavior which will bring happiness to life.

Michenbuam (1977) suggested that learned resourcefulness is the important resource of confidential and secured development, which make individual ready to face and cope with stress or hopelessness.

Braden (1990) indicated that learned resourcefulness is the enabling skills to cope with troubles, which demonstrated the supporting between depended or unsecured feeling and the self-help: cognitive restructuring, problem solving, and belief in one's self.

Zauszniewski (1994) defined learned resourcefulness as a health-seeking behavior for healthy condition.

Rosenbaum (1990: xiv) also said that learned resourcefulness resembles the person's psychological immunity; it is the strategies individual developed to confront and cope with the needs and challenges. Learned resourcefulness enable individual to cope with stressful life events, to withstand with hardship, to control feelings and awareness in daily living, and to have efficiency life-satisfaction on the potential of each one. According to Rosenbaum, to control feelings and awareness in daily living does not mean to constrain of inner desire but to be able to minimize or eliminate thoughts and feelings that bother the individual's mind in order to enable him/her to work in full capability. Therefore, learned resourcefulness consists of skills and idea or belief in one's ability to cope efficiently with whatever happened.

Learned resourcefulness can be developed throughout one's life from reaction with others, learning from condition, model, experiences, formal instruction, and informal instruction (Rosenbaum, 1990). Michenbuam (1977) also found that when the person are trained the special skills to successfully cope with stressful life events, which cause the hopelessness, by control cognitive process and reaction, he/she will get the experiences that can develop learned resourcefulness.

2.2 Components of the learned resourcefulness' concept

They are 6 components: situational factors, physiological factors, PRC, personality repertories, self-control behavior, and target behavior.

2.2.1 Situational factors refer to changes or occurring of the situation in a certain period of time that affect the self-control ability. That is, if there are many situations or even one situation which are/is too powerful for individual to acknowledge or evaluate on self-capability correctly, those changes or situations might not be coped. Therefore, the individual might loss their ability of self-control in these situations.

2.2.2 Physiological factors: The physiological will give signal and information about self-ability in coping with fears. These factors are similar to the self-control concept of Kanfer (1977: 1-48), which indicated that when the person faced with changes or stress situations, the organs start to response to that changes. That is, when the person received emotional arousal by changes or stress situations,

brainstem-limbic and frontal lobe in central nervous system are stimulated to evaluate the changes or situations whether they are dangerous or not as well as decide the fight-flight response. Therefore, the physiological factors are very important to evaluate the changes or stress situations the person faced and resemble the connecting point of sending the acknowledge information to cognitive process which used consciousness together with deliberation and not the automatic thought.

2.2.3 Personality repertories: The person will use them to cope with the similar situations that might occur in the future. Therefore, these skills resemble the person's learned resourcefulness and are the important thing to explain the difference of each person's self-control behavior. In addition, personality repertories affect the response to changes or life situations, evaluate whether they have effects on happiness, assess one's ability in coping with them, and plan the self-control to response to them. They consist of self-control skills, problem solving skills, self-efficacy, and delay immediate gratification (Rosenbaum, 1988). These skills will react to each other in working (Rosenbaum, 1990).

According to Rosenbaum, self-control skills means the skills that make the person minimize or eliminate thoughts and feelings that bother his/her mind or the impulse in order to enable him/her to work in full capability. Those skills include positive self-statement or self-instructions for coping and ability to delay gratification or postponement of immediate gratification of needs. Self-controlled skills had 2 characters as:

2.2.3.1 Redressive self-control referred to self-control aiming to keep homeostasis or be recovery and have normal life. Redressive self-control would be active to deal with any disturbances of their lives, cognition, and habitual behaviors.

2.2.3.2 Reformative self-control involved with self-control purposing to have the adaptation of reformative behaviors that were useful to themselves even if they were against their cognition and habitual activities. Reformative self-control was emphasized on self-control by prohibiting the thinking or habitual behaviors and modifying them to be beneficial for themselves (Rosenbaum, 1990).

Problem-solving skills involved with the strategy of problem solving and planful behaviors or being called as self-direction to solve problems and expect the coming outcomes (Redden, et. al., 1983: 77). A significant factor that aroused people to think and take the strategy of problem solving was any tough situation causing their stresses.

Self-efficacy was a belief that they, themselves, could deal with their coming problems with high efficiency. They believed that they could control their stress level, when they encountered with difficult circumstances and achieved their goals regarding to their plans. They also had the confidence of the outcome expectancy and delay immediate gratification.

2.2.4 Process regulating cognition (PRC): The PRC was the structure and process or mechanism of cognition that seemed to work as well as self-system of human body. It was responsible for perceiving, evaluating and controlling self-controlled behaviors. Process regulating cognition was not an automatic reaction but it was the intended process that people wanted to do and did it with their cognition. Having the self-controlled process seemed like a signal of having process regulating cognition. Process regulating cognition was started to work for self-monitoring, self-evaluation, outcome expectancy and self-efficacy.

2.2.5 Self-control behavior: The theory of Rosenbaum (1983) referred to thoughts and behaviors that required the endeavor to achieve the goal as the adaptive behavior leading to individual pleasure. Rosenbaum (1983) had explained that stress was occurred when some event, actual or imagination, disturbed or barred routine life and/or regulating cognitive behaviors of people. Self-control behavior would be retrieved to create adaptive behavior. Self-control behavior was not an automatic but it would occur from the process regulating cognition. That meant the self-control behavior would be happened after the cognition, evaluation of situation and self-efficacy.

2.2.6 Target behaviors: referred to behaviors that associated with health such as overall health promoting behaviors leading to individual pleasure. Consequently, the target behavior consisted of covert and observable behaviors. It was the psychological-emotion or the level of feeling that influenced to health maintenance.

All 6 components had related functions to promote self-control behavior as in the diagram 3

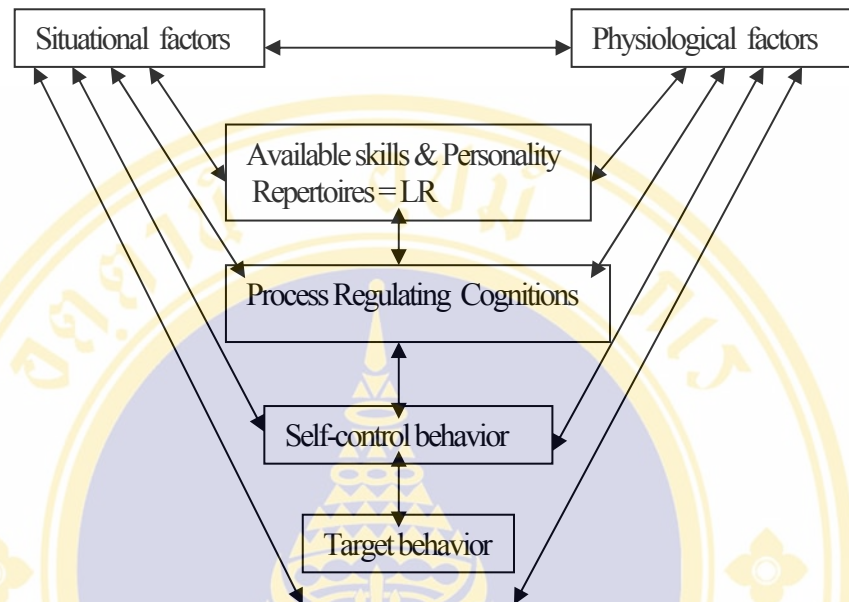


Figure 3: Illustrates the relation of 6 components on the learned resourcefulness

2.3 Assessment of learned resourcefulness

Rosenbaum (1983) emphasized that several skills in individual learned resourcefulness were developed skills from individual cognitive process. Hence, the evaluation of learned resourcefulness skills could not be assessed from direct behavior but from self-evaluation by individual concept that applied with individual self-control being used in the adaptation of behavior. In other words, people took the evaluation of self-control behavior comprising with several skills in learned resourcefulness to find out the solutions of problem. Therefore individual level of learned resourcefulness could be assessed by the Self-control Schedule (SCS) that covered 4 aspects as the followings:

2.3.1 Use of cognition and self-instruction in physical and emotional self- control

2.3.2 Use of problem solving strategies in respective self-control such as planning, definition of problems, estimation of alternatives and outcome expectancy

2.3.3 Ability to delay immediate gratification

2.3.4 Ability of self-efficacy

Self-control Schedule (SCS) by Rosenbaum (1980) was developed and tested as follows (Rosenbaum, 1983 cited in Insawek J., 1996: 97):

Validity: The SCS was tested for relationship, discriminate validity and experimental study.

Rosenbaum brought the SCS to estimate the correlation between the scores of intrinsic-extrinsic beliefs of Rotter and the scores of nonsense belief of Allise for assessing the discriminate validity. The result showed the correlation, $r = -0.40$, $p < .01$ and $r = -0.48$, $p < .001$ respectively. Those indicated that the SCS had the discriminate validity.

The SCS was tested to find the correlation of the scores of individual character for the convergent validity. The result exhibited the correlation with the level of significance, $r = .30$, $p < .001$ that meant the SCS had the convergent validity.

The SCS was brought to test in the experimental study with experimental and controlled sampling groups. Sampling groups had to answer questionnaires before participating in the experimental study. Then the experimental group had been taught about how to encounter with the cool by using the imagination of satisfied objects while putting 2 hands into chill water but no teaching for the controlled group. Both groups answered questionnaires and the result showed that the experimental groups had higher scores of SCS than the controlled group did. A sample who gained highest score could tolerate to the cold more than samples who had lower scores with the level of significance. Hence, the SCS was good for assessing self-control that was harmonious with the actual situation.

Reliability: Rosenbaum conducted the test of reliability in 6 groups of undergraduate students. The first group ($n=82$) had the test retest at the first time and the next forth week that expressed the coefficient as 0.86. The second group ($n=145$) had the coefficient as 0.81. The third group ($n=117$) reported the coefficient as 0.80. The forth group ($n=179$) addressed the coefficient as 0.78. The coefficients of the fifth group and the sixth group were equally 0.80.

In Thailand: Wongkrajang, S. (1980) applied the SCS to the second-year 60 students of the professional certificate aiming to find the internal consistency by the formula of Alpha Coefficient of Cronbach L. The coefficient in her study was 0.79.

Insawek, J. (1996) employed the SCS with 40 additional questions to 100 addicts for getting the validity of the entire study as $t = 4.56$ and the reliability of entire study as Cronbach's Alpha Coefficient = 0.94.

Panitrat, R. (2001) took the SCS of Rosenbaum (1980) to translate into Thailand language and test it with the addicted teens for reliability of Alpha Coefficient as 0.67.

2.4 Effectiveness of Learned resourcefulness on chronic illness patients and non-disease persons

According to Rosenbaum (1983), learned resourcefulness enables individual to cope independently with stressfulness situations, and has been found to facilitate the acquisition of health promoting behaviors. As the literature review, the study of Rosenbaum and Palmon (1984) exhibited the emotion after convulsion of epilepsy patients that was from the combination between the severity of spasm and perceptive of self-control skill that is the learned resourcefulness. The patients was categorized 3 groups, as high, moderate and low frequency of spasm. Self-control Schedule of Rosenbaum was used to assess self-control of patients and classified into 2 groups as high resourcefulness and low resourcefulness including interviewed samples about the level of emotional adaptation by assessing the self-efficacy to spasm. The result showed that groups with moderate and low frequent spasm expressed less depression and worry including better capability to deal with their own disadvantages than a group with low resourcefulness. Patients with high resourcefulness had strong belief that they could control their health and spasm. Frequency of spasm could not diminish their beliefs. That meant individual learned resourcefulness influenced to the level of spasm management, particularly reducing the severity of spasm (Rosenbaum & Palmon, 1984: 244-253). The study of Zauszniewski, et al. (2001: 491) associated with the relation among the social thoughts affecting to the enabling low resourcefulness skills, the help-self determinism and coping response by estimating

from physical and psychological expressions in 137 older adult patients with chronic diseases. Its result indicated that low resourcefulness affected to knowledge utilization and detail-oriented for help-self determinism with the level of significance ($\beta=0.18$, $p<.05$). It demonstrated that resourcefulness had strong influence to deal with stress and it was a crucial variable of health prediction.

