An Optimal Integrated Information System for Strengthening Immunity in Patients with Knee Degenerative Arthritis

By

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Abstract

Degenerative arthritis is a condition in which inflammation and pain occur due to gradual damage to the cartilage or degenerative changes. The number of degenerative arthritis patients is on the rise every year, and more than 80 percent of those 55 years old. Therefore, the paper measures the effectiveness of the optimal integrated information system for strengthening immunity in patients with knee degenerative arthritis. Changes in arthritis in the application of the integrated information system over time were analyzed by a t-test. The results of the paper are as follows. Firstly, garlic intake was significantly higher on average 43.75 points after the application of the integrated information system than 26.19 points before application(t=-3.62, p=.000). Secondly, crossing the legs was significantly lower with 28.34 points after application than the average of 45.91 points before the application of the integrated information system(t=1.93, p=.000). Thirdly, in the case of the experimental group, the arthritis state showed a trend of decreasing after 10 days of application than before the application of the application system. Therefore, the application of this integrated information system was found to be effective in relieving arthritis. Therefore, the derived research results are expected to contribute to treatment as well as prevention of arthritis.
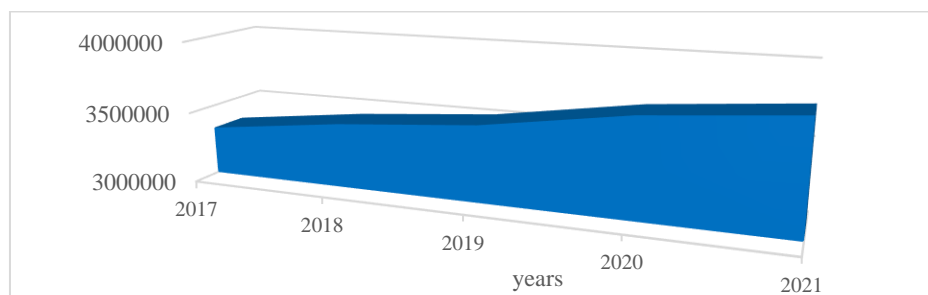
Key Words : Degenerative arthritis, Integrated information system, Immunity, Patients, Garlic

1. Introduction

Degenerative arthritis is a condition in which inflammation and pain occur due to gradual damage to the cartilage or degenerative changes (Abramoff & Caldera, 2020; Wyller et al., 2012). It shows the highest frequency of inflammatory diseases in joints. It is classified as secondary arthritis of damage to primary and cartilage caused by age, gender, genetic factors, and obesity (Bennell et al., 2021; Mahmoudian et al., 2021). The number of degenerative arthritis patients is on the rise every year, and more than 80 percent of those 55 years old. Figure 1 shows that the number of patients with degenerative arthritis has increased by 13% in five years (Ng et al., 2019; Wyller et al., 2012).

Recently, arthritis has frequently appeared even at a young age, but it is often considered a simple muscle pain. It's arthritis that makes it harder because of the pain when the weather gets cold. If it occurs in the knee joint, it may show abnormalities in gait along with joint-shaped deformation. The cause can vary to some extent from part to part. In the case of the spine, repetitive occupational

work or lifestyle can be the cause. Acquired arthritis is suffering from more than a tenth of the population (Karitis et al., 2021). So, information system management is needed to relieve degenerative arthritis. Therefore, the paper measures the effectiveness of the optimal integrated information system for strengthening immunity in patients with knee degenerative arthritis.

