The Development of a Model for Measurement of a Clinical Information System for the Prevention of Osteoarthritis

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Abstract

This paper is focused on the development of a model for measurement of a clinical information system for the prevention of osteoarthritis. The subjects of this paper were 106 patients who had been visited a general hospital which located in Chungnam area. As a result of this study, significantly positive changes of behaviors such as taking vegetables, limiting consumption of alcoholic beverage, and practicing the healthy lifestyles of exercising diminished the progression rate of osteoarthritis. There was a significant difference in body weight control after information intervention(t=2.56, p=.037). This paper found that the health promoting behaviors in osteoarthritis patients were increased by 52.9-64.1% compared with previous status and the patients positively perceived on a clinical management system. Therefore, the clinical management system for the prevention of osteoarthritis can be applied to any hospital which has health promotion center.

Keywords: Model, Measurement, Clinical information system, Osteoarthritis, Prevention

1. Introduction

Osteoarthritis is one of the most common autoimmune disease, and is arisen by the complex interaction between multiple genetic factors and environmental factors [1-3]. The prevalence of musculoskeletal diseases was 197.2, 240.0 and 278.5 and the annual self-reported prevalence rate of osteoarthritis was 146.4, 182.7 and 219.1 per 1,000 population in 2001, 2008 and 2012, respectively. In KNHANES III, osteoarthritis was the most prevalent disease of the musculoskeletal diseases for both genders [1, 4-5]. Fifty-eight percent of the over 65 year-old population had at least one musculoskeletal disease and it was higher in women with 73% [1, 6].

In order to solve the urgent problem, we should look for the practical plans. However, there were few studies to deal with effect of information system for the prevention of osteoarthritis until present in Korea. We also don't have any national program about it [7-9]. Therefore, the comprehensive and integrated information systems including chronic disease are urgently required to control the increasing prevalence of osteoarthritis and produce its related desirable outcomes [10-12].

This paper sought to apply the effect of it on the change of practice behavior of subjects for the prevention of osteoarthritis using a clinical management system. On the other hand, the follow-up survey was conducted at the end of this trial to compare the change before and after information intervention for health promotion behavior between the two groups. Thus, the

purpose of this paper is to a new experimental model for measurement of a clinical information system for the prevention of osteoarthritis. A comprehensive and systematic adoption of a clinical management system to minimize the damage of osteoarthritis will contribute effectively to the rapid disease recovery and prevention.

2. Materials and Methods

2.1 System Development Process

This paper is to provide for a new experimental model system ranging from identification problem structure to solution method. This first of the development is to prepare through need-assessment of the participants [Figure 1]. And then it carries out the procedures of conducting problem analysis and sets a goal of the information system. The second step is to identify the functional elements of successful models and gather the information. In the third step, an experimental stage, where a preliminary program is to be applied and evaluated in the field has been implemented.

2.2 Study Materials

Study participants were patients who were diagnosed with osteoarthritis at least 6 months ago by osteosurgery departments of a general hospital in Chungnam area. The data were collected by interview and self-administered questionnaire from January 21 through May 24, 2013.

This program was totally consisted 106 persons, it has been divided into two parts. The experimental group of 53 patients which was assigned as group with information intervention, while the control group of 53 patients was assigned as group with no information intervention. The two groups are compared to know the difference of changes which affects health promotion behavior. On the other hand, the evaluation of patient satisfaction on the clinical management system through information intervention was performed by two groups. In order to estimate the system efficiency, a follow-up test had been done for the health promoting behavior of an 80-week intervention program.

