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Factors Associated with Diabetes Self-Efficacy among Koreans

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Abstract: This study was designed to investigate the effects of the communication competence of and support from health care providers on the diabetes self-efficacy of Korean patients. A cross-sectional descriptive study was conducted. The 303 study participants were recruited from among all diabetes patients who were endocrinology outpatients of C university hospital. The data analysis included measurements of descriptive statistics, Pearson's correlation coefficients and multivariate analysis using SPSS 22.0. The three models extracted during the hierarchical regression analysis were tested to determine the predictors of diabetes self-efficacy. The findings showed positive associations among health care provider communication, support from health care providers and diabetes self-efficacy. In the first model, personal factors such as age and religion were significant and accounted for 2.4% of the variance whereas age, religion, admission experiences and diabetes education were the key factors in the second model, accounting for 6.9% of the variance. Finally, when personal factors, health care provider communication and support from health care providers were entered into the final model having a spouse (β = -0.123, p = 0.040) strong religious beliefs (β = 0.142, p = 0.018) and support from health care providers were all significant. This final model which included both personal factors and main variables, accounted for 15.6% of the variance. Support from health care providers was an important factor in diabetes self-efficacy. Therefore, health care providers should make efforts to more fully understand the factors influencing patient's self-efficacy in diabetes management and provide support thereof.

Key words: Diabetes mellitus, self-efficacy, health care provider, support, communication, personal factors

INTRODUCTION

More than 1 out of 10 (11.1%) Korean adults over the age of 30 have diabetes. As such, diabetes is one of the most significant chronic diseases in the nation (Devi *et al*., 2016). Diabetes is a chronic metabolic disease that is especially difficult to cure because it is not always easy for patients to maintain optimal blood glucose levels in their daily lives (Yang *et al*., 2008). To prevent diabetes complications, health care providers have recently tried to maximize their efforts to maintain patient's appropriate blood sugar levels (Kim, 2016).

Diabetes management may depend on patient's abilities to self-manage their condition (Gu, 1994). However, many patients with diabetes do not have the necessary knowledge and skills required for diabetes control and prevention, thus necessitating health care provider support (Yang *et al*., 2008). Such support may enhance individual's confidence concerning health care including their self-efficacy and their ability successfully complete a variety of health-related actions (Anderson *et al*., 2000). The American Association of Diabetes Educators (AADE) has proposed that self-efficacy is necessary for patients to perform self-care behaviors and its role is to play the antecedent in patient's forming of diabetes self-management behaviors. According to Bandura (1977), self-efficacy is the belief that individuals can successfully change something within themselves that will enable them to perform particular behaviors. For the successful control of blood sugar in patients with diabetes, lifestyle changes performed on the basis of self-efficacy are necessary because self-efficacy may be responsible for organizing and executing these lifestyle changes (Keum and Suh, 2014). In addition, self-efficacy influences the degree of susceptibility to perform diabetes self-care and diabetes-related physiological indicators such as hemoglobin A1c (Sacco *et al*., 2007; Venkataraman *et al*., 2012; Wardian and Sun, 2014). Health care providers can aid in enhancing diabetes self-efficacy by using proper communication (Nam *et al*., 2014). A study by Wardian and Sun (2014) showed a high correlation between patient's diabetes self-efficacy and health care provider support. Moreover, Sarkar reported that 40% of subjects who communicated better with their health care providers had better control over their diabetes.

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Therefore, it should be useful to investigate the relationship between the degree of Health Care Provider (HCP) communication, HCP support and diabetes self-efficacy in promoting self-management. The purpose of this study was to identify the factors such as HCP communication and support from HCPs associated with diabetes self-efficacy for Korean patients.

MATERIALS AND METHODS

Study design and sample: This descriptive cross-sectional study examined the effect of HCP communication and support from HCPs on diabetes self-efficacy. The participants of this study were recruited from among endocrinology outpatients of C University Hospital in D City, who voluntarily agreed to participate. A total of 340 subjects responded to a self-report questionnaire; the response rate was 87%. Among these, 37 questionnaires were excluded from the analysis because of insufficient data. Thus, 303 questionnaire responses were analyzed in total.

