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The Effects of Telephone Consultation after Discharge on the Secondary PREVENTION Knowledge and the Medication Adherence in STROKE Patients

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Abstract

Purpose: *This study investigated the effects of Telephone Counseling on Secondary Prevention Knowledge and Medication Adherenc after Discharge in Stroke Patients*

Method: *Data were collected from April 19 to August 25, 2018 from patients who were diagnosed with stroke at a general hospital and were discharged from hospital after individual discharge education. The collected data were analyzed by SPSS/WIN 23.0 program for descriptive statistics, x^2-test, Fisher's Exact, independent t-test.*

Results: *Secondary prevention knowledge increased in experimental group(15.06±0.24) more than a control group(8.09±3.21)(t=-8.96, p<.001). A medication adherence for secondary prevention increased in experimental group(6.34±0.69) more than a control group(3.40±1.99)(t=-5.94, p<.001).*

Conclusion: *The results of this study suggest that once-call counseling after discharge of primary stroke patients increases knowledge of secondary prevention and drug use, which may increase the efficiency of nursing work.*

[Keywords] ***Counseling, Stroke, Knowledge, Medication, Adherence***

1. Introduction

Domestic stroke patients as of the year in 2014 are about 690,000 people, thereby having been indicated to include 380,000(1.90%) men 310,000(1.52%) women. Nearly 105,000 new stroke patients are occuring every year[1]. Also, the stroke prevalence rate in more than fully 50 years old are growing from 1.6% in 2009 to 1.8% in 2018[2].

A stroke is left with physical and functional disorders in over 50% after its outbreak. The stroke recurrence is up by 1.7% within the first 30 days, by 6~13% within 1 year, and by 5~8% annually after this. The recurrent rate accumulated over five years accounts for 19~42%[3]. After the stroke occurrence, around 18% of the patients come to the death[4]. Approximately 73% of the patients have various functional disorders such as exercise, sensation, cognition and language depending on the degree of brain damage[5]. Also, a cerebral stroke is a disease with very high recurrence rate even after a full recovery[6]. The recurrence rate within 5 years amounts to 20~40%[7]. In this way, a stroke not only brings about physical damage and disorder but also extends the hospitalization period[8], thereby being a disease in which the continuous care is critical in order to prevent a stroke.

Especially, the prevention is important through improving the living attitudes such as high blood pressure, diabetes, a heart disease, hyperlipidemia, smoking, drinking, etc[8]. Even as for a patient who first suffered a stroke, the enhancement in the living attitudes for the secondary prevention is becoming more important.

What is crucial along with the betterment in the living attitudes for the secondary prevention

is to take drugs consistently. Out of these, the intake of medicines such as antithrombotic agents(antiplatelet drug, anticoagulant drug), blood lipid lower agents is being selected as an efficient strategy for reducing a risk factor[9]. Furthermore, what prevents the recurrence of stroke patients through taking a drug continuously and steadily is becoming a very significant task individually, socially and nationally[10]. Especially when randomly stopping a platelet agent or halting in relation to invasive procedures, it is known to promote embolism within a week[11]. Thus, the constant use of antithrombotic agents is being recognized as an important matter for the secondary prevention of a stroke.

However, a stroke occurs mostly in the old age. There is a difficulty for enhancing the living attitudes or taking a drug regularly for the secondary prevention after discharge. The major causes for this failure to take medication are reported to include a slip of the moment, a difficulty for setting the dosing time in daily life, and the lack of an education program for patients[12].

Accordingly, the continuous follow-up care is needed through the telephone consultation in order to acquire knowledge available for decreasing a controllable stroke risk factor targeting stroke patients, to improve the living attitudes, and to do medication adherence. The telephone consultation is what the phone call leads to being available for exchanging information, managing symptom, and proposing a nursing direction in case of emergency[13], thereby being a good method that can prevent complications because of being able to give relief to a patient after discharge and because of offering the education relevant to symptom management and health[14][15].

