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Effects of Standardized Diabetes Education in Clinical Nurses

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Abstract

The purpose of this study was to exam effects of Standardized Diabetes Education for clinical nurses on the level of diabetes knowledge, the level of persuasion of knowledge and the level of practical application of knowledge for nursing care of patients with diabetes mellitus. This study was a one group quasi-experimental study. Study participants were 115 clinical nurses who 3 general hospitals in Korea from August 3 to September 30, 2013. Data were collected using structured questionnaires including the Knowledge on the DM and NPQ tool by Brett. The data were analyzed using Cronbach's α, means, standard deviations, and t-test with the SPSS windows 19.0 program. The result of implementing the standardized education of diabetes showed that the level of diabetes knowledge (t=2.19, p=.032) was significantly increased. And the level of practical application of diabetes knowledge (t=2.98, p=.004) based on the standardized education of diabetes showed a statistically significant difference between before education and after education

Keywords: *DM, clinical nurses, education*

1. Introduction

Diabetes is a metabolic disease caused by relative or absolute deficiency of insulin [1]. Despite substantial progress in the treatment of diabetes mellitus, it remains one of the world's major health problems. Incidence of diabetes is noticeably increasing in Korea [2, 3].

Recently, with the increase of diabetic patients, the role of clinical nurse has become important in the care needs for the diabetic patients. It is reported to decrease the reliability of the patients on the nurses with the inconsistent cares for the diabetic patients [4].

At the present time, there is no known cure for diabetes mellitus [5]. With prescribed therapy, better control of diabetes is possible. In order to understand the need for treatment, the diabetic needs to know about the disease process itself.

Knowledge about how to manage the disease is also needed. Patient educational program have been developed to improve diabetic patients' knowledge of their disease and its management.

Latest knowledge on treatment of diabetes has been changing quickly, and nurses are required to immediately and properly adapt to the changing knowledge and efficiently apply it to practice [6, 7]. The importance of diabetes education is emphasized as the success of diabetes treatment relies heavily on self-management of patients [8].

Standard guideline recently applied for clinical treatment of diabetes patients showed favorable responses [9]. Education on 'exchange of information between patients and medical practitioners or educators', 'self-management', and 'acquisition of ability to establish voluntary treatment plan' is highlighted. The American Diabetes Association has developed a standard guideline for education on self-management of diabetes and provides the grounds of studies supporting the effect of self-management education on patients as an essential part of diabetes treatment [10].

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Diabetes education course according to the standard guideline can allow doctors, nurses, nutritionists, and related practitioners as multidisciplinary education teams to effectively provide treatment and education on diabetes patients such as evaluation, exercise, diet, examination, medication, treatment and education at the right timing according to optimal sequence [1].

Although clinical nurses must have sufficient knowledge on diabetes and its management, they were reported to have low level of knowledge on diabetes [4]. Since lack of knowledge in nurses not only leads to inappropriate and inconsistent nursing but also reduces trust of patients, it is essential to conduct appropriate education on nursing practice [11].

It is most important for nurses to have correct knowledge on diabetes in order to show nursing interventions appropriate for diverse needs of patients [6, 8]. Standardized, systematic and effective education must be provided by diabetes education team that consists of doctors, nurses, nutritionists, and related practitioners [1].

Accordingly, the aim of this study is to examine the level of knowledge of clinical nurses on diabetes and to help improve knowledge and practice of clinical nurses by educating quickly-changing information with diabetes nurse educators based on the standard guideline.

2. Methods

2.1. Study Design

This study is a one group pretest-posttest design to determine the extent of knowledge of nurses about diabetes and to examine the effect of the standardized training of diabetes on the practical application.

2.2. Participants

This study was conducted with the written consents of 115 nurses who have been nursing the diabetic patients in two general hospitals located in Korea.

Data were collected between September 2013 and February 2014. With permission from the nursing department at each hospital, we contacted head nurses of each ward and directly explained the purpose of this study and how to collect data using the questionnaires.

