

# Effectiveness of Web-Based Multimedia Health Education Program on Maternal Role Strain, Role Attainment and Postpartum Depression

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## Summary

Information technology offers an innovative tool for effective and efficient maternal and child health education. The objective of this study was to evaluate a web-based maternal education program developed for mothers in the postpartum period to provide more information on maternal role strain and help enhance mothering skills. A quasi-experimental design was used. The target population was primipara mothers who use the Internet on a regular basis. The primipara mothers were assigned to either control group or experimental group. Mothers who received web-based education showed a higher mean maternal role attainment score and less role strain. Meanwhile, the web-based education program had no significant effect to relieve postpartum depression. Results suggest that web-based education may contribute to improved maternal role attainment and relieve role strain. Web-based education program can achieve success in promoting maternal role attainment and provide health professionals with an evidence-based intervention.

## Key words:

*Information Systems, Internet, Maternal Health*

## 1. Introduction

Recent changes in Korean social environments consequently dropped total fertility rate. Moreover, poor interpersonal relationships in local communities have aggravated the environments for childbirth and child-rearing. Pregnancy and childbirth have an enormous impact on the physical, mental, emotional, and socioeconomic health of women and their families [1]. Parenting interventions that provide education and training in proper parenting skills are designed to help parents strengthen relationships with their children, develop better ways of dealing with difficult behavior, and assist parents develop skills to help them in the demanding task of parenting [2]. Over recent years such interventions have come to be seen as solutions to a range of child health and social problems [3].

In effect, maternal education, which prove to be effective in maternal role attainment and reducing

postpartum depression were produced in various forms such as books, CD-ROMs, television programs, and videotapes.

In recent years, together with the widespread use of the Internet, web-based maternal health care have vastly been offered as well. Web-based interventions may be the most cost-effective and efficient option to manage maternal health management [4]. NIH asserted that NIH or another appropriate Federal agency should establish and maintain a web site to provide up-to-date information on the benefits and risks of all modes of delivery [5]. However, currently available web-based maternal health information systems are generally westernized and do not adhere to Korean society. As the Internet continues to grow as a delivery medium for health information, designing effective web sites are becoming essentially important.

Hence, the author had previously developed an open web-based maternal health information system (URL: <http://www.baejy.com/im>) designed for maternal health promotion for the general public. Feedback support system was also incorporated. Since 2005, the web-site has been continuously providing free maternal health services for Koreans. Accordingly, the next phase is to evaluate the effectiveness of this web intervention as revisions will be done through further research results for the enhancement of the program. The purpose of this paper was to examine the effectiveness of a web-based multimedia health education program on maternal role strain, role attainment and postpartum depression.

## 2. Methodology

### 2.1 Research design

To evaluate the effects of the web-based intervention for maternal health education, the non-equivalent control group pretest-posttest design was used.

## 2.2 Sample

Thirty eight primiparas participated in this study. All participants were randomly assigned to either the control (n=19) or the experimental group (n=18).

## 2.3 Intervention Program

All participants engaged in an 8-week program to test the effectiveness of the intervention and their general characteristics were laid out in Table 1. The program began on July 2008 and ended August of the same year. Postpartum depression, maternal role attainment and strain scores were measured before the program began and after the program ended.

The subjects in the experimental group were trained through the web-based health information service system.

The system consisted of the following contents: introduction, pregnancy test, fetal assessment, maternal and fetal development during pregnancy, maternal self-care methods, complications of pregnancy, complications of postpartum period, information for parenting, father's page, self-help groups, FAQ, counseling and resource links. The web site was released using the URL: <http://www.baeyj.com/im> (Figure 1). They accessed the website three days a week and at least one hour per day.

The control group, on the other hand, was prohibited to access the site for the entire 8-week duration. Instead, they were to use, freely, other generally available websites.

All subjects were supervised by IP address monitoring to know when and how long they accessed the website and its specific contents.

## 2.4 Measurement

The main outcome measures were 1) mothers' characteristics including age and self-report depression scores and 2) symptom change measures depression scores. Postpartum depressions were measured using the

postpartum depression scale [6], maternal role strain was measured by the Steffensmeier's maternal role strain [7], and maternal role attainment was measured by Walker's maternal role attainment [8].