Looking into the individual education, into the telephone consultation with totally 3 times once a week targeting stroke patients[16], into the research on the patient compliance, the dialysis adequacy and the infection occurrence through the telephone consultation for 8 weeks targeting the peritoneal dialysis subjects as a visiting outpatient[17], into the research on the subjects with Parkinson's disease[18], and into the research through the telephone consultation using the web-based education program targeting the discharged acute stroke patients[19], the telephone consultation led to providing the continuous education information to the discharged patients requiring a long-term care. This showed the research result as saying of enhancing the self-care performance level. In particular, the subjects who first suffered a stroke are at the time that an interest in own disease is higher than ever. Thus, it is thought to be important more than anything to educate the contents on the knowledge offering for the secondary prevention and on the medication adherence through carrying out the telephone consultation during a blank period from the discharge to the next hospital visit. However, like the research[17] that carried out 8 times for totally 12 weeks with once a week for about 10 minutes each time for 4 weeks and with once per two weeks for about 10 minutes each time for 8 weeks after it as for the telephone counseling cycle in the above researches[16][17][18][19], and like the research that conducted totally 6 times(2nd week, 4th week, 6th week, 8th week, 10th week, 12th week) with once per two weeks for 3 months[18], the multi-session continuous telephone consultation showed the effect of the better living for the secondary prevention. The more rise in an education frequency leads unavoidably to the more increase in an educational effect. But for the telephone consultation, it may be considered the residence of professional medical personnel or the rise in a nurse's work burden[20][21][22][23]. Hence, a research of examining an educational effect through the one-session telephone consultation is in a deficient condition. In this study, it is thought to likely have a critical significance even to see a change in the knowledge related to the secondary prevention and in the medication adherence of the subjects who first suffered a stroke through applying the one-session telephone consultation that is regularly executed primarily after discharge.

Therefore, this study aimed to raise the nursing work efficiency of the secondary prevention education regarding a cerebral stroke through the appropriate periodic telephone consultation by verifying the effects on the stroke-related secondary prevention knowledge and on the medication adherence after allowing the patients who first suffered a stroke to be offered the one-

session telephone consultation after discharge.

2. Purpose of Research

The purpose of this study is to increase the nursing work efficiency of the secondary prevention education relevant to a stroke through the appropriate periodic telephone consultation by closely examining the impacts on the improvement in the knowledge related to the stroke-related secondary prevention and on the promotion in medication adherence after allowing the patients who first suffered a stroke to be offered the one-session telephone consultation for the secondary prevention after discharge. Specific objectives are as follows.

First, It verifies the effect of the one-session telephone consultation after discharge in the patients who first suffered a stroke on the knowledge level related to the secondary prevention.

Second, It inspects the impact of the one-session telephone consultation after discharge in the patients who first suffered a stroke on the medication adherence relevant to the secondary prevention.

3. Hypothses of Research

The following are the concrete hypotheses of this study.

3.1. Hypothesis 1

The experimental group that received the one-session telephone consultation after discharge in the patients who first suffered a stroke will have the higher knowledge score related to the secondary prevention than the control group.

3.2. Hypothesis 2

The experimental group that received the one-session telephone consultation after discharge in the patients who first suffered a stroke will have the higher medication adherence level than the control group.

4. Definition of Terminology

4.1. Stroke patient

As a clinical sign of showing a suddenly local or general disorder of brain function that leads to being continued for more than 24 hours or to death due to a vascular cause, a cerebral stroke implies a case[24] that was partially damaged the brain, which had been supplied blood by its blood vessel, owing to the clogged blood vessel.

In this study, it means a patient who was treated by a neurologist after being hospitalized to be carried out MRI(Magnetic Resonance Imaging) test as a patient who was first diagnosed with a stroke.

4.2. Telephone consultation

Telephone consultation implies to exchange information, offer health education & advice and manage symptom over the telephone, or to provide a necessary level of the nursing direction through classifying priority in case of emergency[13]. In this study, it implies the nursing intervention that was implemented for 10~15 minutes by giving a call in the second week to the subjects with the execution of the discharge education through an individual discharge paper.

4.3. Knowledge related to secondary prevention

Secondary prevention signifies what is carried out for preventing relapse in transient cerebral ischemia or ischemic stroke patients[25], and implies what a patient with a stroke is allowed to steadily control risk factors such as hypertension, diabetes, hyperlipidemia and smoking along with antithrombotic therapy[26].

