

Effect of oral health education on PHP-M, dental health knowledge and the planned behavior theory variables among inpatients alcoholics.

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Abstract

This case-control study aimed to verify the effects of oral health education in terms of the changes between Patient hygiene performance index (PHP-M) and dental health knowledge and the planned behavior theory variables in inpatients alcoholics. A total of 32 patients at education group and 30 at non-education control group were recruited. The minimum score of PHP-M becomes 0, and the maximum score is 5. Theory of Planned Behavior (TPB) was composed of 5 articles, and was measured in the 5-point rating scale. Oral health education program was published by the Korean Dental Health Association. Dental health knowledge was presented in 10 questionnaires on a maximum of 10 points, by self-administered questionnaire systems. Independent-sample t tests, Repeated-sample t tests, Pearson's chi-square tests were applied for statistical analysis. The dental health education for alcoholics patients had effects on dental health behavior, PHP-M and dental health knowledge. Dental health behavior had an influence on behavior intention and perceived behavior control among planned behavior variables, and its influence was getting bigger through dental health education. Therefore it is necessary to try to develop and apply the dental health education program which can promote dental health through dental health education for subjects whose dental environments are poor and who have lower oral management ability.

Keywords: Oral health education, Inpatient alcoholics, Patient hygiene performance index, Dental health knowledge, Theory of planned behavior.

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Introduction

Korea is relatively tolerant of drinking culture, which is triggering alcohol abuse and alcoholism beyond heavy drinking, consequently leading into harmful effect and a lot of problems in physical, mental and social areas [1]. The moderate drinking has a positive effect on a coronary artery disease and a stroke, but heavy drinking becomes the cause of a chronic disease and damage [2]. 3.8% of the global death and 8.9% of domestic death are reported to be caused by drinking-related diseases or accidents [3]. Lately health has been recognized as an essential factor for human life and understood as a comprehensive concept, so that dental health which plays an important role in improving life quality has been regarded as important as part of health factors, together with physical health maintenance through normal food intake [4]. Dental caries and periodontal disease, which are most commonly occurring chronic diseases, are not naturally cured and are major dental health breakers [5]. Among reasons of adult

outpatient service are dental caries, ranking in the third, and other diseases including tooth and its support structure disorders coming in the 7th, which are taking the higher positions in the 10 major rankings [6].

Heavy drinking can cause gingivitis, glottal disorder, oral tissue problem, periodontal disease, oral cancer, etc., and can be the cause of carelessness of oral care; and as for a drinker, the occurrence of periodontal disease is higher than a non-drinker by 18~27%, and even small amount of alcohol is likely to increase the risk of periodontal illness [7]. The dental health education is necessary to improve the level of dental health by dental health practice. The dental health education helps a learner acquire knowledge and understanding of dental health, and change follow-up attitude and action, accordingly make it a habit [8]. Therefore, it is helpful to educate the learner by showing a learner the degree of dental plaque adhesion in the oral cavity and training them a proper toothbrushing in order to improve dental health [9]. Thus this study has purpose to

identify the dental health-related characteristics of hospitalized alcoholics patients, figure out the effect of dental health education, investigate influencing factors on dental health behavior by applying the theory of planned behavior model, and consequently provide basic data to develop dental health promotion programs which can induce dental health behaviors more effectively.

Materials and Methods

Subjects

The subjects of the study were 70 male alcoholics patients who understood the purpose of study and agreed participation in the study in the two clinics that allowed the study among alcohol treatment clinics in D area.

Research methods

For the study, the data collection and education of the subjects underwent their ethical consideration, so the approval (No. 12-05) was obtained from the Bioethics Committee of the Graduate School of Medicine of the Chungnam National University. The survey was conducted in the form of self-administered questionnaires by using the structured questionnaires after explaining the purpose of the study to the subjects, informing them of anonymity and confidentiality, and receiving the informed consent from the subjects who agreed the study, and the survey was conducted 2 times before and after the dental health education respectively.

Dental examination and factual survey were conducted by one dentist, one dental hygienist and four students of the Department of dental hygienics before the dental health education, and after the survey, patients who had been designated as the education group went through the dental health education and toothbrushing education four times at one-week interval at the appointed date with a clinic staff after the factual survey. Among designated clinics the education group and non-education group were chosen at each clinic, and the subjects were summoned through systematic sampling on ward-number basis.

