RELATIONSHIPS OF HEALTH LITERACY AND SELF-CARE BEHAVIOR AMONG ELDERLY WITH TYPE 2 DIABETES

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Abstract- Background and purpose: Diabetes Mellitus (DM) is one major problem in Thailand. Elderly having significant difficulty reading and comprehending medical information or having limited health literacy tend to have worse health outcome. The study aimed to describe health literacy and self-care behavior, and examine the association of health literacy with self-care behavior in elderly with diabetes.
Method: ***288***elderly with type 2 diabetes aged 61 – 90 years old were purposively selected from 13 community hospitals in Samut Songkram province, Thailand. Data were collected by using questionnaires. The 3-level Health Literacy Scale developed by Ishikawa was used to assess health literacy level. Data were analyzed using descriptive statistics and Pearson's correlation.
Results It was revealed that the majority of the participants were average 69.88 years old. The majority of them had income less than 5,001 ฿ (48.30 %)and the highest education level at elementary (75.70%). Most of them were diagnosed with DM more than one year (ranged 1- 56 years, average 10.11 years). The participants had moderate health literacy (average = 2.59). They had diabetes self-care behavior at a low level (score 32.04). There was statistically significant correlation ($r = 0.138$, $p = 0.019$) between health literacy and self-care behavior of elderly with diabetes.
Conclusions: The results encourage efforts to monitor health literacy, health education and self-care behavior in Thai elderly with diabetes and examine

Index Terms- Elderly, Health Literacy, Self-care behavior, Education

I. INTRODUCTION

In Thailand, people who are over the age of 60 are defined as an 'elderly' or older person. Elderly people are vulnerable. Old Age and the aging process are of course a biological reality which has its own dynamic, largely beyond our control. Awareness of ageing among middle-aged and old age people refers to the ways they envisage the ageing process and, by extension, experience their own changeover to old age (20). Aging is not a distasteful experience and disagree with the lay belief that ageing is a negative process because it leads to old age and its consequent physical, mental, social and economic deterioration. Very old age (over age 80) is a particular risk factor for poor health literacy. Data suggest that this increased vulnerability is the result of decreased efficiency in information processing, declines in working memory function, and difficulty remembering context or learning, all of which can create confusion. Older adults may have problems when facing new medical issues as they have to learn about a new disease or disorder and make complex decisions about treatments. These tasks may tax the capabilities of a declining cognitive system.

Diabetes mellitus or diabetes is one of chronic diseases and causes death to numbers of patients around the world .In 2013, an approximately 382 million people are estimated to have diabetes and 316 million people are living with impaired glucose tolerance (8).The number of people with diabetes is increasing in every country .For Thailand, according to Ministry of Public Health Thailand, Chronic Disease Surveillance Report of 2010, there were 888,580 diabetic patients in Thailand .The ratio of diabetic illness from the report was 1,395 patients per 100,000 populations .This made it ranked as the second top of non-communicable diseases, of which the first top belonged to high blood pressure .Diabetes is due to abnormal insulin production or the effect of insulin that has an impact on high blood sugar or glucose level .According to pathology, diabetes can be classified into four types; type I, type II, gestational diabetes found during pregnancy, and other types (2).Type II diabetes mellitus is caused by the combination of abnormal insulin secretion of beta cells and the effect of insulin resistance .A person with diabetes may have either result from those mentioned causes greater than one another.

Despite diabetes is a chronic disease, it is treatable through dietary control, physical exercises, and oral medicine .The patients who have long term diabetes, their beta cells may gradually be destructed and fail to control the blood sugar or glucose level .Insulin medication, such as insulin injection, is needed to help control the glucose level instead of the cells' production itself .Type II diabetes is mostly found in people aged over 40 years .Risk factors of this type are older age, overweight, lack of physical exercises, and genetics. The patients with long term diabetes and poor blood sugar control will easily develop complications that cause illness and death .Complications in diabetic patients may be found when the persons are first diagnosed of diabetes .Those people may have diabetes without any symptoms. The goal of treatment in diabetes is to control blood sugar to normal or close

to normal level as much as possible .So fasting blood glucose level after 8-12 hours must be 90-130 mg/dl, or the level of hemoglobin A1c (HbA1c is less than 7 %) (2) .

Diabetes is a chronic disease .The patients must see their doctors regularly for health check up, picking up some medicine, and taking doctors' advice .While examining, the patients must inform symptoms and health problems related to their diabetic illness .The doctor will provide recommendation of how to take better care of themselves, and how to control blood sugar to normal level; prescribe medicine; and explain how to take medicine correctly .In order to make patients understand and follow doctors' advice correctly, communication between patients and doctors must be effective. The important components to improve mutual and better understanding are language usage in communication and point of views on the topic discussing .Both patients and doctors must understand what the other try to communicate and what the other perceive on the subject they are discussing .When the patients do not understand health information or have low health literacy, they will not follow doctors' direction .Low health literacy and abandoning doctors' advice or direction are obstacles prevent them from good health .

