

Application of Information Technology to Enhance Clinical Experience of Adaptation in Glaucoma Subjects

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Abstract

The study was to investigate an effect analysis on the application on the information technology to enhance clinical experience of adaptation in glaucoma subjects. A survey was conducted with a total of 142 patients who visited in a healthcare which is in chungnam region between January 6 and May 30, 2014. Chi-square test was used for the examination of patients' situation in people with ocular disease between one group and another group. Student's T test analysis was performed to measure the distinction of the ocular condition in respondents with glaucoma according to the tool of information technology. Research are the findings of next followings. 1) For marriage status, marriage case (74.6%) in the people of experiment was determined a significantly lower rate than participants (83.1%) in the another group ($\chi^2=2.81$, $p<0.05$). 2) For ocular health, rapid eyeball movement was much better improvement after application of information system than before use of tool experience in the people of experiment ($t=-6.59$, $p=0.000$). 3) The health condition of participants who had eaten spinach was estimated a good change in ocular health ($t=-4.07$, $p=0.000$). Therefore, an optimum information technology will contribute to enhance the effect of ocular health for glaucoma patients of every hospital.

Keywords: Adaptation, Experience, Glaucoma, Information, Subjects, Technology

1. Introduction

The glaucoma patients are visually impaired with peripheral nerve. If the eye disease is not treated, the visual loss of the patients gets worse continually. This can be a blind person over time.

The actual incidence is estimated to be approximately 2 of 400 persons under 50 years old, and 2 of 20 persons over 50 years old which is an eye disease that can lead to blind person among optic nerve diseases^{1,2}. The physical illness is much higher common in old age patients than young age patients. Previous studies reported 65 times higher likely to get cataract or glaucoma than other diseases if the age of patients are American elderly aged more than 65 years³⁻⁵.

There was a family history in optic nerve disease usually due to a combination of hereditary in glaucoma patients. When members of family have the glaucoma or cataract, the descendants of these few had much more incidence than the rest of the members without family history. Previous studies have been reported that the incidence rate of family history increases risk of glaucoma five to ten times. Some evidence reported that the risk for Spain populations is at a much higher risk than those of England populations in aged over 65 years old. There is no known increased risk in Asian populations. Recent studies indicate that steroid has been used to treat glaucoma. A study demonstrated that steroid use showed a 40.3% increase in the incidence of ocular hypertension. On the other hand, open angle glaucoma is required

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approximately 14.1 to 35.3 puffs of steroid inhaler to control asthma of respiratory system. This is a very high dose due to side effects. Thus, it is only required in cases of severe chronic obstructive lung disease among respiratory diseases⁶⁻⁸.

In order to manage a serious disease, glaucoma patients have to perform adequate health practice. However, many patients do not have adequate health behavior and supply the poor quality of life^{9,10}. The supply of clinical application for the design of predictive information technology is important services than the other service can give to glaucoma patients.

Therefore, this paper investigated the effect of the application on the optimum information system to enhance medical experience of adaptation in glaucoma subjects. The information system will contribute to enhance the effect of eye health for glaucoma patients in the field of health care.

2. Research Survey and Data Analysis

2.1 Research Survey

Figure 1 presents a construction of optimum information system. It is as follows. Firstly, preparation stage: defining information architecture, establishing information development. Secondly, analysis stage: data analysis, priorities setting and strategic impacts of information system. Thirdly, application stage: application of information /system, proposals, and presentation. Fourthly, evaluation stage: evaluating the effect on the clinical performance ability in glaucoma patients, verifying study impact.

2.2 Data Analysis

The statistics were analyzed through questionnaires between January 6 and May 30, 2014. Participants of experiment of 71 people who was classified into people with tool of experiment, while another group of 71 people was classified into people who don't have tool of experiment.