Research tools

The theory of planned behavior was produced through modification and supplementation of the study tool that was developed by Han. This tool was composed of 5 articles, and was measured in the 5-point rating scale [10]. 1) Attitude toward the behavior: The higher measurement score by the study tool means a positive attitude in a dental health behavior. It is made up of 6 questionnaires, which are classified to 'good-bad,' 'helpful-harmful,' 'unpleasant-pleasant,' 'important-unimportant,' 'necessary-unnecessary.' [11] 2) Subjective norm: It consists of 4 questionnaires, classifying into the statements in which people 'think that I must brush my teeth,' 'expect that I will brush my tooth well,' 'think that I should have responsibility for my toothbrushing,' 'hope that I will brush my teeth well.' 3) Perceived behavioral control: It is made up of 4

questionnaires, stating that 'I can do it always,' 'It is an easy-difficult thing,' 'It depends on me whether to do or not to do,' 'It is me who decides on it.' regarding toothbrushing. 4) Behavioral intention: It composed of 4 questionnaires, stating, 'I am planning,' 'I will try to,' 'I decided to,' 'I will do well on,' regarding toothbrushing. 5) Oral health behavior: In the study, it is the basic method to prevent dental diseases, and it is the self-report result that the subject briefed of the number of toothbrushing periodically everyday for one week, focusing on practicable behaviors in daily life [12].

Dental examination

Patient hygiene performance index, PHP index: The subject teeth were 6 tooth surfaces, which were the buccal surfaces of the 1st bicuspid on the left and right sides of the upper jaw, the labial surfaces of the dental incisors on the right side of the upper jaw and the left side of the lower jaw, the lingual surfaces of the 1st molar teeth on the left and right sides of the lower jaw, and each tooth surfaces were divided into 5 parts. The dental plaque colorant was applied on the teeth, and after 30 seconds, the score was given according to the adhesion of the dental plaque colored on each parts. If all the subject teeth were colored, the maximum score is 30 points, and after dividing the points by the number of subject teeth, the minimum score of PHP-M becomes 0, and the maximum score is 5. The higher the points, the more the dental plaques, meaning that the dental health condition is bad [13].

Dental health knowledge

The knowledge of the dental health education contents was presented in 10 questionnaires on a maximum of 10 points, by self-administered questionnaire systems for the education group and non-education group respectively with the same questionnaires before and after the education. The contents of the questionnaires were composed of the structure of the teeth, the cause of periodontal diseases, cervical abrasion, dental caries, xerostomia, halitosis, oral auxiliary device, drinking-related oral diseases and fluoride

Dental health education program

The first-week program was composed of drinking and smoking hazard, the structure and function of teeth, two major oral diseases, dental plaque and toothbrushing; the second-week program was made up of other oral diseases such as oral cancer, cervical abrasion, xerostomia and halitosis; the third-week program was composed of the treatment method and materials after two major oral diseases, and denture insertion method and denture types; the fourth-week program was made up of fluoride, scaling and oral auxiliary device [14].

The education group is a treatment group, who was trained to individual toothbrushing after the dental health education, and the non-education group was provided no training. The dental health education was implemented with PPT, dental models and oral care products by dental hygienists, and the toothbrushing training was done by well-trained dental

hygienics students, who applied dental colorant by themselves, and provided one-on-one education. The education was implemented 4 times at one-week interval, and each time took around 40~50 min.

Data analysis

The mean and standard deviation of every variable before and after oral health education program were estimated, and the mean difference test was conducted with independent t-test and a paired t-test. Statistical significance level is $p < 0.05$.

Table 1. Homogeneity of subjects; Unit: Numbers (%).