Fig. 1. Current status of knee degenerative arthritis in Korea

2. Material and Methods

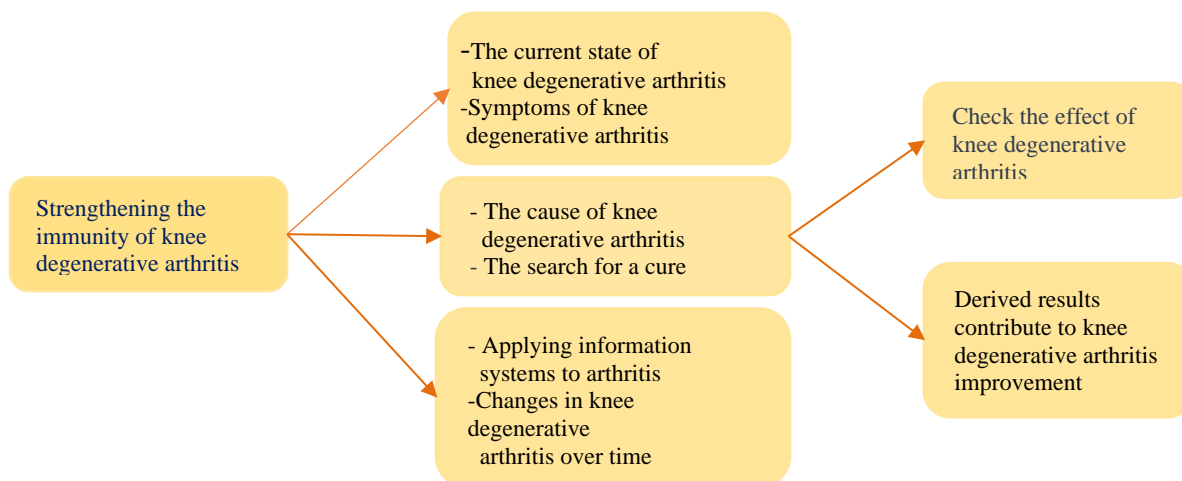## 2.1. Design for Strengthening Immunity in Patients with Degenerative Arthritis

Figure 2 shows a design for strengthening immunity in patients with knee degenerative arthritis. 1) Strengthening the immunity of knee degenerative arthritis 2) The current state of arthritis and symptoms of arthritis 3) The cause of degenerative arthritis and the search for a cure 3) Applying the integrated information systems to arthritis and changes in arthritis over time 4) Check the effect of knee degenerative arthritis 5) Derived results contribute to knee degenerative arthritis improvement.

2.2. Materials and Ethical Considerations

The survey was conducted from May 8 to July 10, 2021, The experimental group applied to the integrated information system was classified as 46 people, and the control group not applied was classified as 46 people. In this study, a total of 92 people used the survey, and poor responses were excluded. This study was conducted after being approved by a cooperative group related to research ethics. The purpose and process of this study were explained to the study subjects. This study identified the purpose of the data before collecting it. This study informed subjects that it was not used for any purpose other than research purposes. A survey was conducted on those who agreed to this study.

2.3 Research Tools

This study is a tool used to prevent complications after hip joint surgery. This study is a tool for strengthening immunity in patients with knee degenerative arthritis A Likert 5-point scale was used for this study. The higher the score, the better the patient's condition. In the previous study on visceral inflammation, Cronbach's a was .829, but in this study, it was higher at .873.

Fig. 2. Design for strengthening immunity in patients with knee degenerative arthritis

2.4. Methods

The basic information of the subjects was used by Chi-square test. Before and after the application of the integrated information system in arthritis patients, the t-test was analyzed. Changes in arthritis in the application of the integrated information system over time were analyzed by a t-test. Changes in arthritis conditions were measured before and after application of the integrated information system, 10, 20, 30, and 40 days were measured.

3. Results

3.1. Basic information of participants in the study

Table 1 presents basic information on the subjects of the study. It was found that 69.6% of the experimental group with cross-legged position every day was significantly higher than 41.3% of the control group. control group(X^2=5.93, p<.05). In the case of overweight in BMI, 58.7% of the experimental group was higher than 45.7% of the control group.

Table 1. Basic information of participants in the study

Variables	Experi group N(%)	Cont group N(%)	X^2
Age			
≤60	9(19.6)	14(30.4)	8.16
61-70	16(34.8)	19(41.3)	
≥71	21(45.7)	13(28.3)	
Gender			
Male	17(37.0)	20(43.5)	2.74
Female	29(63.0)	26(56.5)	
Crossed-legged position			
Everyday	32(69.6)	19(41.3)	5.93*
Hardly	14(30.4)	27(58.7)	
Regular exercise			
Yes	12(26.1)	22(47.8)	7.08*
No	34(73.9)	24(52.2)	
BMI			
Overweight	27(58.7)	21(45.7)	1.62