In this study, the knowledge on a stroke related to secondary prevention stands for what was measured by using the tool that Kim[10] modified and supplemented the disease-related knowledge tool for an acute ischemic stroke patient that Ham[27] developed.

4.4. Medication adherence

Medication adherence implies a consistent level between the prescribed drug and the patient's dosage[28]. Medication adherence in this study means a score that measured the subjects' adherence implementation and compliance level with the drug that was prescribed by using the self-report tool in Korean version of MMAS-8(Morisky Medication Adherence Scale) that Morisky et al[29] developed.

5. Research Method

5.1. Research design

This study is a quasi-experimental research that was conducted with the nonequivalent control-group post design in order to verify the effects of the one-session telephone consultation in the patients who first suffered a stroke on the knowledge related to secondary prevention and on the medication adherence <Table 1>. As the experimental treatment is the education through telephone consultation, the post design was carried out in order to see the medication adherence related to knowledge available for causing the testing effect due to the pre survey.

Table 1. Research design.

	Treatment	Post test	
		Secondary prevention related knowledge	Medication adherence
Control group		C_1	C_2
Experimental group	X	E_1	E_2

Note: X : Telephone counseling, C_1 : Secondary prevention related knowledge E_1 : Secondary prevention related knowledge C_2 : Medication adherence E_2 : Medication adherence

5.2. Research subjects and period

The subjects in this study included the patients who were diagnosed with a stroke for the first time at a tertiary general hospital where is located in I city, who were hospitalized in a neurological ward, and who were discharged from the hospital after treatment from April 19, 2018 to August 25. The specific criteria are as follows.

First, A person who was diagnosed with cerebral infarction for the first time at a tertiary general hospital in I city.

Second, A patient from over 30 years old to under 85 years old.

Third, A person who has a normal consciousness level and is able to communicate.

Fourth, A person who can perform self-care with a little help.

Fifth, A person who has no experience of the stroke education before hospitalization.

Sixth, A person who received the basic stroke discharge education individually upon discharge from a hospital.

Seventh, A person who understood the purpose of the study and agreed to participate in it.

5.3. Data collection method

A research sample included totally 34 people with the test power(1-β) 0.9, the significance level 0.05, and the effect size 0.5 based on the previous research[10], which used the t-test analysis method through G power analysis, and was selected 17 people, respectively, in the experimental group and the control group. The control group was set to include the patients who were first diagnosed with a stroke and then discharged after treatment from April 19 to May 25 in order to prevent the spread of experiment among the hospitalized patients from April 19, 2018 to August 25. The experimental group was carried out convenience sampling as for the patients who were first diagnosed with a stroke and then discharged after treatment from July 19 to August 25 with a difference in hospitalization period.

This study included 17 people in the experimental group and 17 people in the control group, proceeded with finally choosing 34 research subjects without omission in the experimental group and the control group.

5.4. Research process

5.4.1. Prior education

Targeting both the experimental group and the control group, the research assistant 1, 2 individually performed the education for the stroke secondary prevention by using an educational booklet related to a stroke together with the discharge education before discharge, and distributed an educational booklet. At this time, a consent form for the utilization of personal information was received after notifying that the call is due in the fourth week after discharge to the control group, and in the second week and the fourth week to the experimental group.

5.4.2. Experimental treatment

The telephone consultation was conducted once in the second week after discharge in the experimental group from July 19 to August 25, and was explained the knowledge related to secondary prevention by using the distributed stroke-related educational booklet, and was educated about the importance of the constant drug intake, the difficulty on this, and the solution. As the totally telephone consultation time is from 10 minutes to 15 minutes, the direct counseling was executed through the research assistant 3. The schedule of telephone consultation after discharge was coordinated in advance with the subject upon discharge from hospital and was progressed mainly between noon and 1:00 p.m. at lunchtime.

5.4.3. Post survey

Through the phone call to the experimental group and the control group in the fourth week after discharge following the telephone consultation treatment, it notified the objective of the research, explained the collection of general information through medical charts, and sought the consent for this. Also, the research assistant 1, 2 did read the questionnaire on the secondary prevention knowledge and the medication adherence and allowed them to respond to this.