Likewise the learned resourcefulness was important to individual success achieving their goals even weight loss needed much self-control to change their consuming behavior and much patience for the delay immediate gratification. Deborah and Marilyn (1995: 109-121) conducted the research associating with the learned resourcefulness related to the weight-loss program for 22 females. The study demonstrated that females with high resourcefulness would constantly lose their weight differing from others with low resourcefulness who would lose their weight in the end of the program but their weight would gain back up. The reasons might be they had more chances to quit from the program than females with high resourcefulness. Beside, the study of Deborah, et al. (1998) studied the BMI and learned resourcefulness affecting to image cognition and the lifestyle changes in female students with normal weight-range. The hypothesis in this study was female with low resourcefulness had more sadness of over consumption, less cognition of life-control, and more worry about their weight and images than others with high resourcefulness because they lacked of essential skills to create or support appropriate life goals. Over-weight females usually had low resourcefulness, unsatisfactory of their figure, sensitivity of unhealthy behaviors and changed attitude of diet consumption. Females with high resourcefulness earned positive perception of life control, more exercise, proper diet, good diet control, more satisfaction in their figure and less worry of their weights than the ones with low resourcefulness did.

Those studies showed the influence of learned resourcefulness in term of management for the desirable results did not only affect to illness patients but also did to lifestyles of regular people because learned resourcefulness influenced to cognition, practice and life support before reaching the goal of good health

3. Relation of Variables

Good diabetic controlled behaviors and good plasma glucose level in diabetic type 2 persons involved with many factors such as individual factors, psychosocial factors, and environmental factors that were found having relations and no relation. That meant no obvious conclusion of influenced factors. Consequently, as the literature review in this study, the researcher realized that the learned resourcefulness could be a factor relating or not relating with the good practice behavior to control plasma glucose level in diabetic type 2 patients. The relation between variables was explained as the following:

3.1 Relation between the learned resourcefulness and plasma glucose level

Plasma glucose level was a significant indicator to prove the capability of self-control in diabetic type 2 persons in their routine lifestyles along with diabetic treatments aiming to keep plasma glucose level at normal or immediate level. The learned resourcefulness had relation with the health results because people with high LR earned more benefit from diabetic treatments and self-control than people with low LR did (Rosenbaum, 1990: 26). Consequently, the outcome of plasma glucose level in diabetic patients should relate to the learned resourcefulness. The study of Aikens, et al.(1992: 116) involved with the relation of daily stress, learned resourcefulness, proper self-practice regarding to treatments and metabolism control of 62 diabetic type 1 patients for testing the result of daily stress to direct and indirect metabolism by using Path Model and the as the learned resourcefulness moderator. The hypothesis testing on the influence of stress to metabolism by mediating the learned resourcefulness exhibited the finding, as the LR could not be the moderator of the influence of daily stress to metabolism with the level of significance. However the LR showed positive relation with metabolism with the level of significance ($F(1,56) = 7.25, p < .01$). White, et al. (1996: 205-212) studied the relation among emotional state, learned resourcefulness and the perception of diabetic control in 90 diabetic type 2 persons by using HbA1C as an indicator of physical control. The result demonstrated that diabetic patients who had low perception of self-control or required assistance to

control their behavior had poor control of HbA1C and had the relation with the control of HbA1C. The supportive reason might be that the learned resourcefulness took care of the stress causing to the relief of catecholamine and cortisol agents that led the increased plasma glucose level (Ganong, 1981: 287). It was possible that the success of controlling plasma glucose level in diabetic type 2 persons came from the learned resourcefulness so the learned resourcefulness should have relation with the plasma glucose level in diabetic type 2 patients.

3.2 The relation of diabetic controlled behaviors and fasting plasma glucose level

Diabetic controlled behaviors about diet control, exercise, drug administration and pursuing the follow-up was a significant direct factor to control plasma glucose level as well as in the handout of diabetic type 2 persons for controlling plasma glucose level that consistent the study of Hiranwan, S. (1993) studied the influence factors to self-control and the control of plasma glucose level in diabetic type 2 persons without insulin requirement. Self-control in this study involved with 304 patients with uncontrollable plasma glucose level emphasizing with diet control, drug administration and pursuing the following-up appointments. As the result, the sampling group with controllable plasma glucose level gained more self-control in all aspects than other group did with the level of significance, $p < 0.001$. Likewise Sornnarin, K. (1997) studied about 3 factors e.g. diet, exercise, and drug administration that affected to the decrease of plasma glucose level in diabetic patients who constantly attended diabetic treatments. This study indicated that the relation among all 3 factors and the decreased plasma glucose level was positive with statistic level of significance as 0.05. The research of Nampraditkul, P. (1993) reported that the influences of self-practice in diet control, exercise, medicine intakes and pursuing the follow-up related to the control of plasma glucose level in diabetic type 2 persons with the level of significance except pursuing the follow-up had no relation ($p = 0.071$). Keawkerd, O. (2001) brought as the same 4 factors as Nampraditkul, P. to study their influences to the control of plasma glucose level. Pursuing the appointment and no self-drug adjustment were two factors that affected to the control

of plasma glucose level with the level of significance. Remembering to take all doses of medicine had no effect on the control of plasma glucose level with the level of significance except diet control and exercise. There were some studies relating to Chi-Kong Practice (Prongpanom, U., 2002) and Walking Belt Exercise (Wannasiri, T., 1989) affecting to the fluctuation of plasma glucose level. Those resulted that both kinds of exercise motivated the decrease of plasma glucose level with the level of significance, 0.01. Most studies exhibited the positive results as lower plasma glucose level of diabetic patients with diet control, exercise, pursuing the follow-up and drug administration. Hence, the variable of diabetic controlled behaviors in diabetic type 2 persons might associate with the plasma glucose level.

3.3 The relation between learned resourcefulness and diabetic controlled behaviors

Diabetic controlled behaviors e.g. diet control, exercise, drug administration and pursuing the follow-up were the adaptive ways to promote proper diabetic behaviors for a goal of controlling plasma glucose level offering an advantage to diabetic type 2 persons. But they needed to have constant practice because diabetic mellitus was a chronic disease. New proper practice invaded their regular lifestyles creating frustration and irritation. Consequently, self-control skills enhanced positive emotional control blocking the feeling of abrogation with ability to delay immediate. Problem-solving skills assisted to create respective plan for effective practice to solve problems. The belief in self-efficacy made the success of having proper diabetic behaviors (Rosenbaum, 1990). Accordingly, the learned resourcefulness was essential for controlling plasma glucose level of diabetic type 2 persons because diabetic patients with high resourcefulness usually had the success of having proper practice behaviors. Similarly, Amir (1985) addressed that chronic diabetic patient with high resourcefulness showed the ability to control the glucose intake better than the ones with low resourcefulness did. Rosenbaum and Ben-Ari Smira (1986) studied the psychological factors that influenced patients with renal failure to pursue proper practice in health promotion by using Self-control Model. Most renal-failure patients needed to restrict water intake. The result showed the learned resourcefulness had a

positive relation with the ability of restricting water intake in the patients with renal failure regarding to the treatment. Patients with high resourcefulness earned more confidence to pursue proper practice than others with low resourcefulness did. They also believed their success came from their high resourcefulness. Hence, learned resourcefulness was vital variance relating to the proper practice of controlling plasma glucose level in diabetic type 2 persons.

3.4 The relation among learned resourcefulness, diabetic controlled behaviors and fasting plasma glucose level in diabetic type 2 persons

The diagnosis of diabetic mellitus was a chronic disease, and threat of patients' lives leading to tremendous changes in their regular lifestyles for having proper diabetic controlled behaviors to control plasma glucose level at normal or immediate normal level. Several kinds of proper diabetic controlled behaviors created stress and difficulty for diabetic patients to maintain those kinds of practice behaviors. Consequently, using learned resourcefulness aiming to promote self-control of diabetes led to the target behavior as to control plasma glucose level at normal or as immediate level. The incident of diabetic treatment displayed that the difference of and the failure of controlling plasma glucose levels regarding to the target behavior might come from the different resourcefulness, that was high resourcefulness persons gained more success than low resourcefulness persons (Rosenbaum, 1990: 26). Hence, the diabetic persons with high resourcefulness gained more success to control plasma glucose level than the ones with low resourcefulness otherwise, learned resourcefulness motivating the adaptation of positive cognition or constant health-promoting behaviors leading to the success of controlling plasma glucose level as a desirable result (Amir, 1985). Consequently, the learned resourcefulness supposed to have the effect promoting proper diabetic controlled behaviors for controlling plasma glucose level of diabetic type 2 persons.

4. Conclusion

Diabetic Mellitus Type 2 is a chronic disease affecting to both physical and psychological and may lead strong negative impacts that harm patients' lives if they ignore to control their plasma glucose level at normal or immediate level. It is a very difficult problem of patients and medical professionals who took care patients. They attempt to figure out the ways of self-practice in their daily lives aiming to promote their health regarding to the goal of healthy. As the literature review, diabetic control in diet control, exercise, drug administration and pursuing the follow-up were variances affecting to plasma glucose level. But following the proper behaviors to control plasma glucose level is hard to do because lifestyles have been changed. Many studies indicated that diabetic patients normally failed to have target behaviors and control plasma glucose level. Learned resourcefulness regarding to Rosenbaum (1980, 1983, 1990) and the confirmation of several studies in diabetic patients, chronic patients and regular people associated with individual health behaviors by functioning with problem-solving strategies and self-efficacy leading to self-control behavior and delay immediate gratification. Those enhanced to achieve the target behaviors in diabetic type 2 persons. Hence, this research purposes to study the influence of learned resourcefulness on fasting plasma glucose level by mediating effect of diabetic controlled behavior of diabetic type 2 persons at Wang-Num-Yen Hospital, Sakaew Province.

CHAPTER III

METHODOLOGY

This research was conducted in the term of descriptive research purposing to study the influence of learned resourcefulness on fasting plasma glucose level by mediating effect of diabetic controlled behaviors of diabetic type 2 persons.

Population and Sampling

Populations in this study were diabetic type 2 patients who attended in the Diabetic Clinic, Out-patient Department, Wang-Num-Yen Hospital, Sakeaw Province.

Inclusion Criteria: The sampling selection was conducted regarding to the inclusion criteria as the followings:

1. Diabetics type 2 persons who have attended the diabetic clinic at Wang-Num-Yen Hospital, Sakeaw Province over 3 times.
2. Having 3 constant morning results of fasting plasma glucose levels in 3 months. The collecting data would be in the third time and in other 2 previous times.
3. Diabetic type 2 patients had oral medicines for their treatments.

The sample size: Sampling group was specified by power analysis for analyzing multiple regression of Cohen (1988: 452-453) by the Statistic Package for Sample Power 1.0. This study used with two main variable and one dependent variable, medium effect size as 0.15, alpha (p-value) as 0.05 and power as 0.80 (1- β). The sample size was initially set as 67 diabetic type 2 persons but for better statistic distribution, the sample size was reset as 80 patients who reached inclusion criteria.

Setting

The setting of this research was a 60-bed Wang-num-yen Hospital, Sakeaw Province. The statistic of diabetic type 2 patients who were treated indicated 260 patients (Registration Department, Wang-num-yen Hospital, 2002). Four specialists worked at the diabetic clinic in Wednesday and Friday, 8.30 a.m.-4.00 p.m. Diabetic type 2 patients have come to get the blood test since 6.00 a.m. of each day. Specialists and nurses gave the advice of proper diabetic behaviors and a handout of self-care in diabetic type 2 persons to individual patient since their first diagnosis of DM. This handout associated with proper diabetic behaviors in diet control, exercise, drug administration and pursuing the follow-up aiming to promote target behaviors regarding to diabetic type 2.