This survey was conducted with a total of 142 patients who visited ophthalmology in a healthcare which is in Chungnam region between January 6 and May 30, 2014. The effect of participants' condition identified decrease of glaucoma after use of tool of optimum information

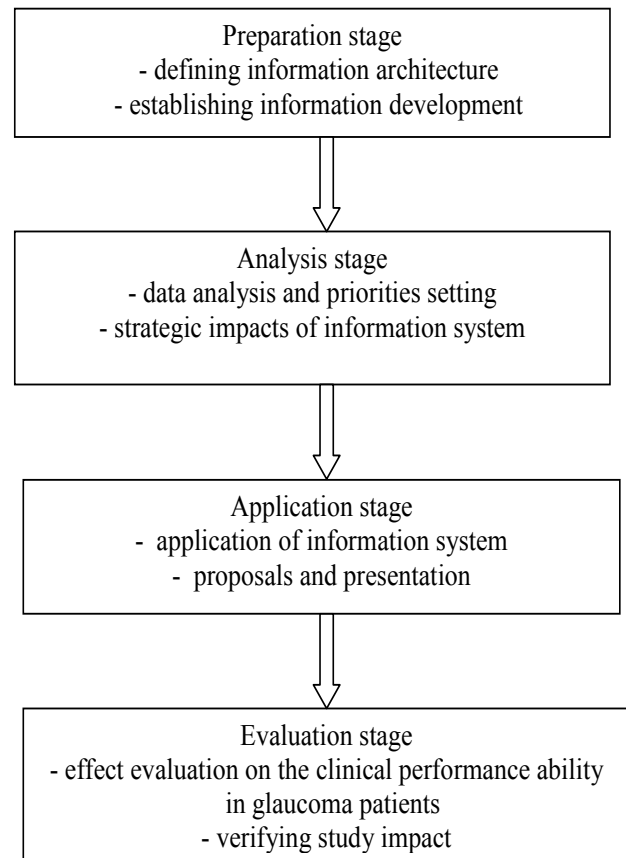


Figure 1. Optimum Information System for the Glaucoma Patients.

technology. In this work, the rate of health practice by technology determined as a work for 140 days.

2.3 Research Instruments

The data collection tool was composed of totally 20 items. This questionnaire covered with 5 items for general characteristics, 15 items for change of eye management before and after information application. It employed a five point scale. After collecting the survey questionnaires, the usable data was analyzed after excluding data deemed as insincere or unreliable. To see if the experimental group was equivalent to control group in the health-related pre-test, the SPSS win 18.0 program used for analyzing data.

Also, the paper investigated durability on clinical performance ability. The experimental group was applied by the information system during a twenty-week period of time, twice a month, for 8 sessions each of which lasted 50 minutes. During the period, the control group received no application. The control group was informed to conduct

the program after finishing program for the experimental group.

2.4 Statistics

Chi-square test was analyzed for the examination of the general characteristics in glaucoma patients between two groups. Student's T test analysis was investigated to measure the distinction of the ocular condition and health practice in participants with glaucoma by use of information tool.

3. Research Results

3.1 Patients' Information in this Paper

The paper showed patients' information in this paper. According to an educational standard, people of experiment who graduated from under high school (77.5%) showed a higher rate than those of education level in respondents (69.1%) of the control group, whereas respondents whose education standard was investigated participants more than 2 year college (22.5%) in the

Table 1. Patients' Information in This Paper

Variables	Subjects of Experiment	Subjects of Non-Experiment	X ²
	N (%)	N (%)	
Total	71(100.0)	71(100.0)	
Technical Standard			
Below middle School	21(29.6)	19(26.8)	6.15
High School	34(47.9)	30(42.3)	
Over College	16(22.5)	22(31.0)	
Age			
<40	5(7.0)	9(12.7)	0.72
40-49	17(23.9)	25(35.2)	
50-59	13(18.3)	16(22.5)	
60≤	36(50.7)	21(29.6)	
Gender			
Male	38(53.5)	32(45.1)	3.28
Female	33(46.5)	39(54.9)	
Monthly Income/Million			
<1	23(32.4)	18(25.4)	12.43
1-1.99	15(21.1)	13(18.3)	
2-2.99	19(26.8)	21(29.6)	
3≤	14(19.7)	19(26.8)	
Marital Status			
Single	18(25.4)	12(16.9)	2.81*
Married	53(74.6)	59(83.1)	

*p<0.05

experimental group showed less than those (31.0%) of control group in the Table 1.

On the other hand, as for monthly income, the 32.4% of people' income sources was the highest people under 1,000,000 won. Also, it showed 26.8% in the area of people between 2,000,000 and 2,990,000 won in the experimental group. Average income is more than 3,000,000 won were 19.7% of respondents.

In addition, people (32.4%) who got money under 1,000,000 won for 30 days in the experimental group was investigated as a higher rate than people (25.4%) who got

money in another group. For marriage situation, marriage case (74.6%) in the people of experiment was a significantly lower rate than marriage case (83.1%) in another group ($\chi^2=2.81$, $p<0.05$).