Health Literacy or skills in health was first recognized in the United States of America where people from different ethnicities with different languages and cultures live together .Some patients have problem with using English as a second language to communicate with health providers .They seldom understand health information or how to take better health care .According to the study in the patients with diabetes, the patients with low health literacy were likely to have care less in their health .They had high blood sugar level, were often admitted in a hospital, and had more complications in diabetes (1), (6), (16), (17), (18) .It was costly to diabetic treatment .Health literacy; therefore, drew more interesting in the United States .In 1998, World Health Organization defined health literacy as "cognitive and social skills that determine an individual's motivation and ability to access, understand, and use the health information to promote and always maintain good health for oneself. Later on Health organizations and researchers defined health literacy as can be summarized as the ability of a person to obtain health information from different media channels, and to understand and recognize the obtained health information until utilizing the information as to promote and always maintain one's good health.

Nutbeam (13) – (14) has classified health literacy into 3 categories) :1 (functional health literacy is the ability to understand basic health information;) 2 (interactive or communicative health literacy is the ability to understand basic health information and to communicate for information exchange with others;)3 (critical health literacy refers to the ability to analyze the obtained health information for decision making in health care .According to previous studies, the patients with diabetes who had low functional health literacy are likely to fail to control blood glucose level (19) .This may result from lack of understanding in health information recommended by health care providers .Increasing high health literacy level in the patients may help them understand what doctors recommend, and be able to control their blood sugar level better.

Measuring health literacy level in the patients can be done through different methods--each of them has different ways of usage and objectives .The previous researches of measurement in health literacy related to blood sugar level (HbA_{1c}) of the patients, the researches common used TOFHLA, s-TOFHLA, REALM or REALM-M (17).These methods have the same goals are to measure ability in reading, pronunciation, vocabularies related to health care and treatment, filling words in the blank, and calculating the given numbers related to health information .These can measure only the level of functional health literacy .The intervention to increase health literacy among the patients is thus formed as health education or media development models .For instance, using pictures for wordings, and using special marks for medicines will help patients to understand health information better .It is a top-down approach of which the intervention is done by researcher team and experts from different fields .The weakness of conducting an intervention to this approach is less participation of patients .It also somehow drops the content of health literacy which makes it far to reach Nutbeam's definition .According to Nutbeam, health literacy is to focus on patients' understanding in health information; patients' ability to access sources of information and knowledge; and patients' ability to analyze the obtained information for proper utilization .This will occur when all stakeholders, who involve in patients care and treatment, cooperate and brainstorm their ideas flowing freely by viewing patients as the centers.

Nutbeam's idea influenced Professor Ishikawa (9)who pays much interest in communication between doctors and patients and health information obtained from various sources of patients, to develop a new instrument to measure the level of health literacy .That is Communicative Health Literacy .It is designed into questionnaire that complies of 14 questions .Those questions are categorized into 3 areas which can determine the level of understanding in the content of health information; the capacity of utilizing in communicative channels to obtain information; and the utilization of obtained information for decision making .Patients will score 1-4 throughout 14 questions .This questionnaire was used to find the relationships between communicative health literacy

and HbA_{1c} level in the patients with diabetes .In addition, Chananya Kumkrong et al (3) applied that questionnaire to the research on the people living with HIV in northern and northeastern Thailand with about 400 sample population .From examining this wide use in patients, it is possible to apply that instrument or questionnaire to diabetic patients in Thailand .It can also be as a guideline to conduct the intervention to raise higher health literacy of Thai diabetic patients . As the result, this can help the patients practice self-care behavior and finally keep blood sugar level as close to normal (HbA1c < 7%)

Self-care behavior, a key concept in health promotion, refers to decisions and actions that an individual can take to cope with a health problem or to improve his or her health (11). There are four dimensions of self-care including physical dimension, prevented complication dimension, treatment dimension, and psychosocial dimension (15).

There are several specific health and behavioral domains could explain why older cohorts have worse reading ability and less understanding health information. The worse physical health of the oldest old could affect their cognition (7) or decrease their ability to concentrate on complex cognitive tasks such as reading. Similarly, depression may impair concentration, and it also may be a risk factor for cognitive decline (5). Thus, worse physical and mental health among older cohorts could contribute to the negative association between age and reading ability and understanding health information.