Fig. 2 Postpartum exercises page

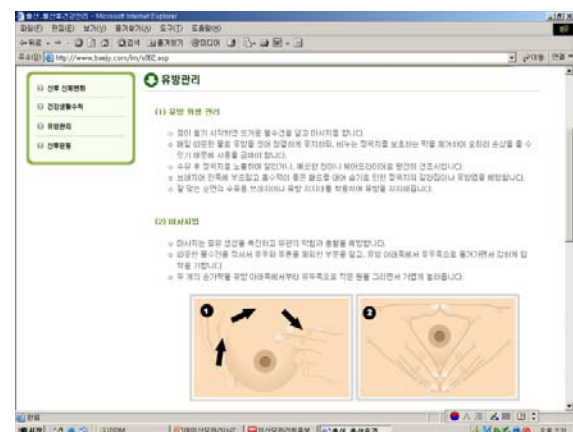


Fig. 3 Breast care for preparation of newborn-feeding during postpartum



Fig. 4 Page on newborn care: maternal-child interaction



Fig. 1 Main menu page of maternal health information service system

Both postpartum depression and maternal role strain were assessed by separate 20-item, self-report questionnaires where answers were represented in a 4-point Likert scale with numbers 1(not at all), 2(rarely), 3(sometimes), and 4(always). Higher scores in both scales mean severe degree of depression and strain. Internal consistency coefficient Cronbach's alpha was 0.95 for postpartum depression and 0.90 for maternal role strain.

Maternal role attainment scale is a self-report questionnaire that includes 11 items. It is a 5-point Likert scale, where higher score represents a higher degree of role attainment. Cronbach's alpha was 0.87.

### 2.5 Statistical analysis

Data were analyzed with SPSS/WIN 14.0. Independent t-test determined the homogeneity of baseline characteristics and outcome characteristics between the experimental group and the control group. Paired t-test compared group differences on study outcomes during the pre-test and post-test measures.

## 3. Results

### 3.1 Subjects' baseline and outcome characteristics

The characteristics of both the experimental and the control group were presented in Table 1. Most participants were in their 20s, without religion, attained high education, claiming to be either healthy, with current physical disease or have never had any history of disease.

In Table 2, outcome characteristics showed that the mean maternal role strain scores of the pre-test were  $46.66 \pm 8.81$  for the experimental group and  $46.73 \pm 7.48$  for the control group. As for maternal role attainment scores, pre-test means were  $36.22 \pm 5.38$  (experimental) and  $36.47 \pm 5.13$  (control). And pre-test postpartum depression scores were  $40.11 \pm 6.75$  (experimental) and  $41.37 \pm 6.03$  (control). Moreover, there were no significant differences between the experimental and control groups with regard to maternal role strain ( $t=0.01$ ,  $p=.979$ ), maternal role attainment ( $t=0.02$ ,  $p=.885$ ), postpartum depression ( $t=0.35$ ,  $p=.554$ ).

### 3.2 Effects on depressive symptoms

After the 8-week period of intervention, participants showed a significant decrease in their maternal role strain and improved maternal role attainment. The maternal role strain scores of the experimental group and the control group after undertaking the program were  $42.50 \pm 8.81$  and

Table 1: General characteristics.

Characteristics		Frequency (%)	
		Experiment al Group (n=18)	Control Group (n=19)
Age	20~24	3(16.7%)	4(21.1%)
	25~30	10(55.6%)	9(47.4%)
	31~35	5(27.8%)	6(31.6%)
Educational attainment	Highschool	6(33.3%)	4(21.1%)
	Above College	12(66.7%)	15(78.9%)
Religion	Catholic	2(11.1%)	2(10.5%)
	Christian	4(22.2%)	4(21.1%)
	Buddhism	3(16.7%)	5(26.3%)
	None	9(50.0%)	8(42.1%)
Monthly income (10,000 won)	99 or less	1 ( 5.6%)	2(10.5%)
	100~199	5(27.8%)	5(26.3%)
	200~299	7(38.9%)	9(47.4%)
	300 or more	5(27.8%)	3(15.8%)
Health status	Healthy	15(83.3%)	15(78.9%)
	Unhealthy	3(16.7%)	4(21.1%)
Depression History	Past	2(11.1%)	2(10.5%)
	Present	1( 5.6%)	2(10.5%)
	Never	15(83.3%)	15(78.9%)

Table 2: Outcome characteristic.

