

Development of Advanced Information System to Strengthen the Immunity System of Pneumonia Patients

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Abstract This paper is to analyze the new experimental analysis on advanced information system for strengthening the immunity of pneumonia patients. Data were surveyed using interview and questionnaires by 146 patients who visited an internal medicine of a general hospital located in K area. The data were collected by interview and questionnaires from February 20 to May 4, 2018. The t-test was conducted to compare the health practice for strengthening lung before and after application of advanced information system. The results of this study are as follows. First, in terms of vitality, the control group's vitality was significantly better than the experimental group ($X^2=2.17, p<.05$). Second, the mean score (52.47 ± 1.72) of walking regularly after applying information system was significantly higher than the mean score (38.45 ± 1.93) before applying information system ($t=-1.46, p=.000$). Third, the patients' immunity system of lung has improved from 30.6% to 50.1% due to mediation of the information system. Therefore, it is expected that the successful implementation of advanced information system will contribute to the establishment of information system infrastructure.

Index Terms: Advanced information system, Immunity, System, Pneumonia, Patients.

I. INTRODUCTION

Pneumonia is an inflammation of the lungs caused by microorganisms such as bacteria, viruses, and fungi. It has a very diverse range of outcomes and varies depending on basic health conditions and the cause of pneumonia [1],[2]. Coughs, phlegm from the discharge of inflammatory substances, and difficulty breathing due to dyspnea arise [3],[4].

Pneumonia is the fourth cause of death in our country. Especially, if an old man gets pneumonia, he or she is 70 times more likely to die. Older people with weak immune systems are more likely to die of pneumonia. It is caused by germs, virus fungi, and tuberculosis. The rate of pneumonia deaths is three out of every 100,000 adults under the age of 65. On the other hand, the number of senior citizens is 209.1 per 100,000.

The old man is prone to pneumonia by a decrease in the lung function. Pneumonia or shock can occur due to pneumonia. Partial complications of the lungs can be accompanied by air flow, pneumothorax, and consumption of the lungs. Previous researches show that there are many treatments for pneumonia, but it is not enough to strengthen the immunity in pneumonia patients [4],[5],[6].

Complications of pneumonia can lead to pleurisy. pleurisy is when an inflammable substance cools between the chest walls and the lungs. When pleurisy becomes severe, the pus gets filled between the two ribs, which is called a kleptomania. A severe case of pneumonia can

spread to the brain. Pathogens that cause pneumonia can enter the blood and cause septicemia [7],[8],[9]. Pneumonia is so suffocating that it is faster than 30 times a minute. Severe fever of 38.3°C or higher can lead to confusion of consciousness and blueness of lips and nails. Eight out of ten elderly patients with pneumonia should be hospitalized 70% of all patients who die from pneumonia are elderly patients [10],[11],[12]. The hospitalization period is twice as long as the average patient.

Thus, this paper is to analyze the new experimental analysis on advanced information system for strengthening the immunity of pneumonia patients.

II. MATERIAL AND METHODS

A. Materials

Data were surveyed using interview and questionnaires by 146 patients who visited an internal medicine of a general hospital located in K area. The data were collected by interview and questionnaires from February 20 to May 4, 2018.

Experimental group of 73 patients which was assigned as group with intervention, while the control group of 73 patients was assigned as group without intervention. The t-test was conducted to compare the health practice for strengthening lung before and after application of advanced information system.

B. Tool for Research

The research tools for the questionnaire are as follows. The general characteristics of the study subjects consisted of 7 items. The health practice for strengthening lung consisted of 12 items before and after the application of advanced information system. The process of changing the patient's breathing state consisted of 1 item before and after the application of advanced information system. The change of patients' immune system of lung consisted of 1 item before and after the application of the system.

C. Process and Components of Advanced Information System

A new design of advanced information system to strengthen the immune system of pneumonia patients shows in Figure 1. Composition of advanced information system for improving immunity of lung indicates in Figure 2. For the methods for strengthening immunity of pneumonia patients, the components for applying information system are follows. 1) Respiratory training 2) Change to positive health 3) Improvement of eating 4)

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Feasibility of a model 5) Reliability of the system 6) Cost reduction 7) Evaluation of a model quality

D. Methods

The general characteristics of the study subjects were carried out with X²-test. The practice for strengthening the immunity was analyzed by t-test. Before and after the application of advanced information system were tested for significance.