II. METHODOLOGY

In the study, a cross-sectional study was used to determine relationships between health literacy and self-care behavior in elderly patients with Type 2 diabetes .The sample of 288elderly with type 2 diabetes aged 61 – 90 years old were purposively selected from approximately 1,000 diabetic patients from13 community hospitals in Samut Songkram province, Thailand. The sample size was calculated by using Yamane's formula (22).Patients who did not speak Thai were excluded .

The data was collected in face-to-face interviews from the respondents by a questionnaire which was organized in three parts .The first section had questions regarding socio-economic characteristics .The second section hadHealth Literacy assessment .The third section had self-care behavior assessment . Health literacy was assessed with the 3-level Health Literacy Scale developed by Ishikawa et al (9), a 14-item self-report measure .Self-care behaviors were assessed using four point likert scale questions adapted from a self-care management questionnaire, a 16-item self-report measure that assesses how often self-care activities are performed from never to always in a given week. The overall self-care behavior scores are ranged from 16 – 64. Varying strengths of practicing behaviors are listed below.

Score ranges	Level of self-car behaviors
16.0 – 44.8	Low
44.9 – 54.3	Moderate
54.4 – 64.0	High

Descriptive statistics including mean, standard deviation, frequency, and percentage will be used to describe the characteristic of the samplesincluding age, income, education, duration of diabetes, health literacy, and self-care behavior .To determine the degree of association between health literacy and self-care behavior, Pearson's correlation coefficients was used (12).

III. RESULTS

Result of the statistical description analysis

It was revealed that the majority of the participants were average 69.88 years old. The majority of them had income less than 5,001 ฿(48.30 %)and the highest education level at elementary (75.70%). Most of them were diagnosed with DM more than one year (ranged 1- 56 years, average 10.11 years) as shown in Table 1. The respondents had moderate overall health literacy($\bar{x}$ = 2.58, S.D = .0.52),and low self-care behavior($\bar{x}$ = 32.03 from the total score 48)as shown in Table 2.

Table1:**The demographic information of 288 samples**

Demographic information	Mean/ %
Age (mean years)	69.88
Income less than 5,001 ฿ (%)	48.30
Education (% element school level)	75.70
Duration of diabetes (mean years)	10.11

Table 2:**Health Literacy and self-care behavior of 288 samples**

Health Literacy /Self-care behavior	Mean	Score range	Interpretation
Overall Health Literacy (mean score)	2.58	1 - 4	Moderate
Overall self-care behavior	32.03	16 - 64	Low
Physical dimension	2.49	1 - 4	Moderate
Prevented complication dimension	2.76	1 - 4	Moderate
Treatment dimension	2.82	1 - 4	Moderate
Psychosocial dimension	2.59	1 - 4	Moderate

The result of Pearson's correlation coefficient analysis An analysis result had indicated that overall self-care behavior(r =0.490, p =0.483), physical dimension(r =0.103, p =0.140) , prevented complication dimension (n) r =0.048, p =0.494),treatment dimension (r =0.065, p =0.375),and psychosocial dimension (r =0.076, p =0.280) did not have significant relationship with overall health literacy as shown in Table 3.

Table 3:**The correlation between variables and overall health literacy**

Variables	The correlation to self-care behavior		Interpretation
	Coefficient (r)	Sig.	
Overall self-care behavior	0.138*	0.019	Little relationship
Physical dimension	0.039	0.510	No relationship
Prevented complication dimension	0.052	0.380	No relationship
Treatment dimension	0.143*	0.015	Little relationship
Psychosocial dimension	0.193**	0.001	Little relationship

.* Correlation is significant at the 0.05 level(2-tailed).

.**Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION AND CONCLUSION

The result that elderly with type 2 diabetes community hospitals in Samut Songkram province, Thailand had moderate health literacy may be because of their old age, low education and low income. This was in accordance with Schillinger (18)and Nutbeam (14)which had proven that limited health literacy is common in low income and low-educated elderly patients with diabetes and has been associated with worse diabetes outcome .

The study found that overall self-care behavior,treatment dimension,and psychosocial dimensionhad significant relationship with overall health literacy, while physical dimension and prevented complication dimension had no relationship with overall health literacy .This was in accordance with Gazmararian et al (6), Prabsangob et al (16), Schillinger et al (18), and Williams et al. (19)which had proven that the patients with low health literacy were likely to have care less in their health . Consequently,they had high blood sugar level, were often admitted in a hospital, and had more complications in diabetes.

The results encourage health care providers to make more efforts to monitor factors affecting self-care behavior in the Thai elderly diabetic patient population .They are also useful in guiding the development of appropriate methods to enhance diabetes knowledge and self-care behavior, such as a strategy for providing health education and motivating elderly to practice healthy behaviors.

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