Research Instruments

1. Process of developing the diabetic controlled behaviors questionnaires

In this study, it was developed by the researcher that had information from literature review, textbooks, researches, leaflets, particularly a handout of basic diabetic controlled behaviors by Medicine Department, the Ministry of Public Health and a handout of proper diabetic behaviors for diabetic type 2 persons by Wang-Num-Yen Hospital, Sakeaw Province. Including, the researcher was considered in actual local lifestyles of the diabetic for set up these questionnaires. After validated of questionnaires, the researcher trial to use these questionnaires, that received the data from interview the diabetic type 2 persons for improvement about wording some questionnaires and then developed to be instrument for measured diabetic controlled behaviors of the diabetic type 2 persons in this study.

2. Instruments in this study

The instrument in this study for data collection was a questionnaire consisting of 4 parts as follow:

Part I: Demographic data of diabetic type 2 persons questionnaire

This part would multiple-choice questions and completing the blanks. The questions involved with gender, age, education level, marital status, occupation, family monthly income, duration of the disease, and complications or comorbidity. The researcher gathered data from patients' files along with the interviews, especially diagnosis of complication and comorbidity data.

Part II: Questionnaire for diabetic controlled behaviors:

Questionnaire of the diabetic controlled behaviors of diabetic type 2 persons in the past 3 months until the interviewing day related to diet control, exercise, drug administration and continuing the follow-up comprising with 28 questions in both negative and positive aspects as follow:

12 questions of self-diabetic control in diet as the question no. 1-12, item no. 2, 3, 4, 6, 7, 11 and 12 were positive and item 1, 5, 8, 9 and 10 were negative.

5 questions of self-diabetic control in exercise as the question 13-17, positive questions were item no. 13, 14, 16, 17 and negative one was item 15.

7 questions of self-diabetic control in drug administration started at the question no. 18-24, positive questions were item 18, 19, 21 and negative ones were item 20, 22, 23, and 24.

4 questions of self-diabetic control in pursuing the follow-up as question 25-28 were positive all.

The answers in most questions of 3 presented aspects of self-diabetic control e.g. diet control, exercise and drug administration were used the rating scale as:

Always do referred to diabetic patients always did in that topic.
 Often do referred to diabetic patients mostly did in that topic.
 Sometimes do referred to diabetic patients slightly did in that topic.
 Never do referred to diabetic patients had never done in that topic.

The answer of a question relating to pursue the follow-up was used the rating scale as: Always do referred to diabetic patients did in that topic 3 all times.

Often do referred to diabetic patients did in that topic only 2 times.

Sometimes do referred to diabetic patients did in that topic only 1 time.

Never do referred to diabetic patients had never done in that topic.

Scoring		score	
Answer	Positive	Negative	
Always do	4	1	
Often do	3	2	
Sometimes do	2	3	
Never do	1	4	

Criteria of interpretation diabetic controlled behaviors as follows:

Mean score: 1.00-1.50 meant to diabetic patients who had poor diabetic controlled behaviors.

Mean score: 1.51-2.50 meant to diabetic patients who had fair diabetic controlled behaviors.

Mean score: 2.51-3.50 meant to diabetic patients who had nearly good diabetic controlled behaviors.

Mean score: 3.51-4.00 meant to diabetic patients who had good diabetic controlled behaviors.

Part III: The measurement of learned resourcefulness

To assess learned resourcefulness (LR), Rosenbaum (1980) used the Self-control Schedule: SCS aiming to estimate individual trend of self-control adaptation or assess the self-control behaviors. It was translated into Thai language and was used to assess the learned resourcefulness by Panitrat, R. (2001) with 36 questions classified to 4 aspects of self-control as the followings:

3.1 Self-control skills assisted people to minimize or eliminate disturbed feelings or thoughts for controlling physical and emotional expression. There were 12

questions as item no. 5, 13, 15, 16, 17, 23, 25, 26, 27, 30, 31, and 36, for instance when I feel depress, I try to think about delightful events.

3.2 Problem-solving skills was the way to use respective problem-solving strategy to control themselves such as determination of problems, planning, alternative consideration, and outcome expectation. There were 11 questions as item no. 1, 2, 7, 10, 11, 12, 20, 28, 32, 33, and 34, for instance when I have to encounter with a tough problem, I try to find the solution with proper steps.

3.3 Ability of delay immediate gratification was a capability of patience to wait for the result of constant practice as target behavior. There were 4 questions as item no. 9, 18, 22, and 29, for example I speeded up to complete a work that I did not like because I would have time to do what I want to.

3.4 Self-efficacy was a self-belief of being capable to effectively handle problems or events even if they were tough and to achieve whatever the goals were. There were 9 questions as item no. 3, 4, 6, 8, 14, 19, 21, 24, and 35, for instance if I change my thought, I can change my feeling to others.

The term of answers was the Likert Scale Format with 6 steps and a condition of selecting the answer that was close to individual character as much as possible. Details are as follows:

Score

Positive

Negative

6= my real character (the most to describe myself)	1
5= nearly be my character (more to describe myself)	2
4= be some of my character (moderate to describe myself)	3
3= be a little of my character (less to describe myself)	4
2= almost non of my character (the least to describe myself)	5
1= absolutely non of my character (the most negative)	6

Positive meanings were in 25 items as item 1, 2, 3, 5, 7, 10, 11, 12, 13, 15, 17, 20, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, and 36.

Negative meanings were in 11 items as item 4, 6, 8, 9, 14, 16, 18, 19, 21, 29, and 35.

The result of total score of 36 questions will be the score that is used to estimate the learned resourcefulness of individual sample.

The higher scores of learned resourcefulness meant to the sample had more learned resourcefulness.

Part IV: The form record o fasting plasma glucose level

Samples had the records of their fasting plasma glucose level 3 times in 3 months. The interview date would be the third time of FPG and other two times are retrospective. The mean (mg/dl) was compute from the interview about the plasma glucose level of diabetic type 2 persons, patient's history and all 3 times of fasting plasma glucose level

Interpretation of Fasting plasma glucose level (Endocrine Society of Thailand, 2000)

FPG 3 times in 3 months $\leq$ 140 mg/dl referred to diabetic type 2 persons were controllable their fasting plasma glucose level.

FPG 3 times in 3 months $>$ 140 mg/dl referred to diabetic type 2 persons were uncontrollable their fasting plasma glucose level.

Instrument Testing

There are 2 sets of instrument that had past the testing. That was the questionnaires of diabetic controlled behaviors of diabetic type 2 persons and the measurement of learned resourcefulness (LR).

1. Test of the questionnaire on diabetic controlled behaviors in diabetic type 2 persons as the followings:

1.1 Content validity by 3 experts, 2 nursing instructors with diabetic care specialty and one registered nurse with expertise in diabetic care.

1.2 Reliability experts supervised to modify the research instruments and then test them with 40 diabetic type 2 persons who were not in the sampling group and got treatments from the diabetic clinic, OPD of Phutthamontol Hospital, Nakornpathom Province and Lertsin Hospital. In this study, the reliability, 0.73 was calculated by the Cronbach's Alpha Coefficient.

2. Test of the assessing model of learned resourcefulness (LR)

Rosenbaum (1980) developed a model of assessing learned resourcefulness, named SCS with 60 sentences. A psychologist who had expertise in self-control checked this 66-sentence model and 44 sentences were good. That 44-sentence model was tested with 152 undergraduate students and item analysis was conducted to finally have only 36 sentences.

2.1 Validity the SCS of Rosenbaum (1980) indicated the convergent validity as $r = .30$, $p < .001$; discriminated validity as $r = -.40$, $p < .01$ and $r = -.48$, $p < .001$. The experimental study confirmed that the model had the convergent validity with actual circumstance of self-control with the level of significance.

2.2 Reliability by test-retest method had the coefficient of reliability as 0.86. The Kuder-Richardson formula 20 was used to test the rational equivalence in 5 sampling groups and the coefficient was in between 0.78-0.84.

In this study, the researcher applied the SCS (Rosenbaum, 1980) that was translated by Panitrat, P. (2001) into Thai language and was tested the content validity by retranslated into English language. Its reliability was 0.67. As this research, the instruments were tested to find the reliability as .087 by the Cronbach's Alpha Coefficient in 40 diabetic type 2 persons at Phutthamontol Hospital, Nakhonpathom Province and Lertsin Hospital.

Data Collection

1. The researcher brought the reference letter from Graduate School, Mahidol University, to Director of Wang-Num-Yen Hospital, Sakeaw Province asking for the permission to collect data in the particular dates of diabetic clinic (OPD) on Wednesday and Friday at 06:00 a.m.-04:30 p.m. in June-July 2003.

2. The researcher identified the research purposes and the procedure of data collection to a head-nurse and registered nurses for well participating in data collection and handing in patient's history. The researcher would conduct the interview by her own.

2.1 Before the interview date: checking the list of diabetic type 2 patients who have the appointments and reach the inclusion criteria of sampling group; history; and records data.

2.1.1 Preparing the interview room with no disturbance from the environment while it will be active.

2.1.2 Preparing assistants to offer the convenience of getting medicines for patients during the interview.

2.2 Interview date: checking diabetic types 2 patients who corrected and inorrected the appointments in that day, selecting patients whom achieved the conclusion criteria of sampling group and interviewing.

2.2.1 Beginning to interview diabetic type 2 patients since waiting for blood test by inviting individual to the interview room and attempting to keep their queues of visiting the doctor by stopping the interview and continuing it when they waited for their medicines.

2.2.2 As the process of interview, the researcher began with the self-introduction, research objectives, and procedure of data collection including asking for cooperation in the interview. The protection of human right was mentioned to sampling group. Then the consent form had to complete by the diabetic type 2 patients before the interview was started.

2.2.4 The sequence of the interview was begun with demographic data, the assessing model of self-control in diabetic type 2 persons and the assessing model of learned resourcefulness (LR). Overall process would be approximately 35 minutes.

2.2.5 The researcher was responsible for recording along with the interview combining with the check of the history from patient's file for reliability of data, particularly morning fasting plasma glucose level 3 times in 3 months.

3. The researcher brought the collected data to check the completeness and scoring regarding to the setting criteria before the further statistic analysis.

Human Subjects Provision

The research was well concerned with the ethics of nursing research. Therefore, before the data collection process, the researcher will explain the purpose of the study, benefits was gained in this study. The samples were assured their participation was secreted and would not have any effect on their health care service. The data was present as a whole in this study for health development. However the samples could accept and reject the interview at any time. When the samples received the information then the researcher gave the consent form (Appendix A) to the sample diabetics for protection of human subjects before collecting data.

Data Analysis

The researcher was analyzed the data by using Statistic Package. The step of analyzed as follow:

1. Frequency and percentage were used to describe the sample's personal.
2. Range, mean and standard deviation were used to calculate the overall scores of the learned resourcefulness and fasting plasma glucose level of the sample.
3. Mean and standard deviation were used to calculate the scores for the diabetic controlled behaviors of the sample.
4. The Mediating function of Lindley & Walker 's method (1993) was performed among learned resourcefulness, diabetic controlled behaviors and fasting plasma through a simple and multiple regression to resemble the Path analysis model. A set of simple and multiple regression were performed in order to examine the effect of learned resourcefulness and diabetic controlled behaviors on fasting plasma glucose. Regression assumption must be examined in condition to use multiple regression analysis. The assumptions included normality, linearity, multicollinearity and homoscedasticity (Appendix D). The mediating function of Lindley & Walker's method was testing by multiple regression model 3 equations as follow the step:

4.1. Equation1: Regressing fasting plasma glucose level (Outcome variable) on learned resourcefulness (Predictor) [Simple regression].