Score	Experimental Group	Control Group	t	p
	Mean $\pm$ SD	Mean $\pm$ SD		
Maternal role strain	$46.66 \pm 8.81$	$46.73 \pm 7.48$	0.01	.979
Maternal role attainment	$36.22 \pm 5.38$	$36.47 \pm 5.13$	0.02	.885
Postpartum depression	$40.11 \pm 6.75$	$41.37 \pm 6.03$	0.35	.554

$46.15 \pm 6.22$ , respectively. There was a 4.16 point decrease after application of the intervention in the experimental group. On the other hand, in the control group, there was only a 0.57 point decrease. The maternal role attainment scores of the experimental group and the control group after undertaking the program were  $39.22 \pm 6.76$  and  $37.42 \pm 4.69$ , respectively. There was a 3.00 point increase after application of the intervention in the experimental group. On the other hand, in the control group, there was only a 0.94 point decrease. Seemingly, the web-based intervention was proven to be effective in managing maternal role strain and improving maternal role attainment in both groups. One the other hand, there is no significant differences were observed between the two groups as to postpartum depression (Table 3).

Table 3: Comparison of depression scores between the experimental and control group.

Variables	Group	Pre-test	Post-test	Difference	t	p
		Mean±SD	Mean±SD			
Maternal role strain	Experimental	46.66±8.81	42.50± 8.81	4.16±4.98	8.14	.007**
	Control	46.73±7.48	46.15±6.22	0.57±2.21		
Maternal role attainment	Experimental	36.22±5.38	39.22± 6.76	-3.00±3.14	5.34	.027*
	Control	36.47±5.13	37.42±4.69	-0.94±2.19		
Postpartum depression	Experimental	40.11±6.75	38.61± 6.98	1.50±2.45	0.21	.644
	Control	41.37±6.03	39.47±7.02	1.89±2.68		

#### 4. Conclusion

Access to the rapidly increasing store of web-based information is essential for effective public health practice including maternal and child health. Computer-mediated communication has the potential to offer educational support to remote clients. In Japan, a bulletin board system (BBS) has been created and incorporated in a maternity hospital's web-site to set up a community for its patients and serve as a means of communication regarding childbirth and the like [9]. Larsson [10] reported that most (91%) Swedish pregnant women often use the Internet to find information on various topics related to pregnancy, childbirth and the expected baby. Through this research, Larsson asserted that antenatal care providers should be able to guide pregnant women to high-quality, web-based information and then take the opportunity to discuss this information with them during antenatal visits.

The general population's increasing needs of online maternal education in Korea is due to the ongoing evolution in social environment. To address these needs, the author developed a website program that is used as a strategic means for delivering management interventions. Accordingly, the present study evaluated the effectiveness of this web-based educational program for primipara mothers.

Relatively consistent with previous studies [11]-[13], the present investigatory research discovered that an internet-based intervention strategy may produce a positive effect for reducing maternal role strain and promote maternal role attainment. It was proven that a web-based maternal educational program provided appropriate support to primiparas and was effective in promoting their maternal role attainment.

According to the International Telecommunication

Union (ITU), Korea has the highest rate of computer usage within homes worldwide (78.7%) [14]. Therefore, this study suggests that a web-based maternal educational program can become a powerful intervention on virtually all mother and infant health concerns. This program can also be used as a basis or resource material by health educators who are in need of a program inclined to promote maternal health.

Many Koreans can utilize this website since it has been submitted for indexing to NAVER, one of Korea's top ten search engines. At present, a total of 95,602 people had visited and accessed the site. The strength of this project lies on the continuous open-service that it provides the public. Its increasing popularity and tested effectiveness contribute not only to promote maternal health, but also to aid future studies that could be developed in other cultures through this innovative and beneficial concept.

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