2.3. Instruments

This study is a one group pretest-posttest design to determine the extent of knowledge of nurses about diabetes and to examine the effect of the standardized training of diabetes on the practical application.

2.3.1. General Characteristics

General characteristics of nurses were include age, educational background, career experience, previous experience in nursing of diabetes patients, and experience in practical diabetes education.

2.3.2. Knowledge on Diabetes

Diabetes knowledge test developed in a study of Hong et al [4] was used as a tool to measure diabetes knowledge. The test was modified as appropriate for the purpose of this study by 1 diabetes specialist, 3 diabetes nurse educators, and 1 diabetes nutritionist educator.

The test was comprised of 40 questions. Sub factors were divided into 8 domains such as pathological physiology (3), diagnostics and examination (8), dietary

therapy (5), exercise therapy (3), oral medication (4), insulin drug treatment (4), management of complications (9), and management on special days (4). A 2-point scale was used to grant 0 point for incorrect answers and 1 point for correct answers, and the range of total score was 0~40 points.

2.3.3. Practical Usefulness of Knowledge on Diabetes

Usefulness of knowledge on diabetes is the degree to which nurses think 8 domains of knowledge on diabetes to be useful for practical application. NPQ of Brett [12] was used to measure usefulness, granting 1 point if a knowledge is useful and 0 point if not. Confidence level of this questionnaire was Cronbach's α=.705.

2.3.4. Practical Application of Knowledge on Diabetes

Practical application of knowledge on diabetes refers to clinical application of 8 domains of knowledge on diabetes to education of patients and actual nursing. NPQ of Brett [12] was used to measure the degree of practical application in actual nursing.

Scores were granted as 2 points for 'Always applied', 1 point for 'Sometimes applied' and 0 point for 'Not applied'. Confidence level of this questionnaire was Cronbach's α=.841.

2.4. Data Analyses

The data were coded and analyzed using SPSS version 19.0 for Windows. A *p* value less than .05 was considered statistically significant.

General characteristics of the participants were analyzed using means and for continuous variables, and frequencies and percentages for categorical variables. And the difference certification between the training on diabetes and the practical application of diabetes knowledge was calculated with t-test.

3. Results and Discussion

3.1. General Characteristics

The mean age of nurses who participated in this study was 23.9±2.213 years, and 96.4% of them were 'community college' graduates and 3.6% were 'university' graduates.

Largest percentage of nurses, 41.1%, had career experience of '12 months or less', and 42.9% of them worked in the internal medicine wards. 46.4% of nurses had previous experience in diabetes education, and 53.6% had no experience in diabetes education (Table 1).

Table 1. General Characteristics

Characteristics	Categories	N(%)	Mean(SD)
Age (year)			23.89(2.213)
Education	Associate degree	108(96.4)	
	Bachelor's degree	4(3.6)	
Clinical career (month)	≤12	46(41.1)	
	13-24	30(26.8)	
	25-36	16(14.3)	
	37-48	14(12.5)	
	49-60	6(5.4)	
Work unit	Medical	48(42.9)	
	Surgical	42(37.5)	
	Other	22(19.6)	
Diabetes patient care experience	All the time	88(78.6)	
	Oftentimes	16(14.3)	
	Sometimes	10(7.1)	
Diabetes education experience	Yes	52(46.4)	
	None	60(53.6)	

3.2. Change of Diabetes Knowledge Level

The result of implementing the standardized education of diabetes mellitus(DM) showed that the DM knowledge level of 30.39±2.78 points before education was raised to 31.45±3.33 points after education (t=2.19, p=.032).

In the sub-questions, 5.21±1.20 points of diagnosis and examination before education was raised to 5.21 ± 1.20 points after education (t = 2.36, p = .022), 4.25±8.9 points of diet therapy before education was significantly raised to 4.86±4.0 points after education (t=4.44, p<.001). In exercise therapy, 2.48±.69 points before education was raised to 2.71±.53 points after education (t=2.14, p=.036). In oral medication, 3.16±.78 points to 3.46±.77 points (t=2.21, p=.031). And in insulin therapy, 2.70±.86 points to 3.07±.81 points (t=2.71, p=.009) (Table 2).