4.2. Equation2: Regressing diabetic controlled behaviors [Mediator variable] on learned resourcefulness (Predictor) [Simple regression]

: Regressing fasting plasma glucose level (Outcome variable) on diabetic controlled behaviors (Mediator) [Simple regression]

4.3. Equation3: Regressing fasting plasma glucose level (Outcome variable) on learned resourcefulness (Predictor) and diabetic controlled behaviors (Mediator) simultaneously [Multiple regression]

To summarize that indicator of mediating effect to be hypothesis that learned resourcefulness would have an indirect effect on fasting plasma glucose through diabetic controlled behaviors. To assess the mediating function of diabetic controlled behaviors, a hierarchical multiple regression was performed. Three conditions are required to indicate the mediating effect of diabetic controlled behaviors. Those are: 1) a significance of the relationship between learned resourcefulness and fasting plasma glucose; 2) a significance of the relationship between learned resourcefulness and diabetic controlled behaviors; 3) a significance of the relationship between diabetic controlled behaviors and fasting plasma glucose; 4) a change in statistical significance or dramatically change in coefficient of the relationship between learned resourcefulness and fasting plasma glucose when diabetic control behaviors was entered (Lindley & Walker, 1993).

CHAPTER IV

RESULTS

This chapter presents the study's findings. The purpose of this study was to examine whether learned resourcefulness has an indirect effect on fasting plasma glucose through diabetic controlled behaviors. Data collection was performed at the diabetic outpatient clinic of Wang-Num-Yen Hospital, Sakeaw Province from June to July 2003. Eighty-four diabetic type 2 individuals met study criteria and participated in this study. The results were present in four parts as following sequence:

Part I : Demographic characteristics of diabetic type 2 persons

Part II: The descriptions of the interest variables

Part III: The relationships between the interest variables

Part IV: The influence of learned resourcefulness on fasting plasma glucose
by mediating effect of diabetic controlled behaviors

Part I: Demographic Characteristics of Diabetic Type 2 Persons

Table 1 Descriptive Statistics of demographic characteristics of the samples (n= 84)

Characteristics	Number	Percent
Gender		
Male	16	19.0
Female	68	81.0
Age (year)		
32 - 40	4	4.8
41 - 60	49	58.3
61 - 79	31	36.9
(Mean = 56.92, S.D.= 9.34, Min = 32, Max = 79)		
Marital status		
Single	5	6.0
Married	60	71.4
Divorce, Widowed, Separated	19	22.7
Highest educational level		
No education	11	13.1
Primary school	69	82.1
Secondary school	3	3.6
Diploma	1	1.2
Occupation		
Housework	32	38.1
Government officer	2	2.4
Agriculture	38	45.2
Employee	4	4.8
Trader	8	9.5

Table 1 Descriptive Statistics of demographic characteristics of the samples (n= 84)
(continued)

Characteristics	Number	Percent
Average income (baht / month)		
≤ 5,000	62	73.8
5,001 – 10,000	17	20.2
10,001 –15,000	1	1.2
15,001 –20,000	3	3.6
Higher than 20,001	1	1.2
Duration of having DM (year)		
≤ 5	51	60.7
6 – 10	28	33.3
11 – 20	5	6.0
(Mean = 5.23, S.D.= 4.05, Min = 1, Max = 20)		
Complications/ Comorbidity		
No	28	33.3
Yes:	56	66.7
Hypertension	32	57.1
Peripheral neuropathy	14	25.0
Blurred vision	7	12.5
Nephritis	2	3.57
Coronary artery disease	1	1.78

From table 1, the eighty-four diabetic type 2 persons who agreed to participate and were the sample in this study. The findings showed that 81% of the diabetic type 2 persons were female. Approximately 58 % were 41 to 60 years old (Mean = 56.9, S.D. =9.4). Most of them (71.4%) were married. Approximately 82 % completed primary school education. Almost half of them (45.2%) were agriculture. Additionally, 73.8 %

had income lower than 5,001 baht /month (Mean = 4958.9, S.D = 9.4). Nearly 61 % reported that they have been diagnosed as diabetes mellitus less than and 5 years (Mean = 5.23, S.D.= 4.05). Out of 84 subjects, 56 (66.7%) reported that they had complications or comorbidity. The most (57.1%) of those reported that they had hypertension is the comorbidity (See table 1).

Part II: Characteristic of the Interest Variables

Table 2 Range, Mean, and Standard deviation of learned resourcefulness, diabetic controlled behaviors and fasting plasma glucose of the diabetic type 2 persons (n = 84)

Variables	Possible Range (Middle score)	Actual Range	Mean	S.D.
Learned resourcefulness	36- 216 (126)	86 - 162	121.39	17.40
Fasting Plasma Glucose	≤140	94 – 220	142.23	28.64

The descriptive statistics of the variables of interest are presented in Table 2. The sample mean of scores of learned resourcefulness was 121.39 (S.D. = 17.4). There is no cutpoint for learned resourcefulness. The higher the scores of learned resourcefulness, the more resourceful the sample is. Therefore, a middle score of a possible range is used as a cutpoint for identifying the level of learned resourcefulness in this study. As a result, the scores of 126 are used as a cutpoint for learned resourcefulness. The descriptive statistic of learned resourcefulness in this study indicated that the mean score of learned resourcefulness was marginally moderate.

In addition, the sample mean of the fasting plasma glucose in this study was 142.2 mg/ dl (S.D. = 28.6). According to Endocrine Society of Thailand (2000), a level of 140 mg/dl or less is an index for indicating whether or not an individual can control their fasting plasma glucose. Therefore, the diabetic type 2 samples had marginally controllable fasting plasma glucose.

Table 3 Mean, Standard deviation and Practice level of diabetic controlled behaviors of the diabetic type 2 persons (n = 84)

Diabetic controlled behaviors	Mean	S.D.	Practice level
♦ Overall diabetic controlled behaviors	2.99	0.30	Nearly good
• Overall diet controlled behaviors	2.68	0.47	Nearly good
• Overall behaviors of physical exercise	2.88	2.80	Nearly good
• Overall behaviors of diabetic drug administration	3.53	0.30	Good
• Overall following-up behaviors e.g.	3.12	0.60	Nearly good

The findings in table 3 revealed that the total score of diabetic controlled behaviors had the mean score of 2.99 (S.D.= 0.30), which indicated that the samples had a diabetic controlled behaviors at nearly good level of practice. According to each dimension, it was found that the samples had a good level of practice (Mean = 3.53, S.D.= 0.30) of diabetic drug administration. Beside, it was found that the diet controlled behavior, physical exercise, and following-up behavior had a nearly good level of practice (Mean = 2.68, S.D. =0.47), (Mean =2.88, S.D.=2.80), (Mean = 3.12, S.D.=0.60) respectively.

Part III: The Relationships between the Interested Variables

Table 4 Pearson's product moment correlation coefficient between learned resourcefulness , diabetic controlled behaviors and fasting plasma glucose of diabetic type 2 persons (n = 84)

Variables	1	2	3
1. Learned resourcefulness	1.00		
2. Diabetic controlled behaviors	.403**	1.00	
3. Fasting plasma glucose	-.386**	-.510**	1.00

** p < .01

The presence of relationships between dependent and independent variables is crucial for multiple regression. A bivariate correlations matrix was presented in table 3, there are statistically significant relationship between learned resourcefulness, diabetic controlled behaviors and fasting plasma glucose of the diabetic type 2 persons. The results revealed that learned resourcefulness was statistically significant negatively related to fasting plasma glucose at a moderate level ($r = -.39, p < .01$) that mean if the diabetic type 2 persons had the high learned resourcefulness will support to have a good fasting plasma glucose level, the otherwise low the learned resourcefulness will make to have a poor fasting plasma glucose level. Learned resourcefulness was statistically significant associated positively with diabetic controlled behaviors at moderate level ($r = .40, p < .01$) that mean if the diabetic type 2 persons had the high learned resourcefulness will support to have diabetic controlled behaviors were good but if had the low learned resourcefulness, will make the poor of diabetic controlled behaviors. Finally, diabetic controlled behaviors was statistically significant negatively with fasting plasma glucose at moderate level ($r = -.5, p < .01$). It can be explained that if the diabetic type 2 persons had a good diabetic controlled behaviors will make to have a good of fasting plasma glucose level but if no good of diabetic controlled behaviors will make the fasting plasma glucose level were poor.

Part IV: The Influence of Learned Resourcefulness on Fasting Plasma Glucose by Mediating Effect of Diabetic Controlled Behaviors

Table 5 Regression analysis summary for mediating effect of diabetic controlled behaviors between learned resourcefulness and fasting plasma glucose (n = 84)

Variables	R ²	R ² _{adj}	F	b	β
Step 1: (Path C₁)					
Learned resourcefulness					
to Fasting plasma glucose	.149	.138	14.326	-.631	-.386**
Step 2:					
Learned resourcefulness					
to Diabetic controlled -					
behaviors (Path A)	.163	.152	15.916	.194	.403**
Diabetic controlled -					
behaviors to Fasting					
plasma glucose (Path B)	.260	.251	28.804	-1.733	-.510**
Step 3:					
Learned resourcefulness and	.299	.281	17.249	-.352	-.215*
Diabetic controlled behaviors (Path C ₂)				-1.44	-.40*
to Fasting plasma glucose					

* p < .05 , ** p < .01

From table 5 to assess a mediating effect on fasting plasma glucose through diabetic controlled behaviors, path analysis was used by performing a set of multiple regression. Lindley & Walker (1993) proposed that 3 regression equations are necessary. Table 4 showed the findings from testing the mediating function of diabetic controlled behaviors.

The results showed learned resourcefulness had a direct effect on fasting plasma glucose ($R^2 = 0.149$, $F(1, 84) = 14.33$, $p < .01$) and had a partial indirect effect on fasting plasma glucose through diabetic controlled behaviors ($R^2 = .299$, $F(2, 84) = 17.25$, $p < .05$). As expected, the magnitude of change was substantial. In addition, the β for learned resourcefulness dropped from -0.386 ($p < .01$) to -0.215 ($p < .05$). Concluded that learned resourcefulness had partial of mediating effect on fasting plasma glucose through diabetic controlled behaviors. This result was mean that the learned resourcefulness will support to have a good diabetic controlled behaviors and increased controllable fasting plasma glucose of the diabetic type 2 persons. The steps of mediating effect testing of Lindley & Walker method (1993) as shown in figure 4.

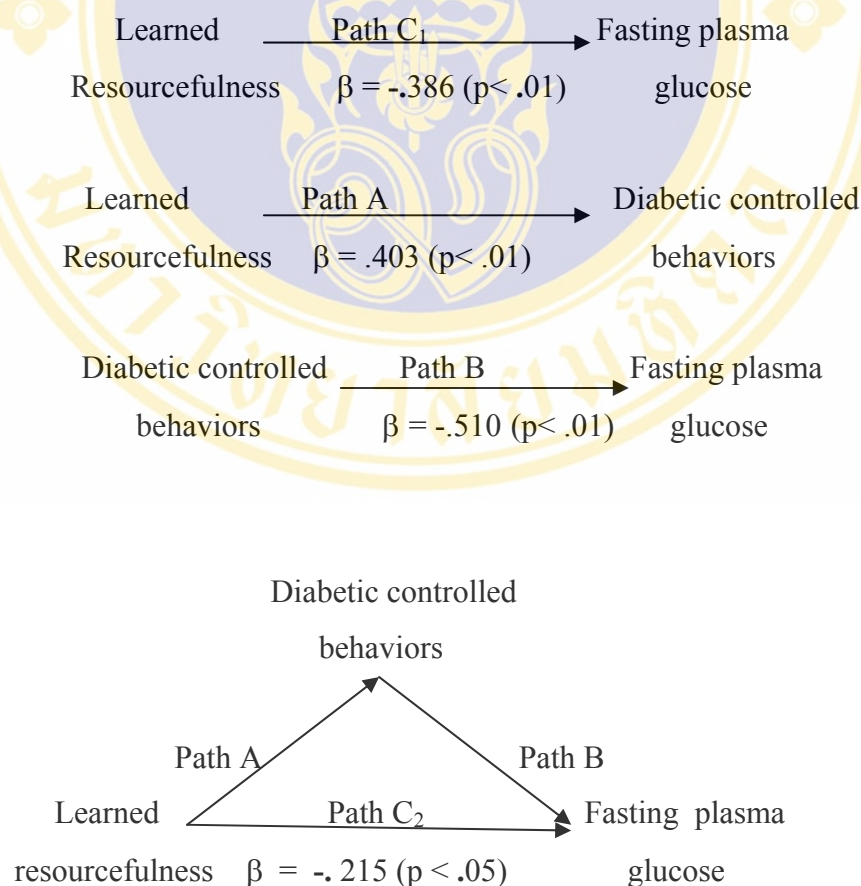


Figure 4: Steps of mediating effect of learned on fasting plasma glucose through diabetic controlled behaviors of Linley & Walker's causal model testing

CHAPTER V

DISCUSSION

The research on the influence of learned resourcefulness on fasting plasma glucose level by mediating effect of diabetic controlled behavior of diabetic type 2 persons from 84 samples was conducted and interpreted the research results regarding to the objectives and the hypotheses of this study as the following:

Purpose 1 Learned Resourcefulness, Diabetic Controlled Behaviors and Fasting Plasma glucose of Diabetic Type 2 Persons

1. Learned resourcefulness

As the result, mean of learned resourcefulness of the samples who were diabetic type 2 persons was 121.39 (S.D. = 17.49) that closed by the middle of the interval score as 126 (Possible range = 36-216) (See table 2). The mean of learned resourcefulness of the sampling group was in the moderate level referring to the samples earned the set of cognitive skills and accumulative learning ability. The whole set consisted of self-control skills, problem-solving skills, self-efficacy and ability to delay immediate gratification that offered the moderate effectiveness of coping with problems.