5.5. Research tool

5.5.1. Secondary prevention knowledge

The tool was used what Kim[10] modified and supplemented the Knowledge Measurement Tool for a Disease in Acute Stroke Patients that Ham[27] developed. This tool was composed of totally 15 items with 4 questions about a diseases such as type, symptom and recurrence related to a stroke, 3 questions about a physiological risk factor, 5 questions about a lifestyle factor, 2 questions about precautions in daily life, and 1 question about a symptom of appearing given taking a drug.

A score was processed 'correct answer' with 1 point, 'wrong answer' and 'don't know' with 0 point, is available for 0 point~15 points, and implies that the higher score leads to the higher knowledge related to secondary prevention. In Ham[26]'s research, Cronbach's α value was .89. Even in this study, Cronbach's α value was .89.

5.5.2. Medication adherence

This study was used MMAS-8 that was improved it with 8 items by supplementing an item of testing a psychological characteristic to MMAS-4(4-item Morisky Medication Adherence Scale) that Morisky et al.[29] developed in 1986. This tool consists of totally 8 items. Among these, 7 items are responded with 'yes' or 'no,' and were scored 'yes' with 0 point and 'no' with 1 point. Item No. 5 was reversely converted. Item No. 8 was measured with the 4-point scale from 0 point in 'very little' to 4 points in 'always so.' Each point was multiplied by 0.25, thereby having been scored from 0 point in 'very little' to 1 point in 'always so.' Total score is from 0 point to 8 points. It implies that the higher score leads to the better medication adherence. Also, it stands for 'low compliance' in less than 6 points, 'moderate compliance' in 6~7 points, and 'high compliance' in 8 points. At that time of developing the tool on medication adherence, it was Cronbach's α=.83. In this study, it was Cronbach's α=.78.

5.6. Data analysis method

The collected data were statistically analyzed as follows by using SPSS WIN 23.0 program.

First, The general·morbid characteristics, the secondary prevention knowledge and the medication adherence in the experimental group and the control group were analyzed with descriptive statistics such as error, percentage, the mean and standard deviation.

Second, The pre homogeneity test in the experimental group and the control group was parsed with x^2-test, Fisher's Exact, independent t-test.

Third, To compare a difference in the secondary prevention knowledge and the medication adherence between both groups for inspecting hypotheses between the experimental group and the control group, independent t-test was used for the verification.

5.7. Ethical consideration

This study carried out convenience sampling targeting subjects at a tertiary general hospital in I city. In addition, the stroke-related education may exist during hospitalization·right after discharge·after experimental treatment in the subjects who first suffered a stroke. Thus, the close attention needs to be paid to generalizing and analyzing the findings.

5.8. Research limitations

This study was screened and approved after passing through IRB(Institutional Review Board) of W hospital(2018-03-006). Data collection was made after explaining the research objective and method to the head of the related hospital's nursing department. The subjects were explained the research plan. To protect the research subjects' ethical problems, the questionnaire through telephone consultation was executed targeting the persons who agreed on the subject's description and consent form when discharging. The content as saying of assuring anonymity was clarified. The explanation was given with saying you can withdraw your participation at any time if you don't want to, and saying the collected materials are used only for the research purpose only.

Also, the control group, which did not take part in the telephone consultation education, was carried out the education with the same contents as the experimental group based on an educational booklet given the outpatient's revisit after the end of the program.

6. Results

6.1. Pre homogeneity test of research subjects

With regard to the research subjects' demographic and disease-related characteristics, the outcome of homogeneity test in the experimental group and the control group is as <Table 2>.

The subjects' age-based distribution corresponds to 66.52±7.01 years old in the experimental group and 71.59±8.59 years old in the control group. Thus, the age-based distribution in the experimental group and the control group did not show a statistically significant difference(t=1.88, p=.690).

As for gender, there were 11 men(64.7%) and 6 women(35.3%) in case of the experimental group. There were 11 males(64.7%) and 6 females(35.3%) in case of the control group. Thus, a difference in gender between the experimental group and the control group was not statistically significant(X^2=0.00, p=.640).

