Abstract of the thesis entitled

An Evidence-based Guideline of Using Acupressure
to Reduce Labour Pain

Submitted by

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Labour is the bringing of new life, with pain as an inevitable part of the process. Regarding the adverse effects of conventional pharmacological pain relief methods, non-pharmacological interventions appear to be safer in contrast. Nevertheless, alternative therapies currently available are inadequate, a new intervention which could reduce clients' labour pain effectively and economically should be introduced.

Acupressure, performed by applying pressure on acupoint, has been reported to reduce labour pain in studies. There is a potential to adopt acupressure into clinical setting. As there is no existing guidelines to support the innovation, systematic review on currently available studies were done.
This dissertation aims to review the up-to-date literature, estimate implementation potential, and develop an evidence-based guideline of using acupressure to reduce labour pain of primigravida women.

Six randomised controlled trial studies were identified from electronic databases including PubMed and CINAHL. They were critically appraised and five are of high or acceptable quality, all reported that acupressure has a positive effect in reducing labour pain.

To ease the implementation of acupressure, clinical guidelines on basis of these studies were developed. Moreover, a pilot study would be conducted to test the feasibility of the implementation. Evaluation would be taken to assess whether the objectives are met. Guidelines would be refined before full implementation of acupressure. Client’s labour pain intensity and satisfaction, staff satisfaction towards the implementation of acupressure, and overall expenditure would be taken into account for the effectiveness of using acupressure to reduce labour pain.

The proposed acupressure is recommended to be adopted in clinical setting to reduce labour pain.
An Evidence-based Guideline of Using Acupressure

to Reduce Labour Pain

by

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A thesis submitted in partial fulfillment of the requirements for

the Degree of Master of Nursing

at the University of Hong Kong.

July, 2015
DECLARATION

I declare that this dissertation represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualifications.

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Lam, Kit Wa

July 2015
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CONTENTS

Declaration ........................................................................................................... i
Acknowledgements .............................................................................................. ii
Table of Contents .................................................................................................. iii
List of Appendices ................................................................................................ v

CHAPTER 1: INTRODUCTION

1.1 Background .................................................................................................... 1
1.2 Affirming the need ......................................................................................... 3
1.3 Objectives and significance .......................................................................... 7

CHAPTER 2: CRITICAL APPRAISAL

2.1 Search Strategies ........................................................................................... 9
  2.1.1 Identification of studies
  2.1.2 Selection Criteria
  2.1.3 Data Extraction
  2.1.4 Appraisal Strategies
2.2 Results .......................................................................................................... 11
  2.2.1 Search Results
  2.2.2 Study Characteristics
  2.2.3 Methodology Quality Assessment
2.3 Summary and Synthesis ................................................................................ 18

CHAPTER 3: TRANSLATION AND APPLICATION

3.1 Implementation Potential .............................................................................. 26
  3.1.1 Transferability of the findings
  3.1.2 Target Population
  3.1.3 Feasibility
  3.1.4 Cost/ Benefit ratio of the innovation
3.2 Evidence-Based Practice Guideline ............................................................... 36

CHAPTER 4: IMPLEMENTATION PLAN

4.1 Communication Plan ...................................................................................... 37
  4.1.1 Identification of stakeholders
  4.1.2 Communication plan and strategies
4.2 Pilot Study Plan ............................................................................................... 41
4.3 Evaluation Plan

4.3.1 Identifying Outcomes
4.3.2 Nature of clients
4.3.3 Design of Outcome Measurements
4.3.4 Sample Size
4.3.5 Data Analysis

CHAPTER 5: CONCLUSION

APPENDICES
REFERENCES
# LIST OF APPENDICES

**Appendix 1**
Table of Evidence

**Appendix 2**
SIGNS Methodology Checklist

**Appendix 3**
Quality Assessment for individual study

**Appendix 4**
Set-up costs of implementing the acupressure to labouring women

**Appendix 5**
Operational costs for implementing the innovation (3-month period)

**Appendix 6**
Evidence-based guideline

**Appendix 7**
Evaluation form of using acupressure to reduce labour pain

**Appendix 8**
Questionnaire on using acupressure to reduce labour pain

**Appendix 9**
Questionnaires of feedback on acupressure implementation by staff
CHAPTER 1: INTRODUCTION

1.1 Background

In 2012, the crude birth rate in Hong Kong was 12.3 per 1,000 population. That was approximately 90,000 births a year.

Pain is an inevitable part of labour process (Abushaikha & Oweis, 2005). The experience of labor pain is a complex, subjective, multidimensional response to sensory stimuli generated during parturition (Lowe, 2002). Unlike other acute and chronic pain experiences, labor pain is not associated with pathology but with the most basic and fundamental of life’s experiences—the bringing forth of new life (Lowe, 2002). Moreover, labour pain is of highest severity when compared to other experiences of pain (Lally et al., 2008).

According to Zwelling & Johnson (2006), the pain that women experienced during labour and birth is subjective, individualized, and caused by a number of interrelating factors. Physical, affective, psychosocial, and environmental factors all shape the pain experience. Several related pain theories, including the gate control, neuromatrix, sensory discriminative system (mechanoreceptors, chemoreceptors, and thermoreceptors), and the influence of endorphins can explain how to decrease pain in labor (Han, 2004; Trout, 2004).
Pain threshold varies from individuals. But labour pain leads to maternal suffering and can be traumatic to women. A negative birth experience is associated with fear of childbirth (Melender, 2002; Nilsson et al., 2012), higher risk of postpartum depression and depressive mood in subsequent pregnancy (Rubertsson et al., 2003; Eisenach et al., 2008; Gaudet et al., 2013; Kwok et al., 2015). Therefore, labour pain management is an important issue among women and caregivers.