These can be explained that learned resourcefulness was developed from life experience (Rosenbaum, 1983; Zauszniewski, 1995: 28-43) or the practical skills of coping with problems or difficulty situations (Meichenbaum, 1977; Zauszniewski, 1995: 28-43). As the study, the samples demonstrated the moderate level of the mean of learned resourcefulness, because learned resourcefulness was inside everybody. Some factors, particularly in the patients as pervious experience, routine life style with

perceived problem-solving skills, and illness duration may relate the learned resourcefulness of people. As this study, the experience on routine life style of the sampling group as the country lifestyle was simple, unhurried and no need to compete with heavy obstacles and time that differed from the city lifestyle. Major occupations of samples in Wang-Num-Yen District were agriculture and milk-cow farm. As the demographic data, 45% of sampling group worked in agricultural career (See table 1). Besides the simple lifestyle, tradition of family roles may be a factor influencing to the development of self-learned resourcefulness. Particularly Thai culture, males were heads of families and females were family members. Consequently, decision-makings were in males' responsibility and females are followers. That situation created small opportunities of female to gain experience in problem solving and stress management. As this study, most samples, 81% were female (See table 1) with marital status, 58.3%. As the data of the interview, most samples indicated that they had never faced with heavy stresses because they had simple unhurried lifestyle and their husbands made decisions in family issues. Hence, simpler lifestyle the samples had the less learned resourcefulness and problem-solving skills they gained. Likewise the qualitative study of Zauszniewski (1995) on the interview of elders relating to the definition and significance of learned resourcefulness, people who gained skills or learned resourcefulness had to have experience of coping with stress or life difficulty.

As this study, the samples had the mean of illness duration as 5.23 years (S.D.=4.05) (See table 1). It was the period that diabetic type 2 persons had encountered and learned to deal with the diabetic mellitus. Hence, those may be the reasons why diabetic patients may require a little learning and adaptation for their diabetic mellitus. It reflects to a possible factor that affects to the samples in this study to have moderate learned resourcefulness.

Additionally, Rosenbaum (1990) stated that consuming useful formal or information could develop learned resourcefulness. As this study, the samples consumed information and news from communication media–television that major purpose was entertained more than received education. As the country lifestyle, society and environment–uncrowded houses with large property, they had some occasional meetings such as religious festivals to meet other people, so they had no place to exchange their experiences or practice self-control skills, problem-solving

skills, self-efficacy and ability to delay immediate gratification. As the interview, most samples claimed the same given information as most of them had routine lifestyle—go to work in the morning and come back in the evening to rest, watch opera and/or news from TV. Consequently, most samples of this study may gain small opportunity of developing their skills and learned resourcefulness leading to have moderate level of the mean of learned resourcefulness.

Noticeably, the Self-control Schedule was developed for assessing individual tendencies to apply self-control methods to the solutions of behavioral problems, initially established for the Western people with the Western lifestyle that was different from Thai routine lifestyle. Consequently, there were some limitations in relation to the instrument for using in the samples in this study. Then reflects on a mean score that was a moderate level of learned resourcefulness of the samples in this study. Similarly, the study of Aikens, et al. (1992: 115) addressed that diabetic type 1 persons showed close moderate level of learned resourcefulness. Although, the samples from 2 studies were different in type of diabetes—diabetic type 1 and 2 persons, age and duration of illness but the mean age of this study as 56.92 (S.D. = 9.39) (See table 1) was more than the samples in the mean age of the study of Aikens, et al. (1992: 115) was as 36 (S.D. = 12). Furthermore, in this study, the mean of duration of illness was 5.23 (S.D. = 4.05) (See table 1) that shorter than the duration of illness's samples of Aikens, et al.'s study, the mean was 17 (S.D. = 11). On the other hand, Leli, P.'s study (2001: 1-11) expressed the opposite results of the study on the effects of self-esteem, learned resourcefulness and social support on health related quality of life in long-term survivors of cancer of South Carolina that samples gained slightly high learned resourcefulness. Its reason might be the samples were the cancer patients age over 60 years with long-term living as 5-10 years. Cancer is really believed or known to be a cause of death. In other words, cancer is a life-threatening disease. Therefore, any cancer-diagnosed individuals are more likely to face with stressful situations due to its pathology and treatments that are the causes of suffering either physical or psychological health, or uncertainty. Unlike cancer, diabetes mellitus is not a major cause of death but it is a major cause of other serious complication such as Coronary – artery disease, Nephritis, Blindness, and so on. That is, diabetes mellitus is less likely to life-threaten than cancer if an individual complies

with regimen, he or she is less likely to suffer or die from diabetes mellitus. That is, diabetes mellitus is a less stressful situation than cancer. Consequently, the cancer sample in the Leli's study was more likely to have opportunities to learn, develop, and practice LR skills. In addition to the difference of a kind of samples between in this study and Leli's study, most of samples in Leli's study graduated from an university, while most of samples in this study graduated elementary school or no education. Moreover, most of samples in Leli's study resided in an urban area, while all samples in this study resided in a rural area

2. Diabetic controlled behaviors

In this study, the result in table 3 showed that the overall average score of diabetic controlled behaviors was at the level of nearly good (Mean = 2.99, S.D. = 0.3). Consider the results of each dimension, the samples demonstrated that they perform nearly good on diet control (Mean = 2.68, S.D. = 0.47), physical exercise (Mean = 2.88, S.D. = 2.80) and follow up treatment (Mean = 3.12, S.D. = 0.60) while they performed at the level of good on drug administration (Mean = 3.53, S.D. = 0.30).

It means that the samples of this study expressed 2 levels of self-practice as good and nearly good levels. They addressed good level on diabetic drug administration. The reason might be the samples believed that the diabetic drug played the big role to control plasma glucose level and only two kinds of diabetic drugs had been taken, so it caused no problem to keep doing it. Consequently, the behavior on drug administration was post in the good level.

The behaviors on diet control, physical exercise and follow-up treatment are also identified in the nearly good level of practice. The explanation can be the samples in this study had the mean of duration of illness as 5.23 (S.D. = 4.05) (See table 1). That made the samples obtaining useful and necessary information regarding benefit from self-care. Self-care encompasses diet control, physical exercise, follow-up treatment, including drug administration. The crucial knowledge was provided through individual informal conversation between nurses and the samples. Also it is believed that talking repeatedly is an effective strategy for encouraging the patients to adhere on regimen. Moreover, knowing his or her owns fasting plasma glucose might

encourage the samples reviewed their own behaviors and monitors their further fasting plasma glucose.

Additionally, the samples had rural lifestyle that facilitate to practice diabetic controlled, that is, the country lifestyle of Wang-Num-Yen differing from urban lifestyle. The chance of consuming Fast food, Pizza, Donut, Bread, Coffee or Ovultin is less than the city peoples do. Most were self-cooked diets with less bagged foods or single-dish orders. Favorite foods were vegetables, homemade chili pastes, Leang-Curry, Pha-Curry, and boiled foods with no extra sugar and no coconut cream. At the mean time, the samples have a limitation on proper diet selection for their disease because they need to have the same diet with their whole families or with their friends in social occasions. That can be a cause of imperfect diet control leading to the mean of behavior on diet control was in the nearly good level.

The physical exercise was reported as the nearly good level because the most of occupations of the samples were agriculture (45.2 %)(See table 1). Those jobs required heavy energy with sweaty activities, so they often had physical activities. It is better than no activities at all. However, it was the physical exercise with no pattern. Hence, those samples rarely had 30 minutes of physical exercise or constant energy usage. It can be improper physical exercise of them that lead to have the mean of physical exercise in nearly good level. Beside, It might be the samples had confidence on the modern diabetic treatment and medical professionals. They believed that constantly attending the diabetic clinic in the hospital enhanced them to have regular blood test aiming to monitor plasma glucose level and continuous diabetic treatment including other health examinations to detect current health status e.g. taking blood pressure and body weight. As the interview data, most samples claimed that attending diabetic clinic in the hospital offered them to know their health status and their abnormal conditions. Early diagnosis of abnormality with immediate proper treatment prohibited severe possible symptoms. They also had a chance to ask questions and retrieve useful information relating to their health problems and proper behaviors from medical professionals. Additionally, the 30-baht Scheme Program for treatments to diminish the obstacles on distance between home and hospital and medical expenses because the living location of people joining the 30-baht Scheme Program should be near by the hospital and they paid only 30 baht per visit. These support the samples to

adherence the follow-up treatment in the nearly good level. As those presented behaviors, overall diabetic controlled behaviors were claimed in the nearly good level.

Beside, diabetic controlled behaviors represent a self-control behavior in Rosenbaum's learned resourcefulness model. It could be explained that learned resourcefulness enables individual to self-control internal responses that interfere with smooth execution of ongoing behavior, habitual ways of thinking, or performance of daily activities, so that the individual may continue to function at an optimal level (Rosenbaum, 1983; Zauszniewski, 1994: 159-168). As shown in the table 2, the mean of learned resourcefulness of the sampling group was in the moderate level. That may support the samples in this study had nearly good practice level of diabetic controlled behaviors.

As presented mention, those promote nearly a good level overall of diabetic controlled behaviors. Similarly, the studies of Ketkarn, K. (1998) addressed good level of behaviors promoting health of diabetic elders. Borisut, C. (1997), Chumnongpol, M. (1997), and Porviriyasup, P. (1997) studied about health behaviors—diet control, exercise, drug administration and utilization of health services in female diabetic people in different regions such as Lower-North, East and West regions respectively. As the result, female diabetic patients showed proper overall health behavior and should be maintained it.

3. Fasting plasma glucose

The mean of fasting plasma glucose in this sampling group was 142.23 mg/dl (S.D. = 28.64) (See table 2) that was close to normal level showing proper controlled plasma glucose level in diabetic type 2 persons (≤ 140 mg/dl) (Endocrine Society of Thailand, 2000). The samples had strong intention of self-care because they had good control of plasma glucose level by constantly attending diabetic clinic with proper behaviors as diet control, exercise, drug administration and follow-up (Mean = 2.99, S.D. = 0.3) (See table 3). Additionally, the samples were also afraid of harms and complications of uncontrolled diabetic mellitus as the information from medical professionals, media and bad experience of severe complications to others such as feet and leg amputation, and blindness. Those severe complications reminded them to be having in proper

plasma glucose control as the way to protect them from the bad complications. Beside, successful control of fasting plasma glucose and the praises from medical professionals and other diabetic patients every time attending the diabetic clinic offered them the pride of themselves. Those promoted them to try to proper plasma controlled behavior. Those causes of the samples in this study had a close normal plasma glucose level with controllable plasma glucose level in diabetic type 2 persons.