Table 2. Change of Diabetes Knowledge Level

classification	pre-test	post-test	t	*p*
	M±SD	M±SD		
Pathological & physiology	2.43±6.28	2.37±.70	..48	.635
Diagnosis & examination	5.21±1.20	5.70±1.02	2.36	.022*
Diet therapy	4.25±.90	4.86±.40	4.44	.000*
Exercise therapy	2.48±.69	2.71±.53	2.14	.036*
Oral medication	3.16±.78	3.45±.66	2.21	.031*
Insulin therapy	2.70±.85	3.07±.81	2.71	.009*
management of complications	7.89±1.11	7.59±1.00	1.60	.114
Special treatment	2.11±.90	2.27±.99	.92	.360
total	30.39±2.71	31.45±3.28	2.19	.032*

* $p < .05$

3.3. Change of the Practical Usefulness of Diabetes Knowledge

The result of applying the standardized education of diabetes showed that 28.75±7.61 points of the practical usefulness of diabetes knowledge before education was significantly raised to 29.30±3.56 point after education (t=2.98, p=.004).

In the sub-questions, 7.11±1.80 points before education was significantly different from 7.69±1.35 points after education in the management of complications (t=2.30, p=.025) (Table 3).

Table 3. Change of the Practical Usefulness of Diabetes Knowledge

classification	pre-test	post-test	t	*p*
	M±SD	M±SD		
Pathological physiology	2.09±.920	2.36±.67	2.01	.052
Diagnosis & examination	5.05±1.31	5.11±1.580	.21	.832
Diet therapy	3.98±1.05	4.41±1.16	1.93	.051
Exercise therapy	2.34±.82	2.43±.828	.64	.527
Oral medication	2.96±1.03	2.93±1.33	.20	.840
Insulin therapy	2.69±.87	2.75±1.15	.34	.732
management of complications	7.11±1.80	7.69±1.35	2.30	.025*
Special treatment	1.93±1.13	2.21±1.02	1.62	.110
total	28.75±7.61	29.30±3.56	.59	.557