In terms of education level, there were 9 people(52.9%) for below middle school graduation, 6 people(35.3%) for high school graduation, 2 people(11.8%) for university graduate or higher in case of the experimental group. There were 7 people(41.2%) for below middle school graduation, 9 people(52.9%) for high school graduation, and 1 person(5.9%) for university graduate or higher in case of the control group. Thus, the education level in the experimental group and the control group was not statistically significant(X^2=1.26, p=.598).

As to a job, there were 11 people(64.7%) for having a job and 6 people(35.3%) for having no job in case of the experimental group. There were 6 people(35.3%) for having a job and 11 people(64.7%) for having no job in case of the control group. Thus, a difference in whether or not having a job between the experimental group and the control group was not statistically significant(X^2=2.94, p=.085).

In terms of religion, there were 8 people(47.1%) for having religion and 9 people(52.9%) for having no religion in case of the experimental group. There were 9 people(52.9%) for having religion and 8 people(47.1%) for having no religion in case of the control group. This was statistically insignificant(X^2=0.12, p=.500).

Regarding the marital status, there were 5 people(29.4%) for the unmarried, 8 people(47.1%) for the married, and 4 people(23.5%) for divorce/bereavement in case of the experimental group. There were 12 people(70.6%) for the unmarried, 0 person(0%) for the married, and 5 people(29.4%) for divorce/bereavement in case of the control group. Thus, a
difference in the marital status between the experimental group and the control group was not statistically significant(X^2=5.80, p=.066).

In terms of the subjects' diagnosis name, there were 12 people(70.6%) for a cerebral stoke and 5 people(29.4%) for transient ischemic attack in case of the experimental group. There were 16 people(94.1%) for a cerebral stroke and 1 person(5.9%) for transient ischemic attack in the control group. Thus, there was no statistically significant difference in diagnosis name between the experimental group and the control group(X^2=3.24, p=.078).

As for a case of the diabetes appearance, there were 13 people(76.5%) for having diabetes and 4 people(23.5%) for having no diabetes in case of the experimental group. There were 10 people(58.8%) for having diabetes and 7 people(41.2%) for having no diabetes in case of the control group. Thus, whether or not having diabetes in the experimental group and the control group was not statistically significant(X^2=1.21, p=.162).

In terms of the heart disease appearance, there were 12 people(70.6%) for having heart disease and 5 people(29.4%) for having no heart disease in the experimental group. There were 12 people(70.6%) for having heart disease and 5 people(29.4%) for having no heart disease in the control group. Thus, whether or not having a heart disease in the experimental group and the control group was not statistically significant(X^2=0.00, p=.292).

As for the obesity appearance, there were 9 people(52.9%) for having obesity and 8 people(47.1%) for having no obesity in the experimental group. There were 8 people(47.1%) for having obesity and 9 people(52.9%) for having no obesity in the control group. Thus, whether or not having obesity in the experimental group and the control group was not statistically significant(X^2=0.12, p=.500).

As to the smoking appearance, there were 10 people(58.8%) for a smoker and 7 people(41.2%) for a non-smoker in the experimental group. There were 6 people(35.3%) for a smoker and 11 people(64.7%) for a non-smoker in the control group. Thus, whether or not smoking in the experimental group and the control group was not statistically significant(X^2=1.89, p=.151).

Given drinking, the experimental group appeared to include 5 people(29.4%) in 'not drinking at all,' 4 people(23.5%) in 'less than two glasses a day,' and 8 people(47.1%) in 'more than 3 glasses a day.' The control group was indicated to include 6 people(35.3%) in 'not drinking at all,' 9 people(52.9%) in 'less than two glasses a day,' and 2 people(11.8%) in 'more than 3 glasses a day.' Thus, the drinking aspect in the experimental group and the control group was not statistically significant(X^2=5.61, p=.056).

In case of exercise, the experimental group included 1 person(5.9%) in taking exercise and 16 people(94.1%) in not taking exercise. The control group included 0 person(00%) in taking exercise and 17 people(100%) in not taking exercise. Thus, whether or not taking exercise in the experimental group and the control group was not statistically significant(X^2=1.03, p=.500).