Purpose 2 The Effects of Learned resourcefulness on Fasting Plasma Glucose through Diabetic Controlled Behaviors of Diabetic Types 2 Persons.

It was hypothesized that learned resourcefulness has an indirect effect on fasting plasma glucose through diabetic controlled behaviors. As expected, the study's results indicated that there was additional variance in fasting plasma glucose to be explained after adding diabetic controlled behaviors in the equation. That is, the level of diabetic controlled behaviors amplified the effects of learned resourcefulness. Simultaneously, the findings showed that greater learned resourcefulness and greater diabetic controlled behaviors occurred with a controllable fasting plasma glucose. In sum, the findings in this study supported the Rosenbaum's learned resourcefulness theory.

In this study the findings showed that learned resourcefulness has both a direct effect on fasting plasma glucose and a partially indirect effect on fasting plasma glucose through diabetic controlled behaviors of diabetes type 2 persons. Approximately 30 % of the variance in fasting plasma glucose were explained by learned resourcefulness and diabetic controlled behaviors with statistical significance at $F_{(2,84)} = 17.25$, $p < .05$ (See table 5). The findings also showed that both learned resourcefulness ($b = -.35$; $p < .05$) and diabetic controlled behaviors ($b = -1.44$; $p < .05$) were a predictor of fasting plasma glucose (See table 5). In addition, the findings showed that fasting plasma glucose was significantly negatively correlated with both learned resourcefulness ($r = -.39$; $p < .01$) and diabetic controlled behaviors ($r = -.51$; $p < .01$). (See table 4). From this study finding could be explained as follow:

That learned resourcefulness had a direct effect on fasting plasma glucose. It could be explained that once diabetes type 2 persons with high resourcefulness face with an emotional and/ or cognitive reaction to any changes either within themselves or within their environment, they may be capable of self-control internal responses that interfere with smooth execution of ongoing behavior, habitual ways of thinking, or performance of daily activities (Rosenbaum, 1983). That is, the high resourceful individuals are more likely to minimize or eliminate disturbing thoughts, feelings, or impulses, so that the individual may continue to function at an optimal level (Rosenbaum, 1983; Zauszniewski, 1994: 159-168). In addition, high resourceful persons can live and make the best thing, although they are facing with hardship (Zauszniewski, 1995: 28-43). Once the diabetes mellitus type 2 individuals can manage their stressful feelings or thoughts, a level of the fasting plasma glucose decreases till it can be controllable. As well known that once an individual encounters stressful situations, an individual's physical system is disturbed and attempts to get back to equilibrium. To return to equilibrium, catecholamine and cortisol hormones are released, which further lead to glycogen break down. As a result, a level of glucose in circulation increases (Ganong, 1981: 287; Peyrot & McMurry, 1992: 842). In conclusion, learned resourcefulness potentially leads to glucose lowering. That is, learned resourcefulness has a direct effect on fasting plasma glucose. This study was consistent with the findings in Aiken's study (1992: 113-118) that findings learned resourcefulness has a direct effect on fasting plasma glucose in diabetes mellitus individuals, although the samples were different in the type of diabetes. That is, samples in the current study were diabetes mellitus types 2, while those in Aiken's study were diabetes mellitus type1.

Rather than having a direct effect on fasting plasma glucose, learned resourcefulness also has influence on diabetic controlled behaviors. The finding showed that approximately 15 % of the variance in diabetic controlled behaviors was explained by learned resourcefulness ($F_{(2,84)}=15.92, p<.01$) (See table 5). It can be explained that learned resourcefulness enables an individual to delay immediate gratification and, to engage in problem solving and planful behavior or adaptive behavior (Rosenbaum, 1990: 20). That is, a high-learned resourceful individual is more capable of adopting more diabetic controlled behaviors. The study's finding was

consistent with the previous studies that were conducted in different groups of population. The studies of Ben –Ari Smira (1986) found those Renal-failure patients with high-learned resourcefulness earned more regimen adherence practice than others with low resourcefulness.

Consider the results showed that learned resourcefulness has a partial indirect effect on fasting plasma glucose through diabetes controlled behaviors. In other words, diabetes mellitus type 2 individuals who are resourceful and perform diabetes-controlled behaviors are more likely to have a controllable fasting plasma glucose. That is, the effect of learned resourcefulness on fasting plasma glucose is augmented by diabetic controlled behaviors. According to Rosenbaum's learned resourcefulness theory (Rosenbaum, 1990) although diabetes mellitus type 2 individuals face with stressful situations or life events in relation to being diabetes, following a regimen, or self-adaptation, high resourceful individuals are able to self-help, to perform adaptive behaviors or to perform help-seeking behaviors in order to obtain a controllable fasting plasma glucose. In other words, high resourceful individuals are able to perform diabetes-controlled behaviors and reach the target behaviors, controllable fasting plasma glucose. This study's result was consistent with the previous studies that were conducted in different groups of population, those study found that learned resourcefulness has an indirect effect on quality of life of physical and psychological health through self-help behaviors, health seeking behavior, and self-care behavior. Those studies were executed in either healthy adults or chronic-ill adults including the persons with Arthritis-related condition (Braden, 1990), Systemic Lupus Erythematosus (Braden, et al., 1993: 29-41), Breast cancer (Braden, et al., 1998: 87-96), chronic pain (Lefort, 2000: 153-160), healthy elders (Zauszniewski, 2001: 490-503). Although, the outcome variables in those previous studies were quality of life or health in psychological and physical health, while in this study was the level of fasting plasma glucose. That is, the influence of learned resourcefulness on fasting plasma glucose was mediated by diabetic controlled behaviors. In addition, those previous examined the function of learned resourcefulness using structural equation modeling, while in the present study examine that using a set of regression analysis. Therefore, despite some differences in types of illness and types of data analyses, those study findings supported the theory that learned resourcefulness has an indirect effect on

fasting plasma glucose through adaptive behaviors. Consider from the result showed that the samples in this study had moderately learned resourcefulness (Mean = 121.39, S.D. = 17.49) (See table 2), composed a nearly good practice level of diabetic controlled behaviors (Mean = 2.99, S.D. = 0.3) (See table 3) so, the samples are be able to marginally control the fasting plasma glucose (Mean = 142.23, S.D. = 28.64) (See table 2).

Notably, besides learned resourcefulness situational factors, which is a determinant identifying how much pressure will be put on a person at a given time, is another variable that influences diabetic controlled behaviors and, then, fasting plasma glucose (Rosenbaum, 1990: 8). Situational factors possibly include duration of being diagnosed as diabetes mellitus, insufficient income, and so on. Additionally, physiological factors is also one of variables influencing diabetic controlled behaviors and fasting plasma glucose. Physiological factors may include whether having other complications or comorbidity such as hypertension, neuropathy, blurred vision, and so on. Rosenbaum (1990) postulated that if these two mentioned factors are too much, a person's attention might be distracted. As a result, the person could not focus on the changes and self-evaluate his or her competency to cope with the problematic situations and physiological conditions. In this study, most (94 %) of the study samples had income less than 10,000 baht per month. In addition, most (60.7%) of them have been diabetes mellitus type 2 for less than 6 years. Lastly, approximately 67 % reported that they had other complications or comorbidity. In conclusion, these situational and physiological factors might confound the relationships among learned resourcefulness, diabetic controlled behaviors, and fasting plasma glucose.

In sum, the improvement of fasting plasma glucose control is mediated by the increasing of diabetic controlled behaviors. Results of model testing indicated that both learned resourcefulness and diabetic controlled behaviors was significantly associated with fasting plasma glucose as predicted. However, learned resourcefulness has only a partly indirect effect on fasting plasma glucose through diabetic controlled behaviors.

CHAPTER VI

CONCLUSION

The Summary of the Study

This study was a descriptive research aimed to examine the influence of learned resourcefulness on fasting plasma glucose level by mediating effect of diabetic controlled behaviors of diabetic type 2 persons. The participated in this study were composed of 84 diabetic type 2 persons who were treatments in Diabetic Clinic, Out-patient Department, Wang-Num-Yen Hospital, Sakeaw Province. Data collection was performed from June to July 2003. The instruments in this study comprised demographic data questionnaire, form record of fasting plasma glucose level, diabetic controlled behaviors questionnaire that developed by the researcher and was past the content validity testing by 3 experts and learned resourcefulness measurement (SCS of Rosenbaum, 1980), The reliability of diabetic controlled behaviors questionnaire and learned resourcefulness measurement was 0.73 and 0.87 respectively that was calculated by the Cronbach Alpha Coefficient. Analysis of data by Descriptive statistics, Pearson's product moment correlation and multiple regression that were performed follow Lindley & Walker method (1993) to test mediating function.

The finding revealed that the most sampling group was female, 81% age 41-60 years with the mean age 56.92 years. They have stayed in married status the most, 71.4%, and had studied elementary education level, 82.1%. Most occupations of sampling group were farmers, gardeners and dairy farmers as 45.2% and the inferior occupation was housewife with no other jobs as 38.1%. Most samples presented the monthly income less than 5,000 baht, 73.8%. The duration of illness was less than 5 years, 60.7% with complications or comorbidity, 66.7%. Most of those were hypertension, 57.1%.

The learned resourcefulness of sampling group showed the moderate mean score (Mean =121.39, S.D. = 17.49).

Diabetic-controlled behaviors of diabetic type 2 persons in this sampling group was defined as the nearly good mean score (Mean = 2.99, S.D.= 0.3). Considering each dimension, they presented good practice level on drug administration (Mean = 3.53, S.D. = 0.3) and demonstrated nearly good practice level on diet control (Mean = 2.68, S.D. = 0.47), physical exercise (Mean = 2.88, S.D. = 2.8) and follow-up (Mean = 3.12, S.D.= 0.6).

The mean level was 142.23 (S.D.= 28.64) of fasting plasma glucose in this sampling group was almost the normal level of the controlled plasma glucose level in diabetic type 2 persons (regarding to Endocrine Society of Thailand, 2000).

Multiple regression analysis was performed to test the mediating function showed that the learned resourcefulness had a partial effects to fasting plasma glucose level by mediating affect of diabetic controlled behaviors of diabetic type 2 persons by explained the variance of fasting plasma glucose level as 29.9 % ($R^2 = 0.299$, $\beta = -0.215$, $p < 0.05$), in addition the learned resourcefulness had a direct effect to fasting plasma glucose level by explained the variance of fasting plasma glucose level as 14.9% ($R^2 = 0.149$, $\beta = -0.386$, $p < 0.01$).

Implications and Recommendations

Recommendation for nursing practice

The findings indicated that individuals who have high-learned resourcefulness are more likely to practice more diabetic controlled behaviors. In addition, the findings also indicated that learned resourcefulness have an indirect through diabetic controlled behaviors and direct effect on fasting plasma glucose. Therefore, nurses should intervene these relationships.

1. Nurses should promote or teach diabetes mellitus type 2 individuals learned resourcefulness, so that individual executes more diabetic controlled behaviors and are able to maintain their own fasting plasma glucose. Besides teaching or promoting learned resourcefulness nurses should provide knowledge regarding how to execute diabetic controlled behaviors. The findings indicated that diabetic controlled

behaviors have an impact on fasting plasma glucose. As a result, nurses should encourage and empower an individual to maintain diabetic controlled behaviors. Additionally, nurses should also monitor their diabetic controlled behaviors. In sum, the nursing program should include teaching or training learned resourcefulness, teaching knowledge regarding diabetic controlled behaviors, and developing a participatory plan to adhere regimen.