Variables	Total	Oral health education		p-value
		Education group	Control group	
Age				
≤ 39	14 (22.5)	6 (18.8)	8 (26.7)	0.579
40-49	15 (24.2)	10 (31.3)	5 (16.7)	
50-59	20 (32.3)	10 (31.3)	10 (33.3)	
60 ≤	13 (21.0)	6 (18.8)	7 (23.3)	
Educational level				
<High school	30 (48.4)	16 (50.0)	14 (46.7)	0.793
High school ≤	32 (51.6)	16 (50.0)	16 (53.3)	
Economic status				
Health insurance	33 (53.2)	18 (56.3)	15 (50.0)	0.622
Welfare recipients	29 (46.8)	14 (43.8)	15 (50.0)	
Smoking experience				
Yes	60 (96.8)	30 (93.8)	30 (100.0)	0.164
No	2 (3.2)	2 (6.3)	0 (0.0)	
Drinking period (year)				
≤ 10	3 (4.8)	1 (3.1)	2 (6.7)	0.944
43059	15 (24.2)	8 (25.0)	7 (23.3)	
21-30	17 (27.4)	9 (28.1)	8 (26.7)	
31-40	14 (22.6)	8 (25.0)	6 (20.0)	
41 ≤	13 (21.0)	6 (18.8)	7 (23.3)	
Total	62 (100.0)	32 (100.0)	30 (100.0)	

Effects of oral health education

As for the PHP index for evaluating the dental plaque management performance, the education group and the non-education group showed similar scores by 3.44 ± 0.69 and 3.52 ± 0.64 respectively before education, but two groups showed lower scores by 1.87 ± 0.59 and 3.21 ± 0.62 respectively after education, displaying lower scores in the education group. In the difference between before and after dental health education, the education group showed 1.57 ± 0.61 and the non-education group showed 0.30 ± 0.52 , displaying a significant decrease in

Results

Homogeneity of subjects

The education and non-education group have no differences in demographic characteristics and drinking-related characteristics (Table 1).

the PHP index. As for the dental health-related knowledge, the education group showed 2.16 ± 1.48 and the non-education group showed 1.90 ± 1.67 , presenting virtually similar scores, but the education group marked 7.72 ± 1.28 and the non-education group marked 3.06 ± 1.55 , showing that the education group displayed higher scores. In the difference between before and after the dental health education, the education showed 5.56 ± 1.36 and the non-education group 1.93 ± 1.08 respectively, presenting a significant increase. In order to evaluate the effect of dental health education, age was

corrected and the changes of variables which had been used in TPB were compared. Regarding the dental health behavior which was measured by the one-day average toothbrushing time in one week, the education group showed 2.14 ± 0.89 times and the non-education group showed 1.65 ± 0.91 times before education, but 3.80 ± 0.31 in the education group and 2.26 ± 0.84 in the non-education group, displaying higher times in 'the education group' and in 'after education,' and in regard to the difference between before and after the implementation of the dental health education, both the education group and the non-education group showed the significant increases by 1.36 ± 1.11 times and 0.60 ± 1.23 times respectively.

As for behavior intention, the education group and the non-education group showed similar scores by 2.79 ± 0.62 and 2.59 ± 0.49 before education, but the education group marked 4.80 ± 0.39 and the non-education group marked 3.45 ± 0.34 after education, showing higher scores in the education group. Regarding the difference between before and after the implementation of the dental health education, the education group and the non-education group showed significant

increases by 2.00 ± 0.70 scores and 0.86 ± 0.34 scores respectively. The attitude toward behavior was similar between the education group and the non-education group before education, but after education, the education group marked 4.78 ± 0.40 and the non-education group marked 4.03 ± 0.36 , showing higher scores in 'after education' and in 'the education group.' In the difference between 'before' and 'after,' the education group showed a significant increase by 1.27 ± 0.63 and the non-education group showed by 0.56 ± 0.29 . Subjective norm displayed higher scores in the non-education group before education, but higher scores in the education group after education. The education group and the non-education group showed significantly different increases by 1.76 ± 0.91 and 0.44 ± 0.32 respectively between before and after education. The perceived behavior control appeared to be higher in the non-education group before education, but higher in the education group after education. The education group and the non-education group showed significantly increasing differences by 1.94 ± 0.93 and 0.48 ± 0.35 respectively before and after education (Tables 2 and 3).

Table 2. Comparison of PHP and knowledge of oral health education before and after: after adjusting for age; Unit: Mean \pm SD.