Measurement: Self-efficacy was measured using (Rapley *et al*., 2003) Diabetes Self-efficacy Scale (DSES). This tool consists of 5 subscales: diet (3 items), self-treatment (5 items), routines (4 items), certainty (4 items) and exercise (2 items), all assessed with a six-point Likert scale. Higher DSES scores indicate greater diabetes self-efficacy. The reliability of the original DSES was a Cronbach's alpha score of 0.61-0.76 (Song *et al*., 2012). In this study, the reliability was 0.64-0.87.

Communication with HCP was measured using the Korean version of the Interpersonal Processes of Care Survey (ICP-12K). The ICP-12K consists of 12 items across two subdomains such as HCP and HCP helper, which address communication, decision-making and interpersonal style choices over the past 12 months. Responses to this tool are made using a 5 point Likert scale higher scores indicated more effective communication with the HCP. The reliability of the ICP-12K in this study was a Cronbach's alpha measurement of 0.90.

HCP support was measured using the Diabetes Care Profile (DSP). The DSP consists of 2 facets (social support needs, i.e., "How much support will you need from the HCP in the future?" and receipt of social support "How much support do you currently receive from the HCP?") each made up of 6 types of diabetes tasks with responses made using a 5 point Likert scale. Higher DSP scores indicate greater HCP support. Its reliability was Cronbach's alpha = 0.82-0.91 for this study.

Statistical analysis: Descriptive statistics, pearson's correlation r and multivariate analysis were performed using the IBM SPSS Statistics 22.0 Program. Sample characteristics was summarized using frequency, percentages, means and standard deviations. Diabetes self-efficacy, HCP communication and support from HCP were analyzed using a t-test and ANOVA with Scheffe's test, in accordance with the demographic information. A hierarchical multiple regression was conducted to examine the predictors of diabetes self-efficacy. Model 1 included personal factors such as sex, age, religion, educational level and having a spouse. Model 2 added health conditions such as depression, HbA1c, admission experiences, alternative therapies, diabetes education experiences and number of diabetes complications. HCP communication and support were then entered into model 3 as predictors of diabetes self-efficacy. The statistical significance level was determined to be $\beta = 0.05$.

Ethical considerations: All study procedures were approved by the C University's Institutional Review Board (IRB No. 2-1046881-A-N-01-201410-HR-046). Before the survey was conducted, the participants listened to an explanation of the study's purpose, procedure, benefits, potential harm to the patients, confidentiality and full details concerning the participant's rights and they provided their written informed consent. After they completed the questionnaire they received $10.

RESULTS AND DISCUSSION

Sample characteristics: The study subject's general characteristics are summarized in Table 1. The study subjects consisted of 165 men (54.5%) and 138 women (45.5%). Their average age was 59.87(±12.61) years. About 37% of them had graduated from high school and 248 participants (82.2%) had a spouse. Among all subjects, 118(38.9%) had religious beliefs while 185(61.1%) had none. Most subjects did not have any experience of depression (89.8%) or hospitalization (84.2%). The average serum HbA1c level was lower than 7.5% for 162(60.7%) patients. One hundred forty patients (46.2%) had received some diabetes education whereas 153 patients (53.8%) had not received any.

Descriptive statistics concerning diabetes self-efficacy, HCP communication and support from HCP: The mean scores of diabetes self-efficacy (71.96±14.70, ranging from 18-108) HCP communication (59.63±810.06, ranging from 12-60) and support from the HCP (21.58±5.46, ranging from 6-30) are presented in Table 2.

