

# Factors Affecting Low Back Pain during Breastfeeding of Thai Women

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**Abstract**— Breastfeeding has been receiving much attention of late. Prolonged sitting for breastfeeding often results in back pain of the mothers. This paper reports the findings of a study on the effect of some factors, especially lumbar support, on back pain of breastfeeding mothers. The results showed that the use of lumbar support can reduce back pain of breastfeeding mothers significantly. Back pain was found to increase with breastfeeding time and the rate of increase was lower when lumbar supports were used. When lumbar support thickness was increased gradually from zero (no support) to 11 cm., the degree of low back pain decreased; rapidly at first, then slowly, and leveled off when the thickness reached 9 cm. Younger mothers were less prone to back pain than older mothers. The implications of the findings are discussed.

**Keywords**—back pain, breastfeeding, lumbar support

## I. INTRODUCTION

THE importance of breastfeeding has been increasingly recognized in recent years. The National Immunization Survey (NIS) in the United States of America (USA) reported that the number of infants born during 1999-2006 who were breastfed was increasing. One reason for the increase was thought to be due to better education of the mothers [1]. Data from the World Health Organization and UNICEF suggested that breast milk is the best food and the best source of nutrients for infants for the first 6 months of their lives [2]. Breast milk comprises various nutrients, hormones, and free radicals necessary for infants to build up immune systems which would enable them to grow up well. Breastfeeding also helps save milk powder cost and medical expenses for treatments of illness caused by immune deficiency. In Thailand, there are several projects initiated by government bodies to promote breastfeeding through the establishments of foundations, clinics, and breastfeeding centres that provide knowledge and advice on breastfeeding [2]. From one of the authors' experience (N.K) and interviews with other breastfeeding mothers, it was found that sitting down for a long period of time breastfeeding babies can cause a good deal of ache and pain; low back pain, neck and shoulder pain, thigh pain.

Understanding factors affecting low back pain so that measures can be taken to reduce the pain would clearly be beneficial to breastfeeding mothers, and would encourage the mothers-to-be to breast feed their infants. Back pain can result from internal factors such as disc degeneration, sprains or strain, and external factors such as gender, age, and

occupation [3]. Beach et al. studied the effects of prolonged sitting on the passive flexion stiffness and found that male showed increasing lumbar spine stiffness after sitting for 1 hour while female showed such increase after 2 hours[4]. The most frequent cause of back pain is degenerated spine manifested in muscle strain, normally found in persons who excessively or improperly use back muscle. Study on back pain showed that 21% resulted from sitting postures [5]. Sitting in bending postures results in bending of spine [6] causing muscle more strain due to increased pressure on disc, which ultimately lead to fatigue and discomfort [4]. To minimize back pain resulted from prolonged sitting, it is necessary to avoid sitting postures that cause bending of the back. Bendix found that, for writing and reading, there was no difference in the pressures between flat back chair and the chair with 7 cm support [7]. Williams and colleagues found that application of lumbar roll support with 13 cm thickness in fact caused back pain [8].

A study by Steven indicated that, for typists and those who work with computers, 3 cm support thickness was more comfortable than supports having 6 and 9 cm. thickness [9]. Anderson found that bad sitting posture could cause backward rotation of pelvis and suggested that degeneration of lumbar could be prevented or ameliorated by using a well-designed low-back support [10].

Low back pain resulting from breastfeeding has not been systematically investigated. This study aims to explore various factors the influence low back pain in breastfeeding mothers. Specific variables to be investigated are; lumbar support thickness, feeding time, and age of the mothers. The knowledge from this research will be very useful for designing and developing ergonomic chair that are more comfortable and suitable for breastfeeding mothers.

## II. METHODOLOGY

### A. Participants

The participants in this study were all Thai women. All of the 12 subjects had breastfeeding experience. The participants were ordinary people leading normal lives and having no serious health problems or other medical complications such as serious accidents or chronic diseases. Personal details of the subjects are summarized in Table 1.

### B. Protocol

The research started with interviewing the subjects to gather relevant information. These include the number of children they have, breastfeeding periods, and durations, personal experience during breastfeeding, age, occupation etc. They were then measured for their weights and heights.