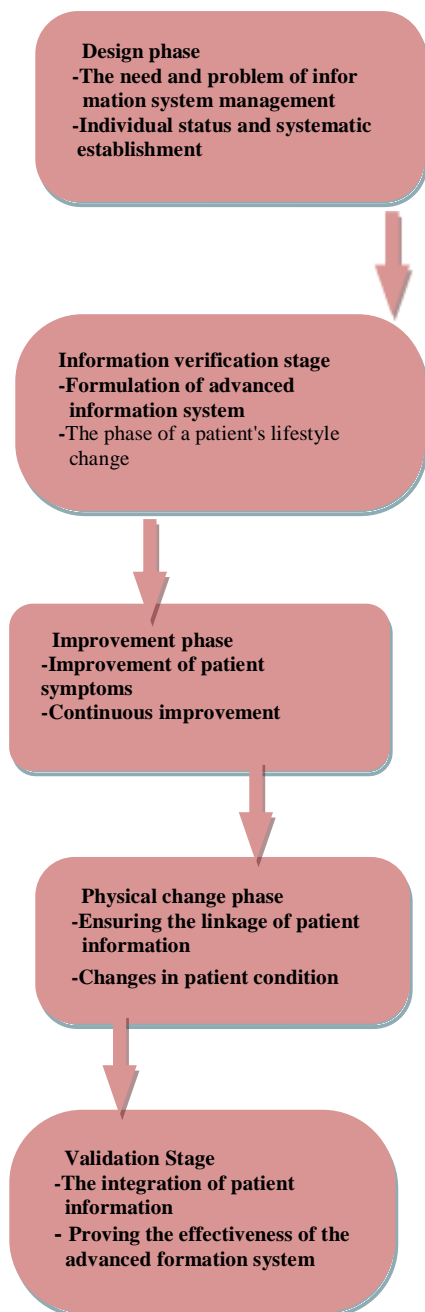


Fig. 1 A new design of advanced information system to strengthen the immunity system of pneumonia patients

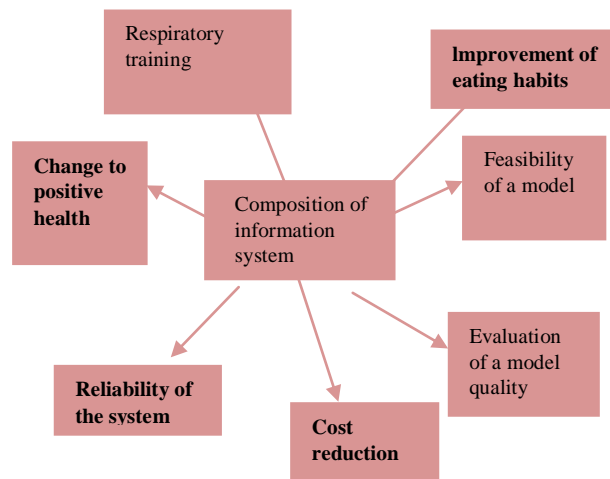


Fig. 2 Composition of information system for improving immunity of lung

III. RESULTS

A. Characteristics of subjects in this study

Table 1 reveals the characteristic of subjects in this study. In terms of vitality, the control group’s vitality was significantly better than the experimental group(X²=2.17, p<.05). In terms of education, the experimental group was higher than control group in below middle school.

Table 1. Characteristic of Subjects in This Study

Variables	Exp. g. N(%)	Con. g. N(%)	X ²
Vitality			
Good	25(34.2)	41(56.2)	2 2.17*
Bad	48(65.8)	32(43.8)	
Level of education			
Below middle school	22(30.1)	19(26.0)	8.49
High school graduation	34(46.6)	31(42.5)	
College and over	17(23.3)	23(31.5)	
Age/years			
<40	8(11.0)	15(20.5)	13.67
40-49	12(16.4)	21(28.8)	
50-59	19(26.0)	17(23.3)	
≥60	34(46.6)	20(27.4)	
Average monthly income/million			
<1	23(31.5)	19(26.0)	8.14
1-1.99	17(23.3)	15(20.5)	
2-2.99	14(19.2)	18(24.7)	
≥ 3	19(26.0)	21(28.8)	
Marriage status			
Single	18(24.7)	16(21.9)	1.94
Married	55(75.3)	57(78.1)	
Gender			
Men	34(46.6)	26(35.6)	3.62
Women	39(53.4)	47(64.4)	
Breathing status			
Good	17(23.3)	49(67.1)	8.75
Bad	56(76.7)	24(32.9)	
Total	73(100.0)	73(100.0)	

*P<.05



B. Health practice for strengthening lung

Table 2 shows health practice for strengthening lung. The mean score(52.47±1.72) of walking regularly after applying information system was significantly higher than the mean score(38.45±1.93) before applying information system(t=-1.46, p=.000).