Labour pain can be explained by several theories, which include the gate control theory and neuromatrix theory.

Gate control theory

The gate control theory forced the medical and biological sciences to accept the brain as an active system that filters, selects and modulates inputs (Melzack, 2001). It was a major advance in recognizing the contribution of the brain not only to the ultimate perception of pain, but also to the nature of pain itself.

The original gate control concept introduced by Melzack & Wall developed in 1967, was most widely used and accepted. It described that if impulse transmission is sufficiently inhibited at the level of the spinal cord, perception of pain would be blocked. However, Melzack (2001) states that the theory fails to account for the perception of the body “as a unity".
Neuromatrix theory

The gate control theory is incorporated and reconceptualised as the neuromatrix theory. Neuromatrix refers to parallel and cyclic processing loops in the brain whose output converges to affect the ultimate perception of pain that is experienced by the conscious mind. The neuromatrix theory of pain recognizes the simultaneous convergence of a panoply of influences, including one's past experiences, cultural factors, emotional state, cognitive input, stress regulation, and immune systems, as well as immediate sensory input.

1.2 Affirming the need

In Hong Kong, births are virtually in hospitals. For the current practice of the labour room in a public hospital in Kowloon, conventional medical approach is the majority of labour pain management and is considered to be most effective pain relief method. The pharmacological methods include entonox inhalation, intramuscular injections of opioid analgesics (Pethidine), and epidural analgesia. Despite the effectiveness of pain relief by pharmacological methods, the potential hazards bring along with should also be considered. The potential adverse effects associated with pethidine injection are maternal nausea, vomiting, dizziness; fetal distress and
neonatal metabolic acidosis (Sosa et al., 2006). Studies showed long term effects on offsprings of mothers received opiates in labour, with a higher risk of becoming a drug addict (Nyberg, Buka & Lipsitt, 2000). Epidural analgesia is considered to be an effective pain relief method during labour (Nystedt, Edvardsson & Willman, 2004). Nevertheless, the potential hazards of epidural analgesia could not be neglected. Direct adverse effects include maternal hypotension, higher risk of intrapartum maternal fever. It may also prolong the first and second stages of labour, increase the rate of instrumental or operative delivery (Howell, 2004; Nguyen, et al., 2010).

Regarding the adverse effects of conventional pharmacological methods, there is an increasing interest for women to choose complementary therapies to help them in managing pain in labour. Non-pharmacological interventions appear to be safe in contrast. Complementary therapies not only reduce pain physically, but provide a holistic approach concerning mind and spiritual well-being.

Currently, there are several non-pharmacological therapies used in the working hospital, which included deep breathing and relaxation exercise, warm compress, birth ball and psychological support from husband accompanying labour. They are at lower risk of causing maternal or fetal distress. Midwives teach labouring women to perform deep breathing and relaxation exercise throughout the whole labour to reduce pain. Warm bean bags are offered on request from clients. Simkin & Bolding (2004)
stated that superficial application of warm compress to lower back or lower abdomen is believed to increase connective tissue extensibility and reduce pain. Birth ball is proved can reduce labour pain (Hau et al., 2012), but some women prefer to rest in bed in labour. Other non-pharmacological pain relief methods are lacking of evidence, and are reported to have fair effects on reducing labour pain. It might cause women dependent on pharmacological methods eventually.

In view of the adverse effects from pharmacological analgesics and inadequate pain control with alternative therapies available in the hospital, improvements should be made for the current practice. Furthermore, there are over 500 deliveries a month in the hospital. Pharmacological analgesics are substantial financial burden to the hospital and healthcare system. On the contrary, acupressure is a cost-effective nursing intervention and may be an ideal way to involve the labouring woman’s partner in the labour process. For the reasons, a new intervention which could reduce clients’ pain effectively, economically, and conveniently should be introduced.

In traditional Chinese medicine, there are 14 meridians with "qi", refers to the flow of energy, running along throughout the body. On the basis of meridian theory, the meridians are considered as a network system to link acupoints via “qi” streaming in the meridians. They enhance the blood flow, nourish tissues, and facilitate normal body functions. Any blockade of meridians as well as energy flow can cause
deficiencies or excesses of energy in different parts of the body, leading to illnesses or diseases (Zhao, 2008). Acupoints are the presentations of meridians near the skin surface.

Acupuncture and acupressure are based on traditional Chinese medicine and share the main principle of opening and harmonizing an obstructed meridian by stimulating surrounding acupuncture points (acupoints). Acupuncture has been used in China for more than 3000 years, and shown to be effective in labour pain relief (Beal, 1999; Ramnerö, Hanson & Kihlgren, 2002). Acupressure is a simple alternative to acupuncture, referring to stimulation of acupoints by pressure with fingers or small beads on acupoints located along the body's meridians (Beal, 1999; Simkin & Bolding, 2004).

Acupuncture or acupressure stimulates the release of oxytocin from the pituitary gland, which then directly stimulates uterine contractions and facilitates labor (Cook & Wilcox, 1997). Studies reported that acupressure is also helpful in reducing labour pain (Heidari, 2008).