2. Nurses should emphasize on the promotion of diabetic controlled behaviors in diabetic type 2 persons as follows:

2.1 To educate about substitute diet, daily diet volume or required energy for diabetic type 2 persons by providing board exhibition posting pictures and explanation of proper substitute diet, energy of individual item and appropriate diet volume. Actual proper menu for diabetes type 2 persons should be displayed.

2.2 To run specific videos with the topic of proper physical exercise for diabetics type 2 persons in every time of follow-up appointment. Diabetic Club should be established for information exchange and physical group-exercise.

2.3 To instruct each group with the handbook of proper diabetic drug administration for diabetic type 2 persons.

Recommendations for further studies

1. Replicate the study using a well-developed instrument measuring diabetic controlled behaviors or replicate the study addressing only each individual dimension of diabetic control behaviors because each dimension of diabetic controlled behaviors is very complex.

2. Replicate the study using other methodology such as qualitative research design or mixed method in order to obtain more complete picture about the influences of learned resourcefulness on diabetic controlled behaviors and fasting plasma glucose.

3. Replicate the study using a modified format of learned resourcefulness instruments. For example dichotomous format may be preferable for use.

4. Examine the effect of learned resourcefulness on diabetic controlled behaviors and fasting plasma glucose in other groups of the population such as

diabetes mellitus type 2 in urban area, early-diagnosis of the diabetic patients, diabetics type 2 inpatients.

5. Conduct a quasi-experimental study particularly purposing to develop the promoting program of learned resourcefulness by evaluating the effectiveness of the promoting program of learned resourcefulness in diabetic type 2 persons.

6. Examining the influences of learned resourcefulness on diabetic controlled behaviors and fasting plasma glucose level in diabetic type 2 persons along with situational or physiological factors such as social support, socioeconomic status, emotional disturbance, complication, and so on.

Limitation of Study

1.The use of convenience sampling limited the generalizability of finding across population.

2.It was not possible to infer causal relationships among study variables from the findings since this study is a cross-sectional design. Cross-sectional design is usually used to describe the relationships among variables at any point in time. This design did not examine change overtime. However, the learned resourcefulness is acquired throughout lifetime (Rosenbaum, 1990).

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แบบฟอร์มการยินยอมและการพิทักษ์สิทธิของผู้ร่วมวิจัย

ดิฉันนางสาวรัตติ ไพเราะ นักศึกษาพยาบาลปริญญาโท คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล สนใจศึกษาแหล่งทักษะภายในตนเอง การปฏิบัติตนตามแผนการรักษาดูแล และระดับน้ำตาลในเลือดของผู้ป่วยเบาหวาน จึงใคร่ขอความร่วมมือจากท่านในการตอบแบบสอบถาม ถ้าหากท่านยินยอมให้ความร่วมมือในการวิจัย ดิฉันขอรบกวนท่านในการตอบตามแบบสอบถามเกี่ยวกับข้อมูลทั่วไป แหล่งทักษะภายในตนเอง การปฏิบัติตนตามแผนการรักษาดูแล และระดับน้ำตาลในเลือดของท่าน โดยใช้เวลาประมาณ 30 นาที

ในการตอบแบบสอบถามครั้งนี้คำตอบของท่านไม่มีถูกหรือผิด ซึ่งข้อมูลที่ได้จะเป็นประโยชน์ต่อการพัฒนาแนวทางการพยาบาลเพื่อวางแผนช่วยเหลือผู้ป่วยเบาหวานต่อไป การเข้าร่วมการวิจัยในครั้งนี้จะเป็นไปด้วยความสมัครใจของท่าน ไม่ว่าท่านจะเข้าร่วมการวิจัยหรือไม่ก็ตามจะไม่มีผลกระทบต่อท่านหรือการดูแลรักษาที่ท่านจะได้รับแต่อย่างใด และหากท่านยินยอมเข้าร่วมการวิจัยแล้วเกิดเปลี่ยนใจภายหลัง ท่านมีสิทธิในการถอนตัวออกจากการวิจัยได้โดยไม่มีเงื่อนไขใด ๆ ทั้งสิ้น โดยข้อมูลที่ได้ทั้งหมดจากท่านจะเป็นความลับและนำเสนอเป็นผลการวิจัยของผู้ป่วยเบาหวานโดยรวม และในระหว่างการเข้าร่วมการวิจัยถ้าท่านมีข้อสงสัยใด ๆ ดิฉันยินดีตอบข้อสงสัยของท่านตลอดเวลา ดิฉันขอขอบพระคุณในความร่วมมืออย่างยิ่ง

นางสาวรัตติ ไพเราะ

ผู้ดำเนินการวิจัย

สำหรับผู้เข้าร่วมการวิจัย

ข้าพเจ้าได้รับทราบรายละเอียดของการวิจัยดังที่อธิบายไว้ข้างต้นแล้ว มีความเข้าใจและยินดีให้ความร่วมมือในการวิจัย

ลงชื่อ.....

วันที่ เดือน.....พ.ศ.2546



Data Collection Instruments

แบบสอบถามในการวิจัยเรื่อง

อิทธิพลของแหล่งทักษะภายในตนเอง ต่อระดับน้ำตาลในเลือด โดยส่งผลผ่านการปฏิบัติ

ตนในการควบคุมเบาหวานของผู้เป็นเบาหวานชนิดที่ 2

แบบสอบถามนี้ประกอบด้วย 4 ส่วนได้แก่

- ส่วนที่ 1 แบบบันทึกข้อมูลส่วนบุคคลของผู้เป็นเบาหวานชนิดที่ 2
- ส่วนที่ 2 แบบวัดแหล่งทักษะภายในตนเอง
- ส่วนที่ 3 แบบสอบถามการปฏิบัติตนในการควบคุมเบาหวานของผู้เป็นเบาหวานชนิดที่ 2
- ส่วนที่ 4 แบบบันทึกระดับน้ำตาลในพลาสมา ก่อนอาหารเช้า (FPG) 3 ครั้งใน 3 เดือน (มิลลิกรัม/เดซิลิตร)

ส่วนที่ 1. ข้อมูลส่วนบุคคลของผู้ป่วยเบาหวานชนิดที่ 2

วันที่เก็บข้อมูล.....

1. เพศ 1 ☐ ชาย 2 ☐ หญิง
2. อายุ ปี
3. สถานภาพสมรส 1 ☐ โสด 2 ☐ คู่ 3 ☐ หม้าย / แยกทางกัน
4. ระดับการศึกษา 1 ☐ ไม่ได้เรียนหนังสือ 5 ☐ ปริญญาตรี
 2 ☐ ประถมศึกษา 6 ☐ สูงกว่าปริญญาตรี
 3 ☐ มัธยมศึกษา 7 ☐ อื่น ๆ.....
 4 ☐ อนุปริญญาหรือประกาศนียบัตร
5. อาชีพ 1 ☐ แม่บ้านหรือไม่ได้ทำงานนอกบ้าน 4 ☐ รับจ้าง ระบุ.....
 2 ☐ รับราชการ/ รัฐวิสาหกิจ 5 ☐ ค้าขาย
 3 ☐ ทำไร่ ทำนา ทำสวน เลี้ยงวัวนม 6 ☐ อื่นๆ
6. รายได้ครอบครัว บาท / เดือน
7. ระยะเวลาการเป็นโรค.....ปี
8. ภาวะแทรกซ้อน / โรคร่วม
 1 ☐ ไม่มี
 2 ☐ มี
 1 ☐ โรคความดันโลหิตสูง 2 ☐ โรคหัวใจ 3 ☐ โรคไต
 4 ☐ ตาพร่ามัว 5 ☐ ขาปลายมือปลายเท้า 6 ☐ อื่น ๆ

ส่วนที่ 2 แบบสัมภาษณ์การปฏิบัติตนในการควบคุมเบาหวานของผู้เป็นเบาหวานชนิดที่ 2

ประกอบด้วย 4 ด้าน ได้แก่ ด้านการควบคุมอาหาร ด้านการออกกำลังกาย ด้านการรับประทานยา และการติดตามการรักษา ขอให้ท่านตอบตรงตามความเป็นจริงที่ท่านปฏิบัติมากที่สุด

โดยข้อ 1-24 เกณฑ์การตอบดังนี้

ปฏิบัติเป็นประจำ	หมายถึง	ปฏิบัติในเรื่องนั้นทุกครั้ง
ปฏิบัติบ่อยครั้ง	หมายถึง	ปฏิบัติในเรื่องนั้นส่วนใหญ่
ปฏิบัติบางครั้ง	หมายถึง	ปฏิบัติในเรื่องนั้นส่วนน้อย
ไม่ได้ปฏิบัติ	หมายถึง	ไม่ได้ปฏิบัติในเรื่องนั้นเลย

ข้อ 25-28 ให้ตอบดังนี้

ปฏิบัติเป็นประจำ	หมายถึง	ปฏิบัติในเรื่องนั้นทั้ง 3 ครั้ง ใน 3 เดือน
ปฏิบัติบ่อยครั้ง	หมายถึง	ปฏิบัติในเรื่องนั้นเพียง 2 ครั้ง ใน 3 เดือน
ปฏิบัติบางครั้ง	หมายถึง	ปฏิบัติในเรื่องนั้นเพียง 1 ครั้ง ใน 3 เดือน
ไม่ได้ปฏิบัติ	หมายถึง	ไม่ปฏิบัติในเรื่องนั้นเลยทั้ง 3 ครั้งใน 3 เดือน

ข้อความการปฏิบัติตน	เป็นประจำ	บ่อยครั้ง	บางครั้ง	ไม่ได้ปฏิบัติ
ด้านการรับประทานอาหาร				
1. ดื่มน้ำตาลในอาหารและเครื่องดื่ม				
2. เมื่อซื้ออาหารที่ปรุงสำเร็จรูป เช่น อาหารถุง ดันเลือกซื้ออาหารที่มีไขมันน้อย และไม่หวาน				
.....				
.....				
12. ดันปรุงอาหารโดยวิธีการต้ม นึ่ง ปิ้งย่าง และทอดด้วยน้ำมันด้วยน้ำมันพืช				

ข้อความการปฏิบัติตน	เป็นประจำ	บ่อยครั้ง	บางครั้ง	ไม่ได้ปฏิบัติ
ด้านการออกกำลังกาย				
13. ฉันออกกำลังกาย /ทำงานนอกบ้าน /ทำงานบ้านด้วยแรงกายจนเหงื่อออก				
14. ฉันออกกำลังกายอย่าง <u>ติดต่อกัน</u> ในแต่ละครั้งนานอย่างน้อย 20 –30 นาที				
.....				
.....				
.....				
17. ถ้าฉันมีอาการหน้ามืด ใจสั่น ขณะออกกำลังกายหรือทำงานฉันจะหยุด และหาน้ำหวานมาดื่ม หรือน้ำลูกอมมาอม หรือน้ำอาหารมารับประทาน				
ด้านการรับประทานยา				
18. ฉันรับประทานยารักษาโรคเบาหวานตามแพทย์สั่ง				
19. ฉันรับประทานยาก่อนอาหาร โดยรับประทาน <u>ก่อน</u> รับประทานอาหารอย่างน้อย 30 นาที				
.....				
.....				
24. ฉันงดใช้ยารักษาเบาหวาน เวลาที่ฉันมีไข้ไม่สบายตัว หรือมีอาการเวียนศีรษะ อาเจียน				
ด้านการติดตามการรักษา				
25. ฉันมาตรวจตรงวันนัด				
.....				
.....				
28. เมื่อฉันรู้ค่าน้ำตาลในเลือด ฉันจะพยายามปฏิบัติตน เพื่อควบคุมระดับน้ำตาลในเลือดให้เหมาะสม				

ส่วนที่ 3 แบบสัมภาษณ์วัดแหล่งทักษะภายในตนเอง ประกอบด้วยข้อความ 36 ข้อความ

คำชี้แจง ข้อความต่อไปนี้เป็นข้อความเกี่ยวกับแหล่งทักษะภายในตนเอง ในแต่ละข้อความไม่มีคำตอบที่ถูกต้องหรือผิด โดย คะแนน 6 หมายถึง เป็นตัวฉันมากที่สุด จนถึง 1 คะแนน หมายถึง ไม่ได้เป็นตัวฉันเลย

ข้อความ	ตัวเลือกของคำตอบ					
	เป็นตัวฉันมากที่สุด	เป็นตัวฉันมาก	เป็นตัวฉันปานกลาง	เป็นตัวฉันน้อย	เป็นตัวฉันน้อยที่สุด	ไม่ได้เป็นตัวฉันเลย
1. เมื่อฉันต้องทำงานที่น่าเบื่อ ฉันจะคิดถึงงานส่วนที่ฉันชอบให้น้อยลง และคิดถึงรางวัลที่จะได้รับเมื่อฉันทำงานนั้นเสร็จ						
2. เมื่อฉันต้องทำงานที่ฉันรู้สึกกังวล ฉันจะพยายามหาวิธีจัดการกับความกังวลนั้นในไว้ก่อนขณะที่ทำงาน						
.....						
.....						
.....						
.....						
36. ถ้าฉันรู้สึกหิว แต่ไม่มีโอกาสที่จะรับประทานอาหารในขณะนั้นได้ฉันพยายามที่จะเบี่ยงเบนความสนใจไปเรื่องอื่น โดยพยายามไม่สนใจกับความหิว						

ส่วนที่ 4 แบบบันทึกระดับน้ำตาลในพลาสมาก่อนอาหารเช้า (FPG) (มิลลิกรัม / เดซิลิตร)

ครั้งที่	วัน/เดือน/ปี	ค่า FPG (mg/dl)	หมายเหตุ
1.			
2.			
3.			