In case of the exercise frequency, the experimental group was shown to include 16 people(94.1%) in 'no exercise,' 1 person(5.9%) in 'less than 3 times a week,' and 0 person(0%) in 'more than 3 times a week.' The control group included 17 people(100%) in 'no exercise,' and 0 person(0%) in 'less than 3 times a week' and in 'more than 3 times a week.' Thus, the exercise frequency in the experimental group and the control group was not statistically significant(X^2=1.03, p=.500).

The subjects' hospitalization period corresponded to 17.12±18.59 days in the experimental group and 18.00±15.61 days in the control group. Thus, the hospitalization period in the experimental group and the control group was not statistically significant(t=0.15, p=.882).

Accordingly, both the experimental group and the control group conform to the homogeneous group in the aspects of age, gender, education level, job, religion, marital status, diagnosis name, high blood pressure, diabetes, heart disease, hyperlipidemia, obesity, drinking, smoking, exercise frequency, and hospitalization period.

6.2. Hypothesis verification

6.2.1. Hypothesis 1

To examine the effect in the one-session telephone consultation offer after discharge to the patients who first suffered a stroke on the knowledge related to secondary prevention, the knowledge relevant to secondary prevention was inspected in the experimental group and the control group. The outcome is as <Table 3>.

Looking into the knowledge relevant to secondary prevention in the experimental group and the control group, it stood at 15.06±0.24 points in the experimental group and 8.09±3.21 points in the control group. Thus, the group with the telephone consultation offer after discharge to the patients who first suffered a stroke had the higher secondary prevention knowledge score than its opposite group. This had a statistically significant difference(t=-8.96, p=.001). Hence, what "the experimental group with the one-session telephone consultation offer after discharge to the patients who first suffered a stroke will have the higher secondary prevention knowledge score than the control group" was supported.

6.2.2. Hypothesis 2

To examine the influence in the one-session telephone consultation offer after discharge to the patients who first suffered a stroke on the medication adherence, the medication adherence was checked in the experimental group and the control group. The result is as <Table 3>. Inspecting the medication adherence in the experimental group and the control group, it came to 6.43±0.69 points in the experimental group and 3.40±1.99 points in the control group. Thus, the group with the telephone consultation offer after discharge to the patients who first suffered a stroke had the higher medication adherence level than its opposite group. This had a statistically

significant difference(t=-5.94, *p*=.001).

Table 2. Homogeneity test of general gharacteristics between two groups. (n=34)

Characteristics		Exp.(n=17)	Cont.(n=17)	t or x^2	*p*
		n(%) or mean±SD	n(%) or mean±SD		
Age		66.52±7.01	71.59±8.59	1.88	.690
Gender*	Male	11(64.7)	11(64.7)	0.00	.640
	Female	6(35.3)	6(35.3)		
Education*	≥Middle school	9(52.9)	7(41.2)	1.26	.598
	High school	6(35.3)	9(52.9)		
	≤College	2(11.8)	1(5.9)		
Occupation*	Employed	11(64.7)	6(35.3)	2.94	.085
	None	6(35.3)	11(64.7)		
Religion*	Yes	8(47.1)	9(52.9)	0.12	.500
	No	9(52.9)	8(47.1)		
marital state*	Single	5(29.4)	12(70.6)	5.80	.066
	Married	8(47.1)	0(0)		
	Divorce/separation	4(23.5)	5(29.4)		
Diagnosis*	Cerebral infarction	12(70.6)	16(94.1)	3.24	.078
	Transient Ischemic attack	5(29.4)	1(5.9)		
Diabetes*	Yes	13(76.5)	10(58.8)	1.21	.162
	No	4(23.5)	7(41.2)		
Cardio disease*	Yes	12(70.6)	12(70.6)	0.00	.292
	No	5(29.4)	5(29.4)		
Obesity*	Yes	9(52.9)	8(47.1)	0.12	.500
	No	8(47.1)	9(52.9)		
Smoking*	Yes	10(58.8)	6(35.3)	1.89	.151
	No	7(41.2)	11(64.7)		

Drinking*	None	5(29.4)	6(35.3)	5.61	.056
	≤Two cups a day	4(23.5)	9(52.9)		
	≥ Three cups a day	8(47.1)	2(11.8)		
Exercise*	Yes	1(5.9)	0(0)	1.03	.500
	No	16(94.1)	17(100)		
Frequency of exercise*	None	16(94.1)	17(100)	1.03	.500
	< 3 Times a week	1(5.9)	0(0)		
	≥ 3 Times a week	0(0)	0(0)		
Hospitalization period		17.12±18.59	18.00±15.61	0.15	.882

Note: *Fisher's Exact test, Exp.=Experimental group, Cont.=Control group.