The average score(57.49±1.54) of sun exposure after application of the information system was significantly higher than the average score(49.17±1.72) before the information application(t=-1.68, p=.052). The average score(51.13±0.49) of knee bending after application of the information system was significantly higher than the mean score(23.46±0.57) before information application(t=-3.56, p=.000).

Table 2 Health practice for strengthening lung

Variables	Before	After	t	p
	Mean±S.D	Mean±S.D		
Walking regularly	38.45±1.93	52.47±1.72	-1.46	.000
Eating garlic	42.61±3.45	50.16±3.16	-3.94	.000
Sun surfing	49.17±1.72	57.49±1.54	-1.68	.052
Radish intake	36.84±5.29	54.26±4.28	-3.42	.000
Stretching	31.25±0.64	52.49±0.73	-1.46	.000
Foot massage	19.40±2.76	35.82±1.59	-1.73	.000
Finger pressure	26.18±5.41	48.95±5.35	-6.28	.000
Knee bending	23.46±0.57	51.13±0.49	-3.56	.000
Breathing	36.59±3.42	53.63±0.67	-1.36	.001
Physical pressure	28.72±1.94	46.81±1.46	-5.29	.000
Depression	45.49±0.51	32.75±0.79	3.41	.052
Finger movement	21.75±3.63	52.42±3.28	-5.87	.000

C. The process of changing the patient's breathing state

Figure 3 shows the process of changing the patient's breathing state. The degree of respiratory enhancement in the lung was observed for 25 days after applying information system between two groups.

The strength of the lung of patients has increased steadily since 5 days of the application of the information system in the experimental group than control group. However, after 10 and 20 days, patient' breathing state decreased slightly.

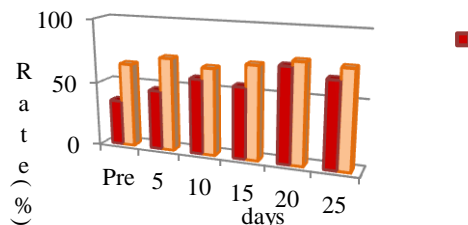


Fig. 3 The process of changing the patient's breathing state

D. Change of the patient's immune system of lung

The change of patients' immune system of lung shows in Figure 4. The patients' immunity system of lung has

improved from 30.6% to 50.1% due to mediation of the information system. In particular, it was confirmed that patients from 10 days after applying information system are effective in improving the immunity of lung.

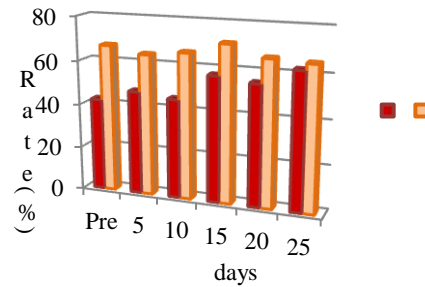


Fig. 4 Change of patients' immune system of lung

E. Change of the patient's immune system of lung

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IV. DISCUSSION

This paper is to analyze the new experimental analysis on advanced information system for strengthening the immunity of pneumonia patients. The experimental group showed a significantly higher rate in radish intake than control group. It was similar to the previous study that people who took a radish were less likely to get pneumonia[13],[14]. Strengthening the lung function through the aerobic exercise was improved after intervention rather than before the intervention. This was similar to studies showing that radish is effective for emphysema patients[15],[16]. Therefore, it is concluded that the application of advanced information system is effective.

On the other hand, physical immunity has increased significantly from 30.6% to 50.1%. Therefore, the information system is effective in relieving pneumonia. Advanced information system can be provided systematically by the establishment of a database containing clinical tests and their utilization methods. It is expected that the successful implementation of advanced information system will contribute to the establishment of information system infrastructure.

V. CONCLUSION

This paper is to analyze the new experimental analysis on advanced information system for strengthening the immunity of pneumonia patients. The results of this study are as follows. First, in terms of vitality, the control group's vitality was significantly better than the experimental group($X^2=2.17, p<.05$). Second, the mean score(52.47±1.72) of walking regularly after applying



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Therefore, it is expected that the successful implementation of advanced information system will contribute to the establishment of information system infrastructure.

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