Several acupoints are reported related to reproductive system, which includes Hegu, Sanyinjiao and Zhiyin.
Hegu acupoint, also known as Large Intestine 4 (LI4), is found between the first and second metacarpal bones (the bones of the thumb and first finger), which lies at the highest point formed when the thumb is brought to rest against the index finger.

Sanyinjiao acupoint, also known as Spleen 6 (SP6), is located using four of the finger widths above the tip of the medial malleous (the shin bone on the inside of the ankle).

Zhiyin acupoint, also known as Bladder 67 (BL67), is located at lateral fifth digit, 1 inch from the corner of the nail.

1.3 Objectives and significance

In response to the need of an evidence-based guideline using acupressure to reduce labor pain, the following objectives would be achieved in this dissertation.

1. To systematically evaluate current evidence on use of acupressure in reducing pain in labour.

2. To develop an evidence-based guideline on using acupressure for labour pain relief.

3. To assess the implementation potential of the evidence-based innovation.

4. To develop implementation and evaluation plan for the proposed innovation.
In relation to the adoption of acupressure in reducing pain in labour, the following question would be addressed, “In primigravida women, is acupressure effective in reducing pain during labour?”. 
CHAPTER 2 CRITICAL APPRAISAL

2.1 Search Strategies

2.1.1 Identification of studies

To identify studies, literature search was conducted in August 2014. The review focuses on the intervention of acupressure on labouring women to reduce labor pain.

Three electronic databases include PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and China Knowledge Resource Integrated Database (CNKI) were systematically searched. Researches were conducted with keywords “acupressure”, “labour or labor”, "pain”. Besides, search of Chinese journals was also conducted with the following Chinese keywords: (1) 穴位按壓, (2) 三陰交, (3) 合谷, (4) 分娩, (5) 生產, (6) 痛. Being translated into English, the words are (1) Acupressure, (2) Sanyinjiao, (3) Hegu, (4) Labor, (5) Labour, (6) Pain accordingly.

Constraints were set for the studies with human species, adults aged 18 or above and randomized controlled trials (RCTs). Results were screened carefully by the title and abstracts of the studies. All articles were scanned manually using the specified inclusion and exclusion criteria to remove any citations that were obviously irrelevant to the topic. Full text of articles satisfying inclusion criteria were reviewed for articles
2.1.2 Selection Criteria

Studies meeting the following inclusion criteria were included:

1. Participants of the study were adult women who were in labour pain;

2. Acupressure on acupoint Sanyinjiao (spleen 6, SP6) or Hegu (large intestine 4, LI4) is investigated as non-pharmacological method;

3. Level of pain was compared as outcome measure;

4. Study design was randomized controlled trial (RCT); and

5. Written in English or Chinese.

Studies meeting the exclusion criteria as follows were excluded:

1. Over one non-pharmacological method were used as investigation;

2. Intervention related to acupuncture, electro-acupuncture, transcutaneous electrical nerve stimulation on acupoints SP6 or LI4;

2.1.3 Data Extraction

Information for the study searched was extracted for analysis including: study design, level of evidence, characteristics of participants, intervention applied,
comparison of experimental and control groups, outcome measures in terms of labour
pain and effect size. Evidence table in Appendix 1 provides a summary of the
extracted data from the study reviewed.

2.1.4 Appraisal Strategies

The Scottish Intercollegiate Guidelines Network (SIGN, 2014) was used as a
critical appraisal tool to evaluate the studies. Methodology used in the studies are
assessed to ensure its validity. Research question, randomization, concealment
method, comparability of groups, internal validity, methodology and the
generalisation of the study results of papers were assessed in the checklists. The
quality of studies is rated as: High quality (++), Acceptable (+), or Low quality (0).
Methodology checklist in Appendix 2 was used in appraising the studies.

2.2 Results

2.2.1 Search Results

The search was conducted in August 2014. It retrieved 47 English and 15
Chinese manuscripts related to acupressure on labouring women in relieving pain. An
initial screening of the result by limitation on human studies and randomized
controlled trials, reduce the number of results into 15 English and 8 Chinese articles.

Secondary screening was done by reviewing the titles and abstracts. After elimination of the duplicated articles, 5 English but no Chinese were retained. Further manual research of journals by reviewing the full articles and reference lists of prior results was done, and 1 additional eligible article was recruited. Therefore, a total number of 6 studies were included.

The table below shows the summary of the searching strategy on English articles (Figure I) and Chinese journals (Figure II). A PRISMA flow diagram (Moher et al., 2009) was used to show the flow of screening journals (Figure III).
Figure I. Summary of English databases search strategies and results

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Search by keywords: &quot;Acupressure&quot; AND &quot;Labour&quot; OR &quot;Labor&quot; AND &quot;Pain&quot;</td>
<td>42</td>
<td>5</td>
</tr>
<tr>
<td>Limit to humans</td>
<td>32</td>
<td>5</td>
</tr>
<tr>
<td>Limit to &quot;RCT&quot;</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Retrieved after exclusion of negligible studies</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Articles retrieved after elimination of duplication</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Manual search of reference lists</td>
<td></td>
<td>1 eligible study</td>
</tr>
<tr>
<td>Total included studies</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