Table 3. Effects of secondary prevention-related knowledge and medication administration after telephone counseling between experimental groups and control group. (N=34)

Characteristics	Groups(n)	M±SD	t	*p*
Secondary prevention related knowledge	Exp.(17)	15.06±0.24	-8.96	<.001
	Cont.(17)	8.09±3.21		
Medication adherence	Exp.(17)	6.43±0.69	-5.94	<.001
	Cont.(17)	3.40±1.99		

Note: Exp.=Experimental group, Cont.=Control group.

Therefore, what "the experimental group with the one-session telephone consultation offer after discharge to the patients who first suffered a stroke will have the higher medication adherence than the control group" was backed up.

7. Discussion

This study was conducted in order to increase the nursing work efficiency of the secondary prevention education about a stroke through the appropriate periodic telephone consultation by verifying the effects on the stroke-related secondary prevention knowledge and on the medication adherence after allowing the patients who first suffered a stroke to be offered the one-session telephone consultation after discharge. The research subjects were divided into the experimental group and the control group and were verified the hypotheses on the secondary prevention knowledge and the medication adherence.

In this study, the secondary prevention knowledge score appeared to be 15.06±0.24 points in the experimental group and 8.09±3.21 points in the control group. The secondary prevention knowledge score between two groups was indicated to have a statistically significant difference(t=-8.96, p<.001).

In this study, the outcome of Hypothesis 1 showed that the secondary prevention knowledge rose when carrying out the telephone consultation treatment after two weeks of discharge in

the patients who first suffered a stroke[10]. This result was consistent with the researches[16] by Kang and Yeun in which the secondary prevention knowledge grew through the individual education for ischemic stroke patients and the 3-time telephone consultation once a week. In light of these findings, the secondary prevention knowledge is thought to be accredited to being strong in a will to know about stroke-related knowledge because of having targeted the patients who first suffered a stroke as in Kim[10]'s research, and to be powerful in an intention of acquiring knowledge related to a stroke owing to being full of fear and awakening as saying of being able to recur during being hospitalized. This may be considered to suggest that the secondary prevention education before the next outpatient's visit after discharge is the important period for the subjects who first suffered a stroke. In addition to this, for the synchronization of knowledge acquisition aiming at the secondary prevention in the subjects who first suffered a stroke, an effort will need to be made in order to be possibly applied the program, which can be utilized anytime and anywhere, by applying various educational methods using web, video production, app as well as the education through telephone consultation.

Also, as in this study and in Kim[10]'s research, when comparing the researches by Kang and Yeun[16] that were made the education through telephone consultation in which the secondary prevention knowledge on the first-time stroke was implemented after two weeks of discharge, and that were made the individual education and the totally three-time telephone consultation once a week, even the secondary prevention knowledge score increases through the one-session telephone consultation as in this study. Considering this, the efficient and short-time education available for reducing a burden of nursing work is thought to be likely necessary as well.

As for the outcome of Hypothesis 2 in this study, the medication adherence stands at the average 8-point perfection. The medication adherence appeared to be 6.43±0.69 points in the experimental group and 3.40±1.99 points in the control group. The medication adherence level between two groups was shown to have a statistically significant difference($t=-5.94$, $p<.001$).

This medication adherence was consistent with the researches[19] by Kim and Park, which carried out telephone consultation using the web-based education program, and with Kim's research[30] of targeting the hypertensive elderly. It is lower than 6.6 points as the research result in Morisky et al.[29] of having targeted hypertension patients.