2.3 Study Methods

General characteristics of study subjects was measured by percentage and number. The pairwise t-test was done to compare the before and after intervention effect of health practice rate of osteoarthritis patients. It was also performed to determine statistically significant differences between the two groups on the satisfaction of a new experimental model for measurement of a clinical information system for the prevention of osteoarthritis patients.
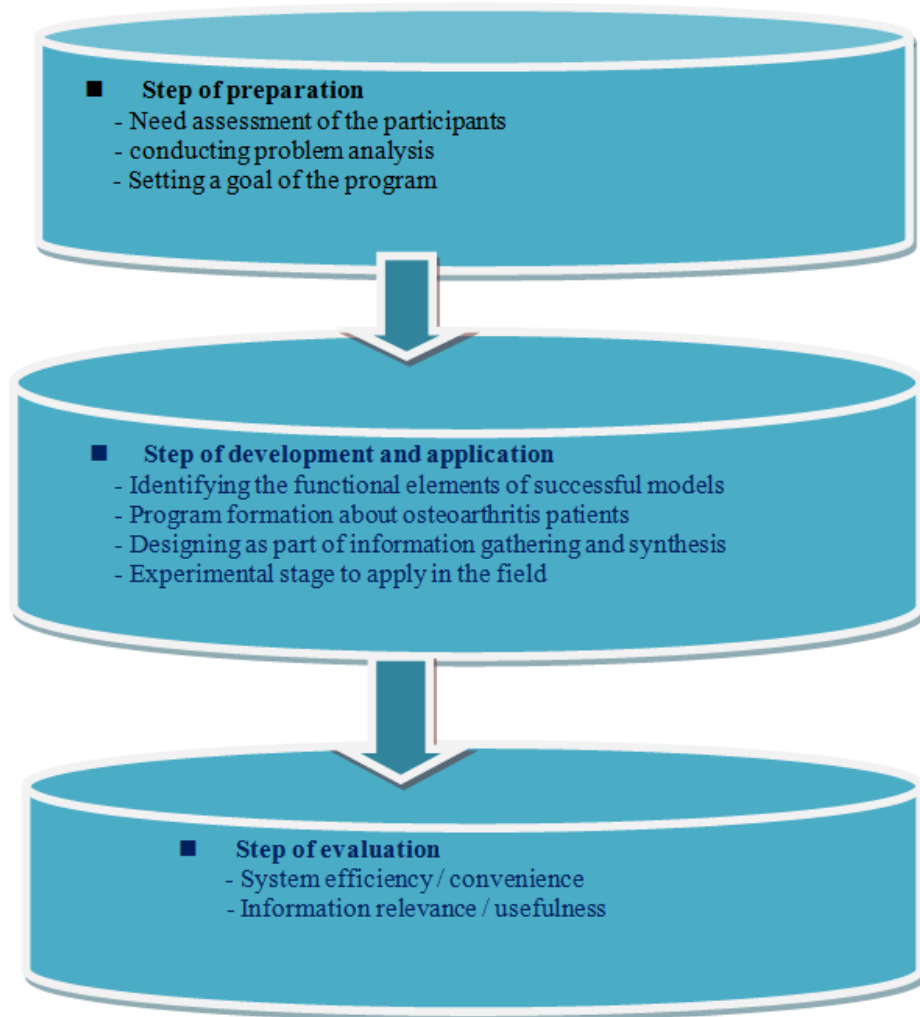
Figure 1. A Clinical Management System Structure for the Prevention of Osteoarthritis

3. Results

3.1 Basic Information of Study Subjects

Table 1 presents basic information of study subjects. Comparing the proportion in the gender, male with 37.7% of the control group showed more than male with 45.3% of the experimental group. In a marital status, married respondents with 56.6% of the control group were lower than respondents with 66.0% of the experimental group. On the other hand, about respondents who have another diseases, the experimental group with 69.8% showed higher than control group with 22.6%.

Table 1. Basic Information of Study Subjects

Variables	Experimental group N(%)	Control group N(%)	Variables	Experimental group N(%)	Control group N(%)
Age/yrs.			Education level		
≤35	5(9.4)	8(15.1)	Under middle †	15(28.3)	7(32.1)
41-49	9(17.0)	12(22.6)	High school s.	21(39.6)	4(26.4)
50-59	16(30.2)	19(35.8)	Over college	17(32.1)	2(41.5)
≥60	23(43.4)	14(26.4)	Housemate		
Gender			Live alone	10(18.9)	3(24.5)
1 Male	24(45.3)		2-4	35(66.0)	9(54.7)
Female	29(54.7)	.3)	≥5	8(15.1)	1(20.8)
Marital status			Another iseases		
Single			Yes	37(69.8)	2(22.6)
Married		.6)	No	16(30.2)	1(77.4)
Monthly income			BMI‡		
<200		14(26.4)	8.5≤BMI<23.5	9(17.0)	4(26.4)
201-400		18(34.0)	3.5≤BMI<25.0	20(37.7)	3(43.4)
≥400		21(39.6)	≥25.0	24(45.3)	6(30.2)
Total	)	53(100.0)	Total	3(100.0)	3(100.0)

† S : School   ‡BMI : Body Mass Index

3.2 Comparison of Clinical Application of Before and After Information Intervention

Table 2 represents the comparison of clinical application of osteoarthritis patients before and after information intervention. Comparing the mean scores in the cholesterol control, subjects' score(41.79±0.36) after intervention significantly decreased than subjects(54.12±1.57) before intervention(t=1.94, p=.028). On the other hand, there was a significant difference in practicing the healthy lifestyles of exercising after information intervention(t=-0.69, p=.015).