Moderate	11(23.9)	13(28.3)
Underweight	8(17.4)	12(26.1)
Total	46(100.0)	46(100.0)

* p<.05

3.2 Before and after the application of the integrated information system for arthritis patients
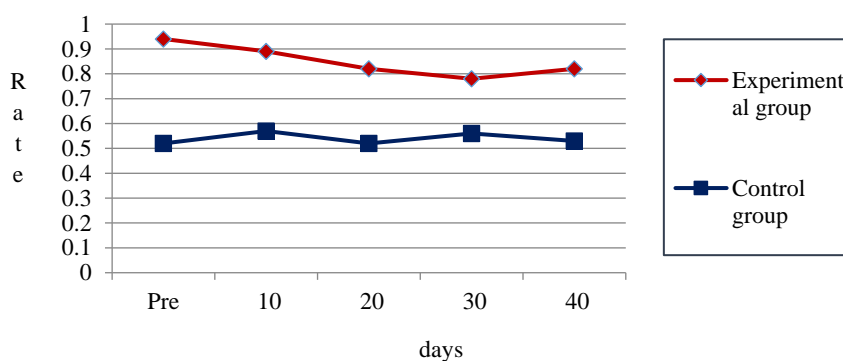
Table 2 shows before and after the application of the integrated information system for arthritis patients. Garlic intake was significantly higher on average 43.75 points after the application of the integrated information system than 26.19 points before application(t=-3.62, p=.000). Crossing the legs was significantly lower with 28.34 points after application than the average of 45.91 points before the application of the integrated information system(t=1.93, p-.000).

Table 2. Before and after the application of the integrated information system for arthritis patients

Items	Pre	Post	T	p
	Mean±S.D	Mean±S.D		
Excessive exercise	40.72±1.64	28.39±1.82	1.94	.000
garlic intake	26.19±3.17	43.75±2.39	-3.62	.000
Squat movement	14.35±0.29	46.13±0.62	-0.58	.000
Eating green-leaf	16.07±1.43	44.28±1.71	-1.94	.000
Difficulty of climbing stairs	48.13±4.57	42.91±3.45	8.17	.693
Pain in both legs	47.62±0.82	4139.64±0.13	3.52	.315
Arthritis	49.97±1.50	41.98±2.63	1.85	.162
Stretching	22.62±3.49	46.15±3.82	5.27	.000
Weight loss	43.78±0.52	39.72±0.95	2.41	.744
Cross-legged	45.91±1.67	28.34±1.76	1.93	.000

3.3. Changes in knee degenerative arthritis state over time

Figure 3 shows the change of knee degenerative arthritis over time**.** In the case of the experimental group, the knee degenerative arthritis state showed a trend of decreasing after 10 days of application than before the application of the application system. However, in the case of the experimental group, the arthritis state tended to increase somewhat after 35 days of the integrated information system application

*Slope =$\dfrac{\triangle Y}{\triangle X}$ $\triangle X$: time interval
          $\triangle Y$: arthritis change
*Ratio = $\dfrac{\triangle Ya}{\triangle Yb}$ $\triangle Yb$: Arthritis before system application
          $\triangle Ya$: Arthritis after system application

Fig. 3. Changes in knee degenerative arthritis state over time

4. Discussion and Conclusion

The paper measures the effectiveness of the optimal integrated information system for strengthening immunity in patients with knee degenerative arthritis. As a result of the study, garlic intake was significantly higher after application than before application of the integrated information system. This was similar to the results of osteoporosis in previous studies (Lespasio et al., 2019; Somford et al., 2016). Arthritis is an inflammation of the joints caused by the penetration of various bacteria such as tuberculosis bacteria into the joints. Garlic is effective for arthritis because it relieves inflammation and acts as a natural painkiller.

Arthritis was found to be alleviated after application than before application of the integrated information system. This has been shown to be similar in other studies (Leopold, 2019; Lespasio et al., 2019). Therefore, the application of this integrated information system was found to be effective in relieving arthritis. The derived research results are expected to contribute to treatment as well as prevention of arthritis.

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