This is thought[30] to be because of comprising the subjects in much higher age group than 52.5 years old as the average age in the research by Morisky et al.[29] while the average age of this study is 69.1 years old. As I city is a regional small and medium city, there is a growing trend in the number of elderly people and even in stroke population. Accordingly, the considerations that will need to be made given applying the education on medication adherence are thought to be likely important for the necessities of being made with educational contents and method in line with age given education, of the education of visual approach notifying the importance of drugs to the stroke patients during staying in the hospital, of being educated a medication guide along with the explanation about specific drugs even in the discharge nursing note given living hospital, and of being secured the resources that will help the medication adherence.

Also, the research implemented the education related to medication adherence by directly visiting for 3 weeks once a week and then executed the telephone monitoring for 2 weeks once per two weeks after the end of the visiting education. Resultantly, as in the research[31] that was decreased the misuse & abuse of drugs and was grown the medication knowledge, the ongoing management is crucial for the subjects with a chronic disease. But considering the outpatient's revisit within 4 weeks after discharge in case of the patients who first suffered a stroke, the process of recalling it again will be important in the education on the secondary prevention knowledge and the medication adherence through the telephone consultation in the second week as the intermediate period. A quick educational approach is considered to be likely needed.

Nevertheless, considering the realistic clinical situation, there is a practical problem as saying that the professional nursing staff residence and the nursing work may grow more than necessary for proceeding with the education through telephone consultation. The more rise in educational frequency may lead to the better educational effect. But considering the real problem

of nursing, a realistic alternative plan is thought to be probably needed in the education through telephone consultation.

The above findings led to having verified the effects of the one-session telephone consultation offer after discharge to the patients who first suffered a stroke on the secondary prevention knowledge and the medication adherence relevant to a cerebral stroke. This led to having proved that the appropriate periodic telephone consultation may raise the nursing work efficiency regarding the secondary prevention education on a stroke.

Consequently, it seems to be likely necessary for arranging the guidelines related to the symptom management and the medication adherence in line with the one-session telephone consultation targeting the patients who first suffered a stroke. What makes this available for being applied to the nursing service is considered to be likely able to contribute to making it possible for increasing the efficiency of the nursing work and for enhancing the self-care ability in stroke patients.

8. Conclusion and Suggestion

This study was attempted to increase the efficiency of nursing work by inspecting the impacts of the one-session telephone consultation on the secondary prevention knowledge and the medication adherence in the patients who first suffered a stroke. The findings are as follows.

A. Hypothesis 1 as saying that “the experimental group with the one-session telephone consultation offer after discharge to the patients who first suffered a stroke will have the higher secondary prevention knowledge score than the control group” was supported.

B. Hypothesis 2 as saying that “the experimental group with the one-session telephone consultation offer after discharge to the patients who first suffered a stroke will have the higher medication adherence than the control group” was backed up.

Synthesizing the above results, the one-session telephone consultation after discharge in the patients who first suffered a stroke appeared to heighten the secondary prevention knowledge and the medication adherence. Thus, the one-session telephone consultation after discharge in the patients who first suffered a stroke was indicated to have the effect on the secondary prevention knowledge and the medication adherence. It is thought to be likely capable of boosting the efficiency of nursing work compared to the nursing intervention through the multi-session telephone consultation. The education related to the secondary prevention for the subjects who first suffered a stroke through the one-session telephone consultation after discharge will make the subjects available for having a habit of acquiring and practicing the knowledge relevant to secondary prevention as well as reducing the burden of nursing work and raising the work efficiency.

Based on the results of this study, the following suggestions are aimed to be made.

The education on the secondary prevention knowledge and the medication adherence through the telephone adherence in the patients who first suffered a stroke is proposed a comparative research between the research of the one-session education and the research of the education in multi-session such as two sessions.

As the medication adherence in the patients who first suffered a stroke is what is relevant to a change in a living habit, there is a need to confirm a change through a continuous research following 3 months and 6 months.

There is a limit to generalization because of having targeted the hospitalized patients at a tertiary general hospital that is located in Jeonbuk. Hence, a replicate research is recommended to be executed by randomly assigning representative samples.

A follow-up research is proposed to be necessary regarding a complementary therapy that affects the secondary prevention knowledge and the medication adherence in the subjects who first suffered a stroke.

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10. Appendix

10.1. Authors contribution

	Initial name	Contribution
Lead Author	MIL	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑
Corresponding Author*	GWL	-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