Table 2. Comparison of Health Practice of Before and After Information Intervention

Items / intervention	Before Mean±S.D	After :S.D	t	P
Cholesterol	54.12±1.57	41.79±0.36		.028
Stress	47.26±1.45	48.96±0.28		.769
Body weight control	61.04±0.33	56.25±1.62		.037
Other disease	50.38±1.04	48.64±0.31	0.19	.094
Hypertension	54.10±0.42	42.57±0.59		.041
Exercise	38.54±0.26	47.92±0.43	0.69	.015
Having vegetable	55.02±0.57	64.19±0.37		.008
Dietary control	50.18±1.56	58.47±0.49	4	)06
Counseling	44.67±0.14	52.93±1.46	7	.019
Smoking	46.05±0.75	37.46±0.05		.047
Diabetes mellitus	42.19±1.32	40.71±1.42		.584
Headache	49.73±0.27	43.05±0.97	!	.095
Alcohol drinking	51.66±1.92	45.38±1.54	)	.031

3.3 Evaluation on the Satisfaction of Information Program Between Two Groups

Table 3 presents an evaluation on the satisfaction after information application between two groups. The mean scores for easy to use the system was 34.60 in experimental group and was 39.35 in control group. There was significantly high difference in control group(t=-1.58, p=.041) than experimental group. There were a significant difference between two groups for easy to connect in system efficiency(t=-3.61, p=.-37).

Table 3. Evaluation on the Satisfaction of Information Program between Two Groups

Items	erimental ıp :S.D.	Control group :S.D.		
tem convenience				
y to use the system	34.60±0.53	9.35±0.81		-1.58)41
y to contact to operator	21.37±1.26	4.32±1.47	2.13	)85
System efficiency				
Easy to connect	32.27±0.49	7.28±0.32	3.61	)37
Fast to search information	27.36±1.28	6.51±1.60	.29	741
Information usefulness				
Useful information to the management of health	40.49±0.75	4.17±0.52	.94	)29
Easy to understand	36.37±1.65	4.56±1.79	.28	)64
Information relevance				
Accurate contact	32.14±0.28	0.82±0.25	.72	790
Detailed contents	38.59±1.49	5.31±1.22	.91	564

3.4 The Change of Clinical Application Between Two Groups After Intervention

Figure 2 presents the change of clinical application in osteoarthritis patients between two groups after intervention. According to the health promotion behavior, after the intervention, the mean scores of the experimental group showed an increase after intervention than control group.
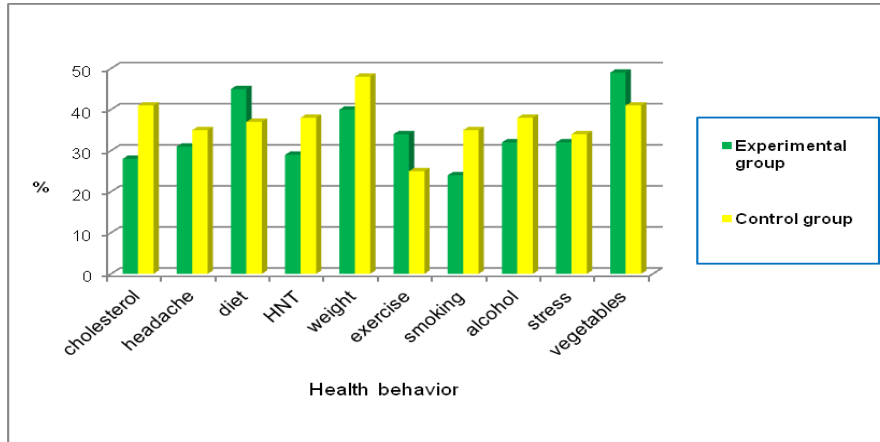

Figure 2. The Change of Clinical Application Between Two Groups After Intervention

3.5 Follow-up of Practice Rate of Clinical Application Between Two Groups

Figure 3 compares the follow-up of practice rate of clinical application between two groups. The follow-up survey was estimated to be higher in the experimental group, regardless of the time elapsed of 20 days after the information intervention. However, the intervention effect was estimated to decrease more rapidly with time elapsed of 60 days after intervention in the experimental group as compared to the control group.
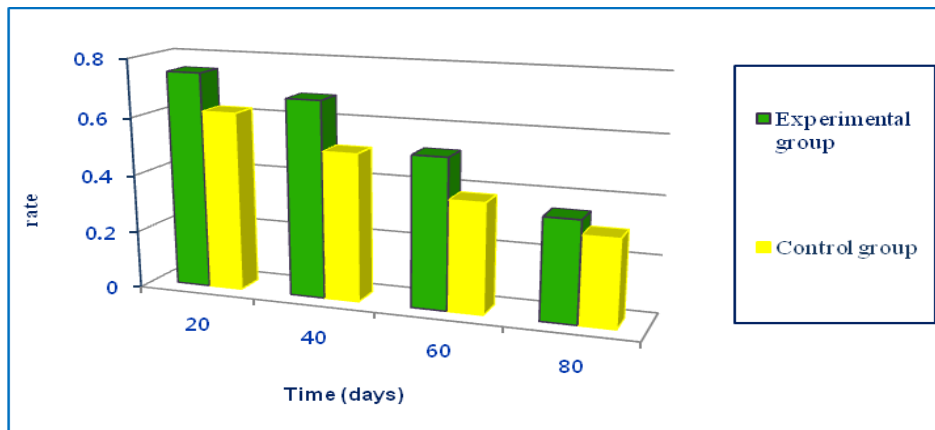