Figure II. Summary of Chinese databases search strategies and results

<table>
<thead>
<tr>
<th>Search item</th>
<th>CNKI (1995- Aug 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search by keywords: (1) 穴位按壓, (2) 三陰交, (3) 合谷, (4) 分娩, (5) 生產, (6) 痛</td>
<td>15</td>
</tr>
<tr>
<td>Limit to humans</td>
<td>12</td>
</tr>
<tr>
<td>Limit to &quot;RCT&quot;</td>
<td>8</td>
</tr>
<tr>
<td>Retrieved after exclusion of negligible studies</td>
<td>2</td>
</tr>
<tr>
<td>Articles retrieved after elimination of duplication</td>
<td>0</td>
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<tr>
<td>Manual search of reference lists</td>
<td>0</td>
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<tr>
<td>Total included studies</td>
<td>0</td>
</tr>
</tbody>
</table>
Figure III. PRISMA 2009 Flow Diagram

Records identified through database searching

Additional records identified through other sources

Records after duplicates removed
(n = 40)

Records screened
(n = 40)

Records excluded
(n = 17)

Full-text articles assessed for eligibility

Full-text articles excluded, with reasons

Studies included in qualitative synthesis

Studies included in quantitative synthesis (meta-analysis)
2.2.2 Study Characteristics

All of the studies tested the effectiveness of acupressure on alleviating pain in labour. Participants were randomly allocated to intervention or control groups. All studies focused on acupressure as the intervention for women in labour. The studies were randomized controlled trials (RCTs), which compared intervention and control groups for research. Five studies reported that ethical approval was obtained (Chung et al., 2003; Lee et al., 2004; Hjelmstedt et al., 2010; Hamidzadeh et al., 2012 Sehhatie-Shafaei et al., 2013). Outcome measures of all studies are level of labour pain by visual analogue scale.

2.2.3 Methodology Quality Assessment

The Scottish Intercollegiate Guidelines Network (SIGN, 2014) was used as a critical appraisal tool to evaluate the studies.

All six studies addressed the focused question appropriately and clearly. All subjects were reported randomly assigned to treatment group, but one of them did not mention the randomization method (Lee et al., 2004). For other studies, one used computerized program (Hjelmstedt et al., 2010), one used stratified randomization (Hamidzadeh et al., 2012), two used block randomization (Kashanian and Shahali,
2010; Sehhatie-Shafaie et al., 2013) and one used two-step selection with drawing
(Chung et al., 2003).

Despite concealment method can affect the effect of interventions, three studies
did not report it (Chung et al., 2003; Lee et al., 2004; Hamidzadeh et al., 2012). In
order to ensure that researchers are unaware which group participants were being
allocated to, sealed opaque envelops were used in two studies (Hjelmstedt et al., 2010;
Kashanian and Shahali, 2010) and one used centralized allocation (Sehhatie-Shafaie
et al., 2013).

Blinding keeps people unaware of which treatment a participant is receiving,
higher blinding level reduces the risk of bias. For the blinding method, one study used
triple blinding (Chung, 2003), two used double blinding (Lee et al., 2004;
Sehhatie-Shafaie et al., 2013) and three used single blinding (Hjelmstedt et al., 2010;
Kashanian and Shahali, 2010; Hamidzadeh et al., 2012). Observer bias could be
eliminated in double or triple blinding methods.

Only two studies reported power calculation of enough sample size according to
mean comparison formula (Hjelmstedt et al., 2010; Sehhatie-Shafaie et al., 2013) to
minimize play of chance. In Hjelmstedt's study, a sample of 36 in experimental and
39 in control group were needed to provide a power of 0.8 and a significance level of
0.01 to detect a 12mm pain intensity difference. In Sehhatie-Shafaie's study, sample of 42 in each group was required with a power of 0.8 and an alpha of 0.05. These two studies had least sample size, but power calculation proved they have enough sample size. Other four studies had more than 100 participants (Chung et al., 2003; Lee et al., 2004; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012).

Regarding to the drop-out rate, Kashanian and Shahali (2010) and Sehhatie-Shafaie et al. (2013) claimed there was no drop-out in the study. Study by Hjelmstedt et al. (2010) stated 1 drop out from control group, while Lee et al. (2004) reported 14 drop out in the whole study (5 excluded because of caesarean section and 9 for incomplete data or withdrawal). Study by Chung et al. in 2003 reported a total of 23 subjects withdrew for caesarean section or pharmacological methods, with 7 from acupressure group and 8 from each of the other two groups. The remaining study did not mention drop-out (Hamidzadeh et al., 2012). Intention-to-treat were not mentioned nor adopted in any of the studies. The only study using multi-site was by Sehhatie-Shafaie et al. (2013), which means the generalisation is comparatively higher than other five studies.
2.3 Summary and Synthesis

Study population

The eligible studies were conducted between year 2003 and 2012. All of them were RCTs, which were taken in India (Hjelmstedt, 2010) Iran (Kashanian & Shahali, 2010; Hamizadeh et al., 2012; Sehhatie-Shafaie et al., 2013), Korea (Lee et al., 2004), Taiwan (Chung et al., 2003).

Level of evidence

The 6 RCTs were categorized on basis of the eight levels of hierarchies by Scottish Intercollegiate Guidelines Network in 2011. One was of high quality (Sehhatie-Shafaie et al., 2013), four was acceptable (Chung et al., 2003; Hjelmstedt et al., 2010; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012), and one was of low quality (Lee et al., 2004).