3.2 Change on Ocular Condition of Information Technology

This paper was determined the change of ocular condition of information system in this Table 2. For eye health, rapid eyeball movement was much better improvement after tool application of information system in the sub-

Table 2. Change of Ocular Condition by Information Technology

Items	Before	After	t	P
	<i>M±S.D</i>	<i>M±S.D</i>		
Eye Health				
Rapid Eyeball Movement	24.61±0.83	73.52±0.65	-6.59	0.000
Sitting Posture	36.97±0.51	68.74±0.29	-3.25	0.000
Blink	24.18±1.74	63.25±1.83	-6.47	0.000
Pressure around the Eyes	21.64±0.95	61.74±0.63	-3.52	0.000
View in High-Rise Buildings	38.95±0.62	53.92±0.07	-5.29	0.001
Closed-eye rest	41.52±0.75	74.36±1.39	-3.41	0.000
Health Habits				
Diabetes Mellitus Control	48.29±0.18	41.57±1.73	4.95	0.417
Insomnia	46.94±0.63	44.28±0.45	6.37	0.629
Carrot Intake	53.71±1.26	72.27±0.63	-3.64	0.002
Spinach Intake	35.58±0.42	64.93±1.94	-4.07	0.000
Seaweed Intake	39.15±1.65	73.86±0.56	-3.58	0.000
Vitamin C Intake	37.67±1.49	62.17±1.82	-1.42	0.000
Drinking Alcohol	56.42±0.57	46.82±1.56	4.15	0.582
Stress Status	68.05±1.49	52.68±0.27	2.73	0.294
Depression	47.84±1.17	36.17±1.49	4.18	0.053

jects of experiment ($t = -6.59, p=0.000$). On mean scores of the eye condition, score of pressure around the eyes1 significantly increased in respondents after application than respondents before application ($t = -3.52, p=0.000$). On the other hand, health condition of the people who had eaten spinach was determined a good change by information application ($t = -4.07, p = 0.000$).

Assumption of the mean is as follow: if measured quantity($X_1, X_2, \dots, X_n$) make up the sample of the measurements, then the standard deviation represents as follows. The X values indicate the mean of measured quantity (1).

The Formula of mean is as follow: if we divide total of X worth as no. of worth (N)

and then the mean is equal.

Student's t test is used to analyze the distinction between one group and another group. Especially, it compares statistically different between pretest and posttest. (2).

$$T\text{-value} = \frac{\bar{X}_T - \bar{X}_C}{SE(\bar{X}_T - \bar{X}_C)} \quad (2)$$

3.3 Persistence Tendency of Medical Experience of Adaptation

The paper was investigated the persistence tendency of medical experience of adaptation. For the improvement of ocular health, the condition of optimum system technology was indicated more increase in the subjects of experiment than subjects of non-experiment in the change on the ocular health, after 40 days after tool experience.

But the tool adaptation reduced after 80 days after tool experience in the subjects of experiment.

For health habits, the tool experience of optimum technology was investigated as higher rate in the people of experiment than people of non-experiment in the change on health habits, after 40 days after tool experience of optimum technology. But the tool experience reduced after 60 days after tool experience in the people of experiment than people of non-experiment (Figure 3).

$$\text{Slope} = \Delta Y / \Delta X$$

$$\text{Slope} = \Delta Y_a / \Delta X_b$$

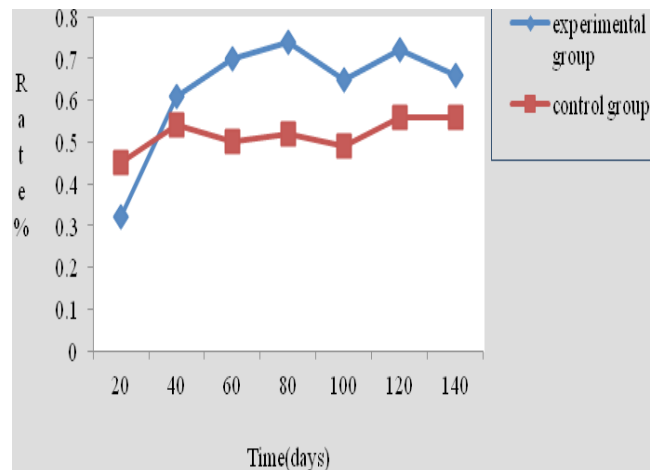


Figure 2. Durability of Eye Health between Two Groups.