Figure 3. Follow-up of the Practice Rate of Clinical Application Between Two Groups

4. Discussion

The purpose of this paper was investigated to provide basic data for the introduction of a new experimental model of the osteoarthritis prevention and management by examining the

control of stress, mental health and physical symptoms. This attempt of a new experimental model was evaluated to have brought about a significant improvement in patients' health management.

The intervention effect did not significantly increase for stress, and then multi-displinary approach is required to reduce the factors related to stress. As a result of this study, statistically significantly positive changes of behaviors such as taking vegetables, controlling body weight, and smoking cessation diminished the progression rate of osteoarthritis. The findings were similar with the previous studies on the chronic disease [13-15]. This study suggests that individuals with osteoarthritis should be targeted for specific health behavioral intervention to prevent the progression of osteoarthritis. Based on the results obtained by the study, it is anticipated that this paper may be used as basic data for developing and interventing health promotion behavior for the chronic disease patients. However, the result shows that in order to maintain desirable food behaviors, convergence educational program for osteoarthritis patients focused on health promoting behaviors. It is more successful than single program. The results of this paper, after receiving intervention, there was a positive change for the weight control after intervention than before intervention in the mean score of weight control. The finding was consistent with the result of earlier research [16]. Therefore, it needs to perform systematic weight management. There is a need for the program to be implemented on the groups who characterize having lower levels of health knowledge and health promoting behavior.

The present research showed that practice rate of the health behavior can be increased 52.4-64.1% by a clinical management system, which is similar to data reported in the previous studies [6, 17]. However, it should be noted that the intervention effect by a clinical management system is not maintain for a long period of time. Accordingly, in order to maintain the intervention effect by a clinical management system, it is very important to determine adequate intervention period and perform various program in consideration of their circumstances. The present work elucidated throughout the statistical analysis how effectively the synthetic and systematic education contributes to health promoting behavior for the prevention of osteoarthritis. The future work should focus on the study of the intervention effect as a classification of patients throughout more prolonged research based on a larger data base.

Until the present, the limitation of osteoarthritis patients lies in that nothing put into action despite the increase of knowledge. The results of this study would be the enhancement of practice behavior for the prevention of osteoarthritis. Thus, this paper indicated that the implemented systematic intervention showed significant positive effects on the life of subjects and health behavior. The quality of life in the experimental group has been enhanced as time passes by compared to control group, showed that it is an effective program for the prevention of osteoarthritis. This management intervention has been developed by complementing and revising preliminary program. Therefore, the management program for osteoarthritis patients implemented by intervention research is quite meaningful in that it is evidence-based program development which will contribute in replicating the intention under field conditions for osteoarthritis patients.

Osteoarthritis patients who had moderate exercise level and who were under diet care had better quality of life. Current practice of exercise in osteoarthritis patients was obtained through intervention of information system. Therefore, adequate health practice behavior in osteoarthritis patients will improve their quality of life in accordance with proper information program. The development about management system is so essential to the osteoarthritis patients. For successful performance of the study, this paper had tried to provide various information to enhance the practice rate of health behavior in osteoarthritis patients using a

clinical management system. So there were many changes which improve the quality of life in osteoarthritis patients using the system. This study showed that a clinical management system could help osteoarthritis patients in providing effective practice of their health behavior. Significant correlations among stress, mental health, and physical symptoms suggested that continuous observation and assessment are required for the management of osteoarthritis patients.

5. Conclusion

The purpose of this study was to find the effects of a new experimental model on prevention and management methods for osteoarthritis patients. For this purpose, this research developed the experimental model. It conducted a positive effect on health improvement of osteoarthritis patients. According to this research, the experimental model on health management for the osteoarthritis patients will be contributed on the prevention construction of any hospital or society.

Practitioners can use the results as guidelines for designing control health behavior and networks. As a result of this study, positive changes of behaviors diminished the progression rate of osteoarthritis. This paper found that the health promotion behavior in osteoarthritis patients was increased by 52.9-64.1% compared with the previous status and the patients positively perceived on a clinical management system. Moreover, this paper showed that using the system as health practice tool was a good way to enhance the practice rate of health behavior in osteoarthritis patients.

The management system for health promotion can be applied to any hospital which has health promotion center. Also, this system can be extended to impatient or outpatient departments. With integration of information system, the effective management of chronic disease patients would also be possible.

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