Number of participants

The sample size varies from 75 to 212 participants in different studies. One study recruited over 200 participants (Hjelmstedt et al., 2010), while three studies had 100 to 200 participants (Lee et al., 2004; Kashanian and Shahali, 2010; Hamidzadeh et al.,
Two studies had smaller sample size of 75 and 84 respectively (Chung et al., 2003; Sehhatie-Shafaie et al., 2013).

**Characteristics of participants**

Comparison of participants' baseline measures (demographics, gestational age, intensity of pain before intervention, cervical dilatation) was reported in studies, all studies showed there was no significant difference of participants' characteristics.

**Intervention**

Acupressure was the intervention for all studies. In all studies, acupressure was applied by manual. Intervention are standardized in studies with intervener training in several studies (Chung et al., 2003; Lee et al., 2004; Hjelmstedt et al., 2010; Sehhatie-Shafaie et al., 2013) to ensure accurate treatment with adequate control of pressure, accuracy of acupoints, and dexterity in manual techniques, while the intervention by Kashanian and Shahali (2010) was carried out by investigator. Two studies reported standardization of pressure of acupressure applied with medical engineer (Chung, 2003; Lee, 2004).

In the reviewed studies, three used acupressure on SP6 acupoint (Lee, 2004; Hjelmstedt, 2010; Kashanian and Shahali, 2010), one on LI4 acupoint (Hamidzadeh,
2012), one on both SP6 and LI4 acupoints (Sehhatie-Shafaie, 2013), and one on both LI4 and BL67 acupoints (Chung, 2003).

Regarding to the starting time of intervention applied, most of the study participants were women in active phase of first stage of labour, with 3 cm dilatation of cervix. One study recruited participants and started intervention earlier at latent phase of labour (Chung et al., 2003).

Application methods were reported in details. Similar methods were used in studies referring to SP6 acupoint only (Lee et al., 2004; Hjelmstedt et al., 2010; Kashanian and Shahali, 2010), which acupressure was applied by intervener on both legs simultaneously during each uterine contraction. Study by Sehhatie-Shafaie et al. (2013) adopted acupressure by thumb for 1 minute and 30 second resting time on either SP6 or LI4 acupoint, altering to the other acupoint after 5 minutes. Hamidzadeh (2012) designed to apply acupressure on LI4 for 10 seconds then rest for 2 seconds, repeated over the period. For Chung's study (2003), acupressure was applied by thumb or eraser end of a pencil, on either acupoint LI4 or BL67 for 10 seconds with 2 seconds resting time and changed to the other acupoint every 5 minutes.

Acupressure was applied for specific duration. Three studies applied acupressure with a limit of 20 minutes (Chung et al., 2003; Hamidzadeh et al., 2012
Sehhatie-Shafaie et al., 2013), while three applied for 30 minutes (Lee et al., 2004; Hjelmstedt et al., 2010; Kashanian and Shahali, 2010). Moreover, acupressure was repeated by Hjelmstedt et al. (2010) at 2 hours after initial intervention if the participants were still in first stage.

Comparison

Light touch without pressure was applied as the control treatment to test the placebo effect. Studies by Hjelmstedt et al. (2010), and Chung et al. (2003) added one more group of participants with standard care, no touch or acupressure applied for comparison of the strength on pain relief.

Outcome Measures

Outcome measures were clearly described in all studies. Primary outcome measure was the intensity of labour pain, in which they were measured in a standard, valid way with visual analogue scale (VAS). VAS has been adopted to estimate the intensity of labour pain and have been found to be valid and reliable (Molina et al., 1997; Niven & Gijsbers, 1996). A scale of 0 to 10, with 0 indicating no pain and 10 is most intense pain, was used in five studies (Chung et al., 2003; Lee et al., 2004; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012; Sehhatie-Shafaie et al., 2013). Study by Hjelmstedt et al. (2010) used a fine scale of 100-mm VAS to measure the
labour pain instead. Four of the studies used self-report methods (Chung et al., 2003; Lee et al., 2004; Hjelmstedt et al., 2010; Kashanian et al., 2010), while two used observer-report (Hamidzadeh et al., 2012; Sehhatie-Shafaie et al., 2013) to evaluate pain experience of women receiving treatment. Pain is the perception of individual, but self-report method may lead to response bias in studies.

Time of measurements of pain intensity taken varies. Baseline pain level, pain level before intervention, was assessed before intervention in all studies. In addition, four studies measured the pain intensity immediately after intervention (Lee et al., 2004; Hjelmstedt et al., 2010; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012), one study measured outcome at 20 minutes after intervention (Hamidzadeh et al., 2012). At 30 minutes after intervention, Lee (2004) and Hjelmstedt (2010) took measurements. Three studies measured outcome at 60 minutes (Lee et al., 2004; Hjelmstedt et al., 2010; Hamidzadeh et al., 2012), two studies measured at 120 minutes (Hjelmstedt et al., 2010; Hamidzadeh et al., 2012). Hamidzadeh (2012) further measured the outcome at 240 minutes, onset of second stage and 24 hours after delivery, while Hjelmstedt (2010) measured again in postnatal ward within 2 to 24 hours after delivery. One study did not define clear time of measurements, but used latent, active and transitional stages as time phrase instead.
Other measures were reported in some studies. Duration of labour (Chung et al., 2003; Lee et al., 2004; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012), use of analgesics (Lee et al., 2004; Hjelmstedt et al., 2010), anxiety level (Lee et al., 2004) and Apgar score of newborn (Hjelmstedt et al., 2010; Kashanian and Shahali, 2010) were taken into account for the effect of acupressure.