* $p < .05$

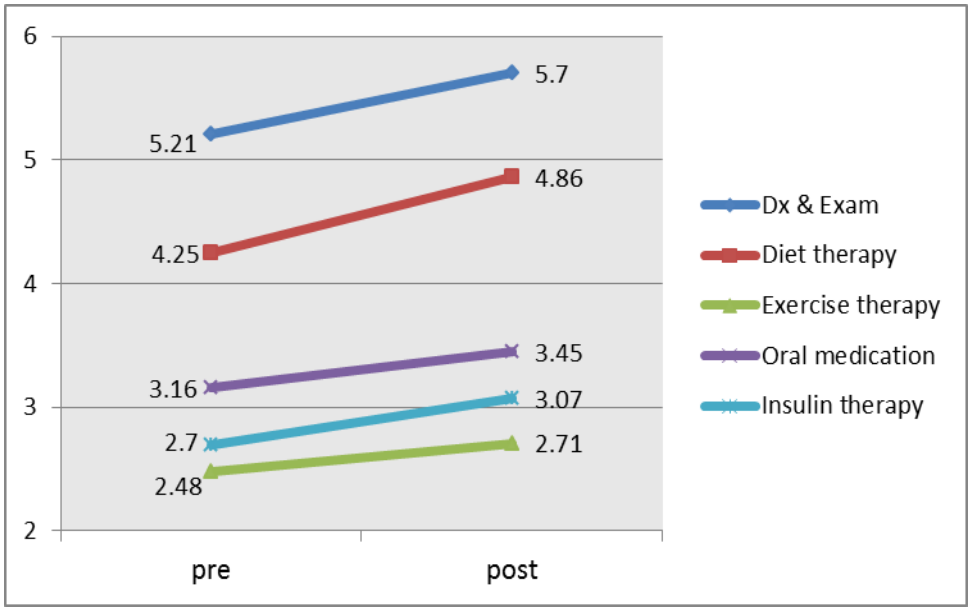

Figure 1. Change of Diabetes Knowledge Level

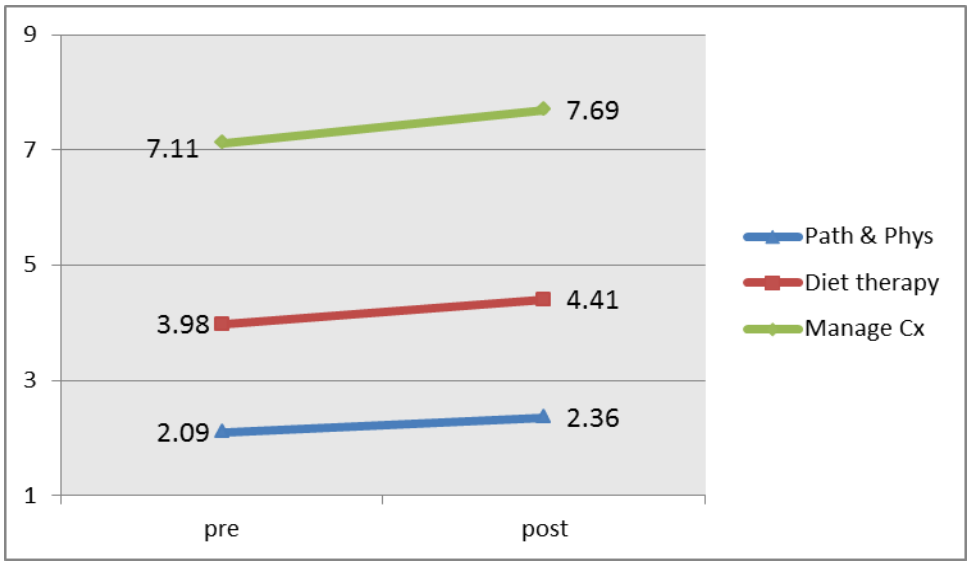

Figure 2. Change of the Practical Usefulness of Diabetes Knowledge

3.4. Change of Practical Application of Diabetes Knowledge

The result of applying the standardized education of diabetes showed that 49.12±11.73 points of the practical application of diabetes knowledge before education was significantly raised to 53.07±11.35 point after education (t=2.98, p=.004).

In the sub-questions, 4.57±2.44 points before education was significantly different from 5.34±2.37 points after education in the oral medication (t=2.24, p=.029) (Table 4).

Table 4. Change of Practical Application of Diabetes Knowledge

classification	pre-test	post-test	t	*p*
	M±SD	M±SD		
Pathological physiology	3.55±1.62	3.82±1.75	.95	.346
Diagnosis & examination	8.89±2.73	9.73±2.91	1.81	.076
Diet therapy	3.98±1.05	4.41±1.15	1.93	.059
Exercise therapy	2.34±.81	2.43±.82	.63	.527
Oral medication	4.57±2.44	5.34±2.37	2.24	.029*
Insulin therapy	4.88±1.87	5.30±1.90	1.51	.136
management of complications	13.32±3.23	13.84±3.53	1.26	.212
Special treatment	1.93±1.12	2.21±1.02	1.62	.110
Total	49.13±1173	53.07±11.34	2.98	.004*