The low back pain in this study was measured indirectly by electromyographic method. The equipment used in this study was ME3000P4 MEGA with 2 signal channels (Mega electronics Ltd. Kuopio, Finland), and software version 2.3 was used for data analysis.

TABLE I  
PERSONAL DETAILS OF THE SUBJECTS

Subjects No.	Age (year)	Weight (kg)	Height (cm)	Occupation
1	32	58	150	Weaving factory
2	24	41	150	Housewife
3	27	45	164	Weaving factory
4	24	54	150	Weaving factory
5	32	43	150	Weaving factory
6	30	48	150	Casual workers
7	28	56	163	Automobile assembly
8	28	46	160	Weaving factory
9	22	54	155	Casual workers
10	32	45	161	Automobile assembly
11	28	55	166	Automobile assembly
12	24	40	154	Housewife
mean	27.58	48.75	155.25	

The skin corresponding to the lumbar area of each subject was first cleaned using cotton with alcohol. When the skin was dry, two surface electrodes (Blue Sensor P-00-S) were placed at L3 area, one on each side of the spine, and 3 cm from midline of the spine. The low back pain of the subjects were measured in terms of percentage maximum voluntary contraction (MVC), the unit of which was in microvolts.

After the personal resistances of individual subject were measured, each subject was instructed to carry a baby doll and sit on an adjustable chair in the breastfeeding posture as shown in Fig. 1.

The chair can be adjusted to have supports of different thicknesses ranging from zero (representing no support), 3, 5, 7, 9 and 11 cm. All the supports were made from polyurethane foam.

The length of time used in measuring MVC for each thickness was 90 minutes with 15 minutes breaks between different measurements. Behaviors of the subjects such as body movements, facial expressions were observed and recorded during the experiment.

All the subjects were finally asked the questions regarding comfort or discomfort during the experiment, and general feeling about the experience, when different thickness of the support were used.



Fig. 1 Sitting posture of the subjects.

### III. RESULTS

#### A. Effect of breastfeeding time on MVC

The effect of breastfeeding time on MVC is as shown in Fig. 2. The results showed that as the length of breastfeeding time increased, the MVC values increased. The rate of increase, however, differ when sitting on the chair with and without lumbar supports. The rate of increase in MVC values are higher when sitting on the chair without support compared with those with support. When the 9 cm. thick support was used, MVC values increased only slightly with time.

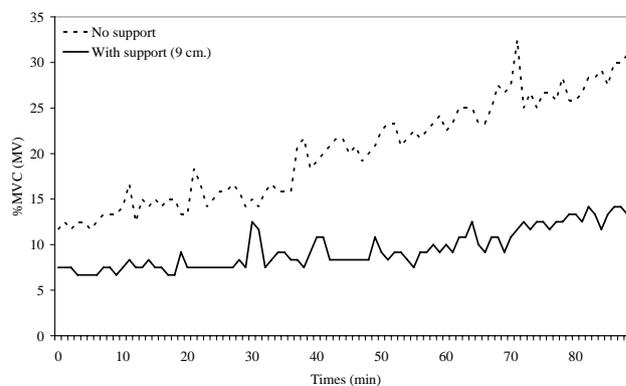


Fig. 2 The effect of breastfeeding time on MVC

#### B. Effect of lumbar support thickness on MVC

The effect of lumbar support thickness on MVC are as shown in Fig. 3. The results showed that MVC values lowered significantly when the support were used. As the thickness of the supports was increased from zero (no support) to 11 cm, the MVC values were reduced from about 32 to 21 and 30 to 14, for left hand side and right hand side, respectively. The MVC values leveled off at about 9 cm support thickness. It can be concluded from this observation that the MVC values decreased with increasing lumbar support thickness and that the optimum support thickness is about 9 cm.