Results

All studies reported that acupressure has a positive effect in reducing labour pain. Five studies showed that using acupressure can significantly lessen labour pain. However, one study stated that the effect is small, and maybe most effective during initial phase of labour (Kashanian and Shahali, 2010).

Three studies revealed the duration of first stage of labour is significantly shortened with acupressure. (Chung et al., 2003; Lee et al., 2004; Hamidzadeh et al., 2012). In Lee's study (2004), the acupressure group had a significantly shorter duration from the time of 3-cm cervical dilatation to full dilatation than did the control group ($t=2.689, p =0.009$). Studies by Chung (2003) and Hamidzadeh (2012) also demonstrated significant difference in duration of first stage between intervention and control groups. Duration of second stage of labour was shown shorter in the acupressure group when compared with that of control group. (Hamidzadeh, 2012).
Two studies reported that there were no significant group differences between the two groups on the use of analgesics during labour (Lee et al., 2004; Hjelmstedt, 2010). The statistical difference of pharmacological use is ($\chi^2=1.616$, $p=0.204$) in Lee's study (2004), where no difference between the intervention and control groups. However, the use of analgesics was lower in acupressure group.

Anxiety level was reported in one study (Lee et al., 2004), which reported significantly lower in the acupressure group than in the control following the intervention ($t=2.214$, $p=0.030$).

For Apgar scores of newborn, the results showed that there was no significant difference between intervention and treatment group in two studies (Hjelmstedt et al., 2010; Hamidzadeh et al., 2012). It can be concluded that there are no adverse effects on newborn with the use of acupressure. No risks were noted on them.

**Conclusion**

In this review, six articles were retrieved, they were all in English. All of the articles were well-constructed and five are of high or acceptable quality. The significant outcomes measured in these studies could be considered. Acupressure for relieving pain in labour is evidence-based and could be implemented into clinical
setting. Development and establishment of clinical guidelines on basis of these studies are recommended.
CHAPTER 3: TRANSLATION AND APPLICATION

The literature systematically reviewed provides sufficient evidence that acupressure is effective in reducing labour pain in primigravida women. However, translating the innovation into the clinical field may not be ideal as the study results. An estimation of the implementation potential is necessary to determine the transferability of the findings and the feasibility of the implementation. An evidence-based guideline would be developed to ease the implementation and instruct staff.

3.1 Implementation Potential

3.1.1 Transferability of the findings

The mission of the local hospital is "to deliver quality health service to clients". To achieve the mission, continuous improvement on basis of latest reliable evidence should be made to ensure excellence in service.

The proposed setting is the labour room of a public hospital in Kowloon. In the setting, women in first stage of labour (spontaneous or induced) are transferred to, and being taken care in the labour room. Vaginal deliveries are conducted in labour room as well. Besides, the local setting is compared to those in the selected studies (Chung
et al., 2003; Lee et al., 2004; Hjelmstedt et al., 2010; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012; Sehhatie-Shafaie et al., 2013), which were similar and taken in labour rooms of hospitals.

The target population would be primigravida women in labour, with aged 18 or above. Participants in five of the studies meet the target (Lee et al., 2004; Hjelmstedt et al., 2010; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012; Sehhatie-Shafaie et al., 2013), while one from Chung et al. (2003) recruited women aged 15 to 42. Other participants’ characteristics of the six reviewed studies are similar to the target population.

The philosophy of care underlying the proposed innovation is similar to the practice setting. Both of them aim at improving health physically, psychosocially, spiritually as well as a holistic approach. Adopting a non-pharmacological intervention to reduce labour pain not only enhance physical well-being, but also diminish labouring women's psychological distress.

In the proposed setting, the monthly birth rate was over 500. Statistics from the hospital showed that 80% of deliveries were vaginal. The innovation would be excluded for women with caesarean section. Therefore, approximately 4800 women in the local hospital could benefit from the innovation in a year. Additionally, after the
termination of services for non-eligible persons to deliver baby in Hong Kong, there was a growing trend of women shifting from private to public sector for obstetric service. A significantly large number of clients would be favoured.

To utilize the up-to-date evidence into clinical field, it will not take too long to implement and evaluate the innovation. The implementation program involves planning, training of trainer and staff, implementation, and evaluation. The innovation would be proposed to ward manager and department manager, which takes around 2 months. Once that is approved, a committee of labour pain management would be set up, to carry out preparation and planning in meetings within 3 months and monitoring of the innovation implementation continuously. Meetings would be held for details of the implementation. Train-the-trainer and further training of staff on utilization of the innovation would last for 2 months. The implementation period and evaluation afterwards would last for 6 months and 1 month respectively. In total, the duration is 14 months.

Therefore, the proposed innovation would be transferrable into the local hospital.

3.1.2 Target Population

The target audience of the proposed innovation includes clients who are: (i) Primigravida women in labour; (ii) aged 18 or above; and of (iii) gestational age 37
weeks or above.

3.1.3 Feasibility

In labour room, nurse midwives are responsible for caring the labouring women, by psychological support, assessing progress of labour, providing physical pain relief, meeting women's unique requests, and conducting normal deliveries. Options of pain relief methods would be offered to clients to choose, while nurse midwives have the autonomy to give professional advices and execute the procedure. A guideline of the innovation would be developed for the staff. Nurse midwives would always have the freedom to carry out or terminate the innovation in the process.