* $p < .05$

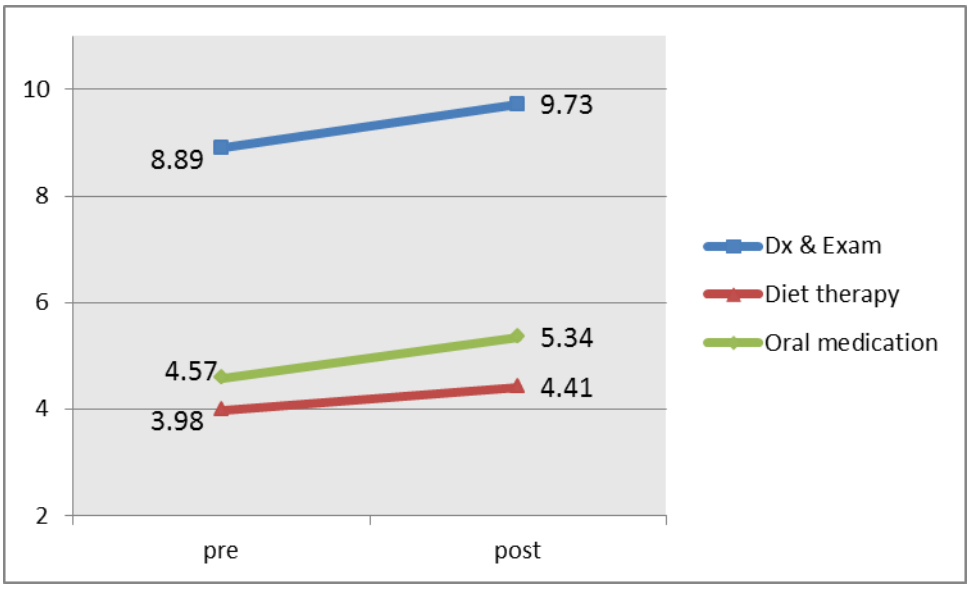

Figure 3. Change of Practical Application of Diabetes Knowledge

4. Conclusion

It seems that the development of science and changes in the mode of living today bring about the extension of the span of life and lead the aspects of disease to respresent a chronic and metabolic tendency. In as much as diabetes is a chronic and metabolic disease and complicatedly invade internal organs, its complications show a high rehospitalization rate, which thereby gives rise to an increase in medical expenses.

Diabetes, it attacked once, is hard to be completely recovered but with treatment and management can alleviate the disease and so be able to prevent complication for the maintenance of a healthy life. In order for a diabetic to successfully carry out efficient self-care of the disease, it is needed to receive such education of diabetes as can be adapted to practical life so that the patient can incessantly cope with it with corret knowledge.

According to a study, standardized knowledge on diabetes is absolutely required in clinical nurses in order to provide quality nursing to diabetes patients. Also, the main task involved with nursing of diabetes patients is to spread latest knowledge and apply it to practice.

First, the percentage of correct answers by nurses to questions about knowledge on diabetes in this study was 76%. This result was higher than 70% reported by Shin and Park [8] and 67% reported by Choi [6] and Hong [4]. As a result of conducting a standardized diabetes education, the level of knowledge on diabetes was significantly increased. Among sub factors, diagnostics, examination, dietary therapy, exercise therapy, oral medication, and insulin therapy showed significant change in the level of knowledge on diabetes. Nurses have many clinical opportunities to encounter patients. Therefore, quality nursing can be provided only if nurses have specific and standardized knowledge about diabetes patients.

Second, as a result of standardized diabetes education, there was no significant change in usefulness of knowledge on diabetes. However, 'management of complications' showed a significant effect among sub factors. High level of knowledge on diabetes and low usefulness of practice indicates that nurses have accurate knowledge but do not understand the importance of clinical application. Overloaded tasks given to nurses at work resulting in lack of time to utilize knowledge on diabetes is considered as one of the causes.

Third, statistically significant difference was shown in practical application of knowledge on diabetes according to standardized diabetes education. Among sub factors, oral drug treatment showed statistically significant difference. This explains that higher level of knowledge on diabetes is more useful and frequently applied to practice. Therefore in order to increase practical application of knowledge on diabetes by clinical nurses, it would be necessary to provide them education for gaining proper knowledge on diabetes.

In conclusion, the standardized education of diabetes was shown to have a significant effect on the diabetes knowledge level of the nurses and their practical application, which is considered necessary to develop the specific and specialized educational program for diabetes rather than the general programs and to do the regularly repeated education in the on-the-job education, the education for all members by the ward of hospital, and the refresher training including the latest diabetes knowledge.

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