ค่าเฉลี่ย 3 ครั้ง ของระดับน้ำตาลในพลาสมาก่อนอาหารเช้า (FPG) = mg/dl



Testing Assumption of Multiple Regression Analysis

Before analysis of the data with Multiple regression statistics, there are assumptions to be checked that included normality, linearity, homoscedasticity and multicollinearity (Monro, 2000: 271-275). The results for each assumption were presented as follow:

1. Normality distribution

The relationship of dependent and independent variable must be linear and normally distributed for each value of the independent variable. Using a histogram of the standardized residuals can assess them. Then the residuals had a fairly normally distributed and one peak of .00 of standard deviation above mean. It was possible to indicate of the assumption of normality. This result as shown in figure 5

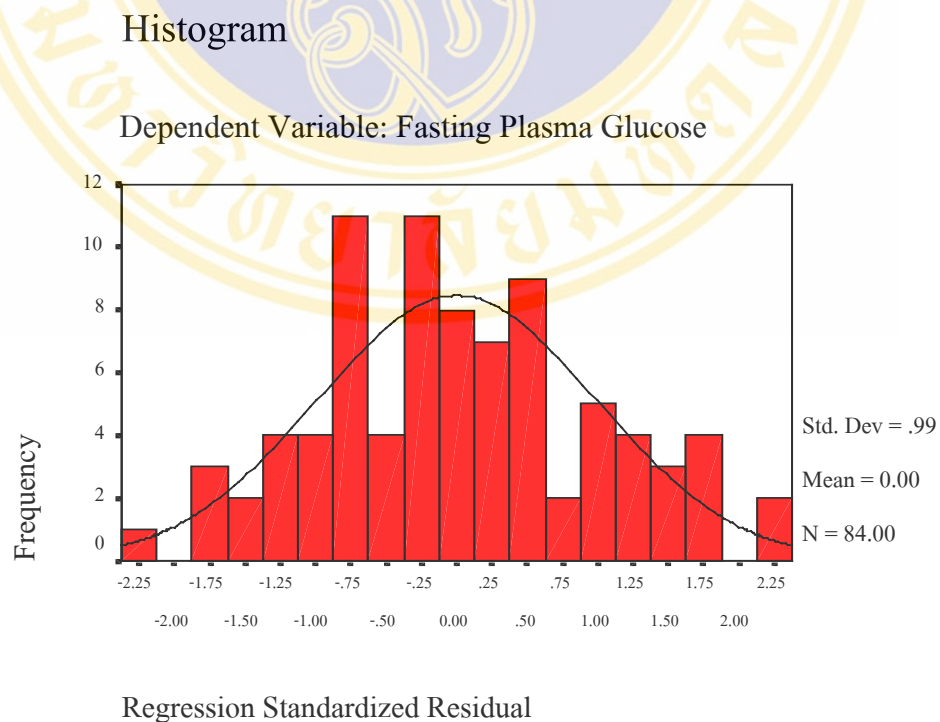


Figure 5 Histogram of residuals

2. Homoscedasticity

The residuals can be plotted against the predicted values and against the independent variables. The data would form a straight line from the lower – left corner to the upper – right corner if the model fit the data exactly. In figure 6 as shown the actual scores vary around the prediction line.

When the residuals are from a normal distribution, the plotted values fall close to the line in the normal probability plot as shown in figure 7

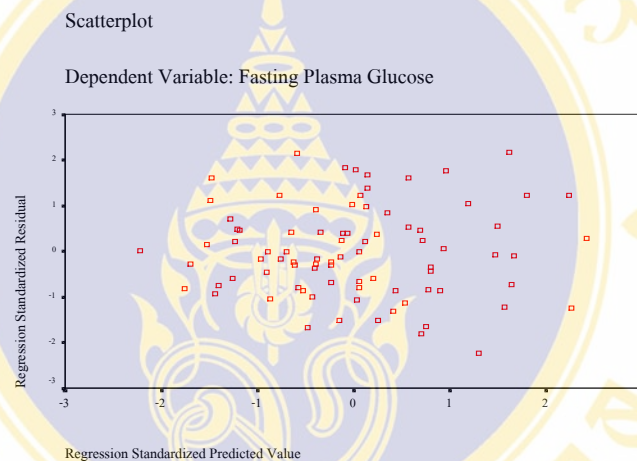


Figure 6 Scatterplot between regression residual and regression predict value

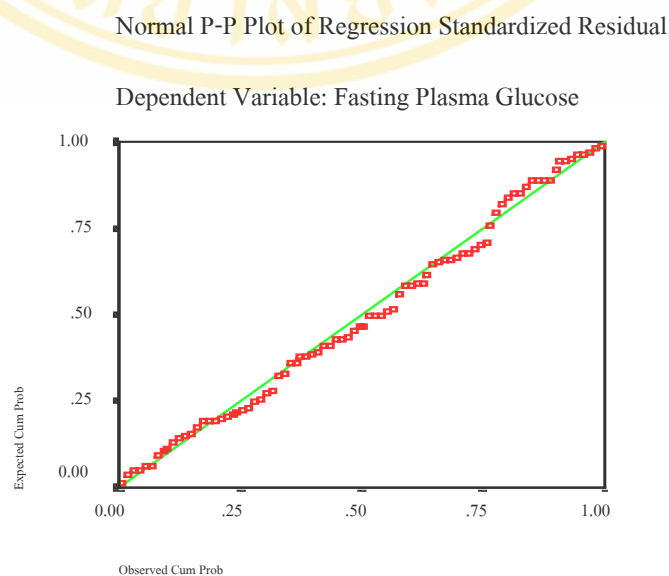


Figure 7 Normal P – P plot of regression standardized residual

3. Testing assumptions by multicollinearity

The Pearson's Product Moment Correlation was performed to examine the relationship among independent variables. The result of the analysis showed that correlation coefficient among independent variables was 0.403 ($p < .01$) (Table 4).

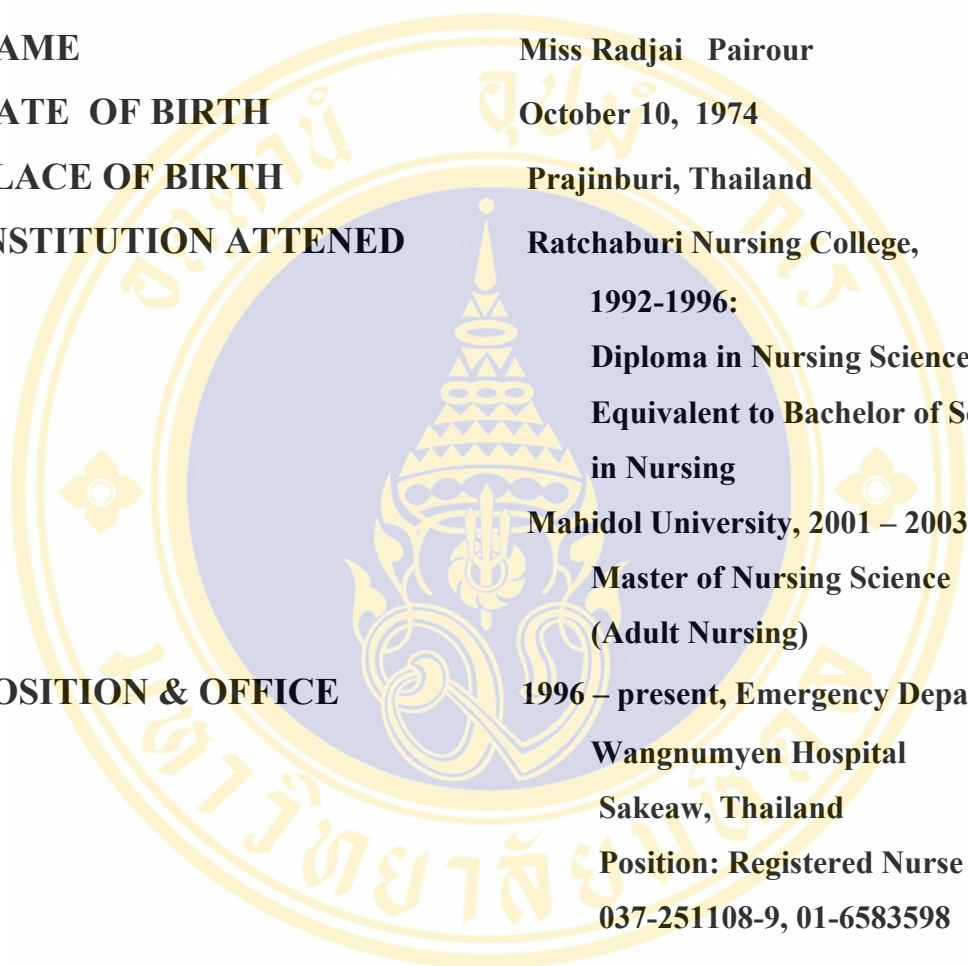
The tolerance of a variable was used as a measure of collinearity. The tolerance values of learned resourcefulness was .837 (Table 6) that means had 17.3 % ($1 - .837 = .173$) of the variance in this variable was shared with the other predictor. Because the other values for tolerance are even higher, multicollinearity was not a problem in this analysis (Munro, 2001: 272). As a result, concluded that the data in this study could be test by Multiple Regression Analysis, because the data met all of the assumptions required by this method.

Table 6. Unstandardized coefficients, Std. Error, standardized coefficients, t- value, and collinearity statistics of learned resourcefulness and diabetic controlled behaviors, and constant

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	Collinearit Statistics	
	B	Std.Error				Tolerance	VIF
(constant)	305.553	27.979		10.921	.000		
Learned Resourcefulness	-.352	.166	-.215	-2.115	.038	.837	1.194
Diabetic controlled Behaviors	-1.438	.346	-.423	-4.162	.000	.837	1.194

a. Dependent Variable: Fasting plasma glucose

BIOGRAPHY



NAME	Miss Radjai Pairour
DATE OF BIRTH	October 10, 1974
PLACE OF BIRTH	Prajinburi, Thailand
INSTITUTION ATTENDED	Ratchaburi Nursing College, 1992-1996: Diploma in Nursing Science Equivalent to Bachelor of Science in Nursing Mahidol University, 2001 – 2003 Master of Nursing Science (Adult Nursing)
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