Nurse midwives would be the major performer of the innovation, but support from other professions are also important. Consistent advices on utilization of the innovation in the department give confidence to clients to choose it, and ensure smooth running of the program. The innovation could reduce women's physical distress, doctors would support the innovation under circumstances that would not do harm to women or fetuses. Monitoring of maternal and fetal well-being would be assured in the process.

People are reluctant to changes. It is expected that there would be voices against the innovation with worries about increase workload or affect current practice. To gain understanding, cooperation and support from clinical and administrative,
thorough explanation of the program, reinforcing the purposes, rationale and advantages would be given to staff in briefing sessions. The innovation indeed would interfere the current staff in the target place when it is newly introduced. Trainers and the staff would be mostly interfered in the preparation and training courses.

Appropriate training is needed for staff to perform innovation properly. At the beginning, 4 interested staff would be recruited as trainers. They would attend a 2-hours training course. In the local hospital, there is a Chinese medicine clinic for outpatient service. The Chinese medicine practitioners from the clinic would be invited for cooperation and support of the innovation. One registered Chinese medicine practitioner would be invited to be speaker of the introductory course, teaching theory of acupressure, location of acupoints related to labour pain relief and practical techniques of applying acupressure. Video would be recorded for reference in the future, which would be saved in video compact discs and 5 copies would be kept and circulated in department for reference. Trainers would be tested to ensure they acquire the skills. They would provide further training to other nurse midwives in two identical sessions, last for 1.5 hour each. All nurse midwives of the target department would be officially released to briefing session and training courses. Staff attending courses out of working hours would be considered for compensation hours. Staff attending the training sessions and able to perform practical acupressure
techniques would be given a certificate of qualification.

With reference of the reviewed studies (Chung et al., 2003; Lee et al., 2004; Hjelmstedt et al., 2010; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012; Sehhatie-Shafaie et al., 2013), the innovation is designed as acupressure on acupoints by thumb during each uterine contraction over a period of 20 minutes. The acupressure would be applied onto Sanyinjiao (SP6) on both feet for 5 minute and alter to Hegu (LI4) on both hands for 5 minute, repeating 2 cycles. No extra equipments are needed to purchase for implementing the innovation.

Modern medical system is dominated by western medicine. Acupressure is derived from Chinese medicine. Despite the rise in popularity of Chinese medicine in Hong Kong, the implementation of acupressure into wards in hospitals is not effortless. In the local hospital, the Chinese medicine clinic provides services for outpatients only. Queries and doubts about the innovation on inpatients may be raised during introducing a complementary medicine into majority in the local hospital.

The nurse to client ratio in the target place is one to three, there is sufficient time for nurse midwives to apply acupressure to clients, without increasing workload.

The administrators would support the proposed innovation. According to previous experience, the organization supports introduction of evidence-based non-pharmacological pain relief method. Birth ball was implemented successfully in
the target hospital for labour pain relief. Staffs are encouraged to attend courses and
conferences to update new clinical information, and participate in sharing to
colleagues. Therefore, the organization welcome staff to utilize research findings to
deliver quality care to clients.

Evaluation is essential for the proposed innovation after implementation. In order
to assess whether the aim and objectives are met, staff acceptance and make
modifications of innovation in the future, two sets of tool would be prepared.
Effectiveness of proposed innovation, to what extent that the labour pain is reduced
with the use of innovation would be measured. Referring to the reviewed studies
(Chung et al., 2003; Lee et al., 2004; Hjelmstedt et al., 2010; Kashanian and Shahali,
2010; Hamidzadeh et al., 2012; Sehatie-Shafaie et al., 2013), the tool being used for
measuring labour pain was visual analogue scale (VAS). In the target place, the
measuring tool, VAS, is available. Secondly, acceptability of the innovation would be
evaluated by collecting feedbacks from staff through questionnaires.

3.1.4 Cost/ Benefit ratio of the innovation

*Risks of the implementation of the innovation*

A coin has two sides. Though acupressure is proved to be efficient in reducing
labour pain, there are potential risks to clients. Acupressure has not been introduced
for labour pain relief in Hong Kong, there are no available data showed the risks of it
on labouring women. From the reviewed studies, there were no adverse effects on the newborns (Lee et al., 2004; Hjelmstedt et al., 2010) or women's physiologic indices (Hamidzadeh et al., 2012). Acupressure is not associated with risks of infections because the skin is kept intact during the procedure (Hjelmstedt et al., 2010). However, the application of acupressure acupoints might induce bruises to clients with bleeding tendencies.

**Potential benefits result from implementation of the innovation**

Acupressure has been demonstrated to have a positive effect in reducing labour pain in labouring women. With the implementation of acupressure, it could also help in shortening duration of stage of labour (Lee et al., 2004; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012), relieving anxiety (Lee et al., 2003). Besides, the innovation could promote a physical and psychological well-being and eliminate the traumatic experience.

For the nurse midwives, they would obtain a higher job satisfaction through the success in helping clients with the innovation.

For the administrative level, as the innovation requires no extra equipments, there is no financial burden to the hospital. Moreover, the innovation could shorten the duration of labour, as well as the length of stay in hospital. The medical expenses are reduced. Nevertheless, the standard of care and the image of the target hospital
could be improved with the implementation of complementary medicine in the hospital.