Table 1: General characteristics of participants (n = 303)

Variables	n or Mean	Percentage or±SD
Gender		
Male	165	54.5
Female	138	45.5
Age (years)	59.87	±12.61
Education level		
Illiteracy	14	4.6
Elementary	42	13.9
Middle school	55	18.2
High school	111	36.6
More	81	26.7
Having spouse		
Yes	249	82.2
No	54	17.8
Having religion		
Yes	118	38.9
No	185	61.1
Having depression		
Yes	31	10.2
No	272	89.8
HbA1c		
>7.5	162	60.7
<7.5	105	39.3
Experience of admission		
Yes	48	15.8
No	255	84.2
Alternative therapy		
Yes	77	25.4
No	226	74.6
Experience of diabetes education		
Yes	140	46.2
No	163	53.8
No. of complication	1.20	±1.52

Table 2: Diabetes self-efficacy, HCP communication and support from HCP (n = 303)

Variables	Mean±SD	Min.	Max.	Range
Diabetes self-efficacy	71.96±14.70	18	108	18~108
HCP communication	59.63±10.06	33	75	12~60
Support from HCP	21.58±5.460	6	30	6~30

Table 3: Correlation among HCP communication, support of HCP and diabetes self-efficacy (n = 303)

Variables	1	2	3
HCP communication	1		
Support from HCP	0.424 (p<0.001)	1	
Diabetes self-efficacy	0.218 (p<0.001)	0.331 (p<0.001)	1

Correlations between HCP communication, support from HCP and diabetes self-efficacy: The correlational r-values between the HCP communication, support from the HCP and diabetes self-efficacy variables are shown in Table 3. HCP communication was positively correlated with HCP support (r = 0.424, p<0.001) and diabetes self-efficacy (r = 0.218, p<0.001). Moreover, HCP support and diabetes self-efficacy were positively correlated (r = 0.331, p<0.001).

Factor associated with diabetes self-efficacy: The results obtained from a hierarchical regression model for diabetes self-efficacy are presented in Table 4.

Personal factors including demographic information, were entered into model 1 and the regression equations were significant (F = 2.331, p = 0.043). The explanatory power for diabetes self-efficacy was 2.4%. Age (β = 0.132, p = 0.054) and religious beliefs (β = 0.130, p = 0.040) were significant predictors of diabetes self-efficacy in this model.

When health condition was added in Model 2, the regression equations were still significant (F = 2.787, p = 0.002). Age (β = 0.137, p = 0.043) and religious beliefs (β = 0.144, p = 0.022) remained as predictors. Additionally,

Table 4: Hierarchical eegression models examining the associatiion of diabetes self-efficacy (n = 303)

Models	β	t-values	p-values	Adjusted R^2	F(p)
Model 1					
constant		8.047	0.000	0.024	2.331
Sex (1 = female, 0 = male)	-0.060	-0.928	0.354		(0.043)
Age	0.132	1.933	0.054		
Education level	0.093	1.347	0.179		
Having spouse (1 = yes, 0 = no)	-0.079	-1.262	0.208		
Having religion (1 = yes, 0 = no)	0.130	2.064	0.040		
Model 2					
constant		5.436	0.000	0.069	2.787
Sex (1 = male, 2 = female)	-0.090	-1.406	0.161		(0.002)
Age	0.137	2.036	0.043		
Education level	0.045	0.653	0.514		
Having spouse (1 = yes, 0 = no)	-0.114	-1.831	0.068		
Having religion (1 = yes, 0 = no)	0.144	2.299	0.022		
Depression symptoms (1 = yes, 0 = no)	0.106	1.746	0.082		
HgA1c	-0.044	-0.723	0.471		
Experience of admission (1 = yes, 0 = no)	0.121	1.986	0.048		
Alternative therapy (1 = yes, 0 = no)	-0.068	-1.125	0.262		
Experience of diabetes education (1 = yes, 0 = no)	-0.167	-2.753	0.006		
Number of complication	-0.092	-1.512	0.132		
Model 3					
constant		3.375	0.001	0.156	4.768
Sex (1 = male, 2 = female)	-0.051	-0.835	0.405		(0.000)
Age	0.105	1.636	0.103		
Education level	0.024	0.373	0.709		
Having spouse (1 = yes, 0 = no)	-0.123	-2.063	0.040		
Having religion (1 = yes, 0 = no)	0.141	2.372	0.018		
Depression symptoms (1 = yes, 0 = no)	0.080	1.370	0.172		
HgA1c	-0.070	-1.199	0.232		
Experience of admission (1 = yes, 0 = no)	0.093	1.595	0.112		
Alternative therapy (1 = yes, 0 = no)	-0.055	-0.949	0.344		
Experience of diabetes education (1 = yes, 0 = no)	-0.093	-1.566	0.119		
Number of complication	-0.113	-1.934	0.054		
HCP communication	0.104	1.658	0.098		
Support from HCP	0.258	3.981	0.000		