Variables		Oral health education		Difference	p-value
		Before	After		
Patient hygiene performance	Education group	3.44 \pm 0.69	1.87 \pm 0.59	-1.57 \pm 0.61	0.000*
	Control group	3.52 \pm 0.64	3.21 \pm 0.62	-0.30 \pm 0.52	
Oral health knowledge	Education group	2.16 \pm 1.48	7.72 \pm 1.28	5.56 \pm 1.36	0.000*
	Control group	1.90 \pm 1.67	3.06 \pm 1.55	1.93 \pm 1.08	

Table 3. Comparison of TPB variables of oral health education before and after: after adjusting for age; Unit: Mean \pm SD.

Variables		Oral health education		Difference	p-value
		Before	After		
Oral health behavior	Education group	2.14 \pm 0.89	3.80 \pm 0.31	1.36 \pm 1.11	0.014*
	Control group	1.65 \pm 0.91	2.26 \pm 0.84	0.60 \pm 1.23	
Behavioral intention	Education group	2.79 \pm 0.62	4.80 \pm 0.39	2.00 \pm 0.70	0.000*
	Control group	2.59 \pm 0.49	3.45 \pm 0.34	0.86 \pm 0.34	
Attitude toward the behavior	Education group	3.50 \pm 0.49	4.78 \pm 0.40	1.27 \pm 0.63	0.000*
	Control group	3.47 \pm 0.35	4.03 \pm 0.36	0.56 \pm 0.29	
Subjective norm	Education group	2.86 \pm 0.76	4.63 \pm 0.47	1.76 \pm 0.91	0.000*
	Control group	3.05 \pm 0.46	3.49 \pm 0.45	0.44 \pm 0.32	
Perceived behavioral control	Education group	2.80 \pm 0.84	4.75 \pm 0.38	1.94 \pm 0.93	0.000*
	Control group	3.01 \pm 0.76	3.50 \pm 0.51	0.48 \pm 0.35	

Discussion

The changes between PHP-M and dental health knowledge after age correction in this study show a great effect of oral

health education. Jang also reported that conducting dental health education for middle-aged women in a lifelong learning facility had a positive effect on increasing dental health knowledge [15]. In a study on ship-building company workers,

Kim and others reported that workers with the dental health education had higher dental health knowledge than workers without the education, which was similar to the results of this study [16]. Checking for the effect of planned behavior theory variables, after the education, these increases showed that dental health education had a positive effect on the ability and fulfillment of dental health behavior by changing all TPB variables measured. In this study, the reduction of 1.57 points was done by 4 times of the repeated education and conducting private lessons for toothbrushing. A few reductions were reported by researchers. Kim made a reduction of 1.31 points by 4 times of the repeated education [17], Jeon, 1.7 points by 2 times of the repeated education [18], Han, 0.88 points by 2 times of the repeated education [10], and Lee, 0.3 points by one-time education [19]. In another study by Cho, who used the dental plaque examination. After four times of the education for toothbrushing, dental plaque removal improved as the number of educations for toothbrushing increased [20]. It was considered that as repeated educations increased, Modified Patient Hygiene Performance Management improved.

This study produced the research results by selecting patients who were hospitalized in local alcoholic hospitals, so it has a limit to generalize the study output. In addition, it is considerable to apply various methods including observation method, not using paper surveys to evaluate dental health behavior correctly. It is reported that the dental plaque management education is relatively effective to perform the second education 3 weeks after the first education, and the third education 2 months after the second education [12], but this study implemented 4-time dental health education programs for 4 weeks, and measured their effects immediately after the education, so their short-term effects were found, but faced a limit that patients' condition after the completion of programs and frequent discharges from hospital made it impossible to observe subjects' practices and regression phenomenon. Therefore, a systematic dental health education program should be developed in order to measure long-term effects, such as 3 months, 6 months, etc.

Conclusion

Consequently the dental health education for alcoholic patients had effects on dental health behavior, PHP-M and dental health knowledge. Dental health behavior had an influence on behavior intention and perceived behavior control among planned behavior variables, and its influence was getting bigger through dental health education. Therefore it is necessary to try to develop and apply the dental health education program which can promote dental health through dental health education for subjects whose dental environments are poor and who have lower oral management ability.

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