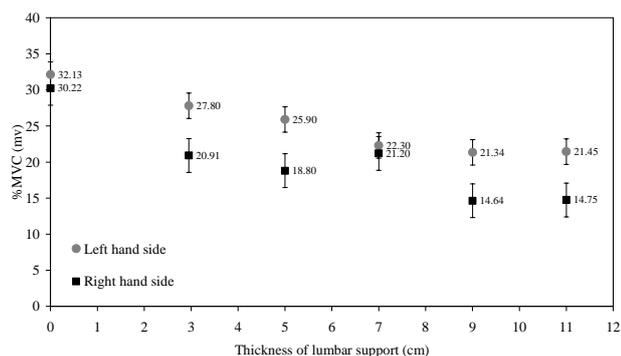


Fig. 3 The effect of lumbar support thickness on MVC

### C. Effect of age of subject on MVC

The effect of the age of participants on MVC is as shown in Fig. 4. The results indicated that the older the subjects, the higher the MVC values, both in the cases of sitting on the chairs with and without lumbar supports. It is interesting to note that the MVC values for 22-year-old participants were higher than those of 24-year-olds. The anomaly might be due to other factors other than age.

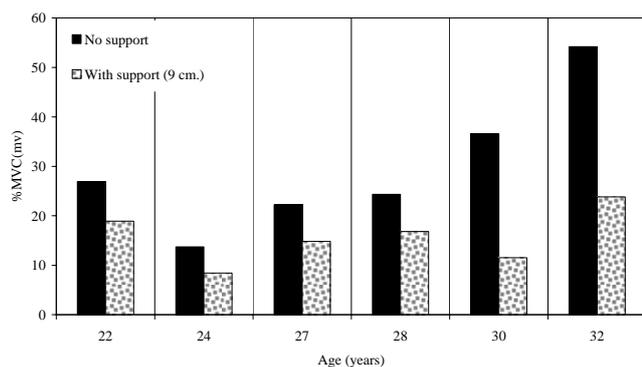


Fig. 4 The effect of ages on MVC

The post experiment interviews revealed that most of the subjects (57%) felt most comfortable when the chair had supports with thickness of 9-11 cm. Some participants (20%) felt that 7 cm support thickness was the most comfortable while 14% felt 5 cm thickness was the best. All participants agreed that the chair with lumbar support was more comfortable than that without support.

## IV. DISCUSSION

The increase in the value of MVC with breastfeeding time is to be expected. As the participants sat in the breastfeeding posture for longer period of time, their muscles had to endure greater strain leading to more back pain and corresponding increasing MVC values. The finding is in agreement with previous work by Williams [11]. It is interesting to note that the rate of increase in back pain differs significantly between sitting in the chair with and without lumbar support. The benefits of lumbar support to breastfeeding mothers are clearly evident.

Increasing support thickness resulted in decreasing MVC values. This is because the support reduced the bending of the spine thus reducing the strain in the low back region. And the greater the thickness of the support, the greater the 'reduction' effect. MVC values lowered comparatively rapidly when support thickness was increased from zero (no support) to 3 and 5 cm. This means that even a small support thickness is beneficial. The leveling off of MVC values at 9 cm support thickness suggested that this thickness is the most suitable for breastfeeding. The results are different from those of Steven and colleagues in their study of back pains of office workers.

Younger subjects showed less back pain than older ones. The result agreed with a study by Grimmer and Williams who found that older persons were more likely to have greater back pain than younger people due to greater disc degeneration. Long time weight bearing results in more back pain in older persons than in younger ones [3].

This study allows us to understand that the use of lumbar support with certain thickness can reduce back pain resulting from breastfeeding. The findings can be used as a guideline for design and development ergonomics chairs for breastfeeding activity. Properly designed chairs can ameliorate bodily fatigue and pain problems, especially low back pain, and keep breastfeeding mothers relaxed which would facilitate breast milk production and breastfeeding as a whole.

## V. CONCLUSIONS

The follow conclusions may be drawn from the present study;

- 1). Sitting in breastfeeding postures for a long time results in back pain. The longer the time, the greater the pain.
- 2). Sitting on the chairs with no lumbar support results in more back pain than sitting on the chairs with support. Increasing support thickness from zero (no support) to 11 cm results in decreasing back pain. The optimum value of the support thickness from this study is 9 cm.
- 3). Younger mothers experienced less back pain than older ones.
- 4). The findings can be used in the design and development of ergonomic chairs specifically for breastfeeding mothers.

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