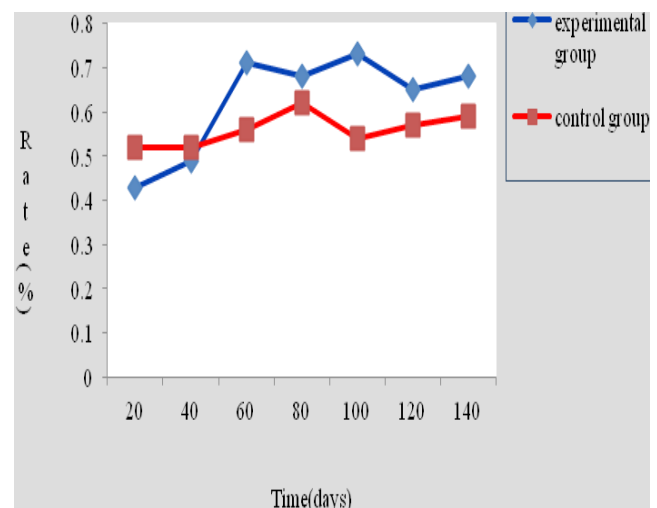


Figure 3. Durability of Health Habits Between Two Groups.

Delta (Δ) presents individual differences in using slope. The delta change the values of Y axis according to change in the values of X axis (3).

$$\text{Slope} = y \text{ change} / X \text{ change} \quad (3)$$

4. Discussion

Our research was to conduct results by the application of information management to improve physical and mental activities of living in people with ocular disease. The findings of this study are followings. When subjects of study had performed personal practice behaviors toward skin

pressure around the eyes diminished the incidence rate of glaucoma. It had done progressive increase physical state. Moreover, rapid eyeball movement in the experiment appeared much better the physical state of eye health after the application of optimum information as compared to before the application of optimum information. As a result of analyzing the change of eye disease, this study showed a little similar to early studies on the cataract^{3,11}. Through the analysis of this finding, subjects should develop more diverse education program on eye health for the application of medical information to diminish the incidence of glaucoma. It will be more helpful for glaucoma patients to improve the disease.

The research showed group who intake seaweed was much better than group who didn't intake in the experimental group. There is difference with data reported in the other studies between groups^{5,12} through the analysis of this study, it suggests that the dietary management to improve eye health is very important^{13,14}.

On the other hand, ocular management determined a good change through eyeball-movement and food habits. It was determined a good change through tool experience in people who had eaten seaweed, spinach. Everyday health-related life in people with ocular diseases were determined quality of self-satisfaction through tool experience, As a result, health status of the people who had spinach consumption was determined a good condition after tool experience. This paper conducted the effect of eyeball movement and dietary factors by information application for therapy and management to patients with glaucoma. The study will take a role to stimulate the academics research on the dynamic structure and characteristics of the medical area.

Therefore the improvement of information system is quality of life to glaucoma patients. It is the first subject that patient study is important for valuation of information quality, and patient study is to proceed on the view point of mutual relations among quality, self-activity performance, and usability in information system.

The system developed can provide a user specific database of glaucoma patients within the required performance. Thus it shows good application possibilities in effective design.

5. Conclusion

This paper attempted to apply the optimum information technology to improve medical experience of adaptation among glaucoma subjects. Findings of our research are as below.

- For marriage situation, people with married life (74.6%) in the people of experiment were a significantly lower rate than people (83.1%) in another group ($X^2=2.81$, $p<0.05$).
- For eye health, rapid eyeball movement was much better improvement after application of information system than before tool experience in the people of experiment ($t=-6.59$, $p=0.000$).
- Depending on the ocular condition, the score of pressure around the eyes significantly increased in respondents after application than respondents before tool experience ($t=-3.52$, $p=0.000$).
- Health condition of the people who had spinach consumption was determined a good change after the tool experience ($t=-4.07$, $p=0.000$).
- Adaptation of optimum information technology was determined as a higher rate in the people of experiment than control people in the change of ocular health, after 40 days through tool experience of technology.

Therefore, optimum information system will contribute to enhance management and care of glaucoma patients in the medical area. In addition, the study can contribute to verify a road map of the study on medical area. Moreover, we can also expect an effect of gaining a full foothold in providing an academic source specialized for the study of the glaucoma patients.

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