HCP: Health Care Providers

diabetes education experiences (β = -0.167, p = 0.006) were significant variables in Model 2 and accounted for 6.8% of the variance in the other variables.

Finally, HCP communication and support was entered into Model 3, therefore, Model 3 was significantly altered (F = 4.768, p<0.001). Support from the HCP (β = 0.258, p<0.001) was observed to be a strong predictor of diabetes self-efficacy. Moreover, having a spouse (β = -0.123, p = 0.040) or religious beliefs (β = 0.142, p = 0.018) as well as complication numbers (β = -0.113, p = 0.054) were significant predictors in the last model, accounting for 15.6% of the variance.

CONCLUSION

This study was designed to evaluate the impact of HCP communication and support from HCPs on diabetes self-efficacy. The present results demonstrated significant positive correlations among HCP communication, support from HCPs and diabetes self-efficacy. These results were consistent with previous studies that mentioned significant associations among these three factors for diabetes management (Nam *et al*., 2014; Jin and Chung, 2009). However, in the multivariate analysis, HCP communication was not a predictor of diabetes self-efficacy whereas support from the HCP was an important factor in the final model. HCP communication did not affect diabetes self-efficacy among Korean patients with diabetes. Possible reasons for these results can be inferred in terms of the Korean cultural health care environment. The patients could not easily communicate with their primary health care providers because health care providers in Korea interview and treat their patients only for a limited time in clinics. In some cases, patients only get 3 min to see their doctors. This brief treatment time is not sufficient for encouraging self-efficacy in disease management among diabetes patients. Hence, diabetes education nurses tend to play a more important role in helping Korean diabetes patients manage their disease. Recently, hospital diabetes education nurses in Korea have begun conducting counseling and education for patients as diabetes management coordinators and patients are generally satisfied with this arrangement (Nam *et al*., 2014; Song *et al*., 2012). Since, diabetes management within a health care setting changes along with patient's needs in terms of education and counseling, the patterns of communication between diabetes education nurses and patients should be explored further in future studies. Additionally, it will be necessary to consider the impact of HCP communication for diabetes self-efficacy based on the revealed patterns of communication.

Personal factors such as age and religion affected diabetes self-efficacy in this study. Patients who were older had greater diabetes self-efficacy. The mean age of the participants was about 60 years. In consideration of this, the higher score on the diabetes self-efficacy measurement may be atypical because "aging" should have an adverse effect on the self-management capabilities of elderly diabetic patients. Jin and Chung (2009) reported that "aging" problems inherent in elderly diabetic management may lead to much compromise and resolve. Based on this result, diabetes management enhancement for the elderly should focus on improving diabetes self-efficacy. Moreover, in the final model the presence of a spouse and religious beliefs were significant predictors of diabetes self-efficacy in our study. These two factors may have acted as sources of moral and social support for the diabetes patients. Rogers *et al*. (2011) classified the system of support as health professionals and non-health professionals, according to health-related and health-relevant functions. They grouped support systems into voluntary community groups and personal communities. The support received from spouses and religious belonging may function as a form of non-health professional support. Support from HCPs was also found to be an important predictor of diabetes self-efficacy as a health professional support system. From these findings, it can be inferred that combining both professional and non-professional support may enhance the self-efficacy of diabetes patients. Therefore, future studies should investigate the role of support obtained from various sources in constructing diabetes self-efficacy enhancing interventions.

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