*Risks of maintaining current practices*

Maintaining the current practices allow limited choice of non-pharmacological pain relief methods for the clients to choose. Otherwise, the clients could choose the pain relief by medical means, which they would suffer from the side effects of the medicine that were revealed in Chapter 1.

*Material costs of implementing the innovation*

Though there are no extra equipments required to purchase for the innovation, set-up costs and operational costs for running the program are still essential. The set-up cost of implementing the innovation includes the expenses on manpower and materials. The estimated set-up costs are listed in Appendix 4, in which the total amount is $24,140. The implementation requires training of staff prior to that, staff participation in working hours contribute to most of the manpower costs. On the other hand, the operational costs are those for running the program. Appendix 5 shows the estimated operational costs in 3 months of time, targeting 100 clients. Manpower costs on implementing the innovation and pain assessment forms are the operational costs, which the estimated amount is $6,677 for 3 months.

*Potential nonmaterial costs of implementing the innovation*
Implementing the innovation to the hospital may bring stress to the staff. People are reluctant to changes. The introduction of new practice might lower the staff morale. Besides, the training and acquiring of skills, adoption of the innovation might give them pressure. The documents after implementing the innovation would increase their workload. If the staffs are unable to overcome it, there is a potential of increase staff turnover rate. Therefore, the committee should give support to staff in the program, and administrative are to encourage staff instead of forcing them to implement the innovation. Despite the advantages of the innovation, psychological factors of the staff should always be considered to maintain a quality nursing care.

**Material costs of not implementing the innovation**

There will be no additional material costs for not implementing the innovation. However, current practice would be maintained, and so as the expenditure on purchasing the pharmacological pain reliefs. Administration of pethidine injections requires ampoules of pethidine injection, syringes for the injections, and alcohol swabs for disinfections. For epidural analgesia, there are expenses on drugs, infusion sets, skin disinfectants and dressing materials for securing the tubing. There is also expenditure on the manpower of nurses performing the injection or anaesthetists for epidural analgesia.

According to the discussion of transferability of findings, feasibility and
cost/benefit ratio of the innovation, the proposed innovation is transferable in the proposed setting and the benefits outweigh the risks of implementing it. Therefore, acupressure is advised to be introduced into the proposed setting. To ease the implementation, an evidence-based guideline would be developed.

3.2 Evidence-Based Practice Guideline

The evidence-based guideline of using acupressure to reduce labour pain in primigravida women is stated in Appendix 6. Six reviewed studies were used as reference to set the guidelines, in which one was of high quality (Sehhatie-Shafaie et al., 2013), four was acceptable (Chung et al., 2003; Hjemstedt et al., 2010; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012), and one was of low quality (Lee et al., 2004). Recommendations were assessed by the Scottish Intercollegiate Guidelines Network (SIGN) in grades of A, B, C and D, with A as the highest and D as the lowest.
CHAPTER 4: IMPLEMENTATION PLAN

In implementation of the innovation, different parties would be affected by the proposed changes. A communication plan is essential to convince the potential users of the innovation. It aims to improve communications, gain cooperation, and reduce misconceptions or discouragements. A pilot study and evaluation would also be key components of testing the feasibility of, and making modifications to ease implementation of the innovation.

4.1 Communication plan

4.1.1 Identification of stakeholders

Stakeholders being involved in the proposed innovation can be classified into three levels: operational, management and administrative.

Operational level

Operational level include the labouring women admitted labour room, husbands accompanying labour, nurse midwives who are responsible on applying acupressure and observing maternal and fetal conditions, and obstetricians work at frontline managing clients in labour room. They should be well informed and fully understand the significance of applying acupressure.

Management level

Support from leaders is associated to staff's positive attitude of implementing the
innovation. Advanced Practice Nurses (APNs), Nursing Officers (NOs), Ward Manager (WM) of labour room, Department Operation Manager (DOM) are experienced nurse midwives, supervising other staff in clinical field. They are also responsible for establishing and developing the guidelines, monitoring the feasibility and transferability on implementing the innovation, resourcing human and financial issues on it, and proposing the innovation to administrative level.

**Administrative level**

The administrative level accounts for setting directions to the hospital and adoption of new innovation. They are responsible for directing the management level of target department, making approval of implementing proposed innovation. They are Hospital Chief Executive Officer, General Manager (Nursing) and Chief of Services (COS).

4.1.2 Communication plan and strategies

Communication between stakeholders and innovator eases the implementation of innovation. It allows transferring of ideas and concepts, providing evidences of the innovation, promoting its significance and correcting misconceptions.

Meetings to critical persons in clinical setting are important to convince them for implementing the innovation. The management level of the target place (Obstetricians, WM and DOM) would be the first persons to meet and discuss the innovation with.
They are responsible of management in the labour room, any change of practices required their initial agreement. Therefore, a formal meeting would be made with them. In the meeting, the clinical issue and its severity, the need of innovation, the cost-benefit ratio, the evidence reviewed supporting the innovation, significance and objectives of the guidelines and evidence from the literature would be presented. Discussions would be made as well.

*Set up a communication team*

After verbal agreement of management level, a labour pain management committee would be set up. It consists of the innovator, 2 Registered Nurse Midwives (RNMs), 2 Advanced Practice Nurses (APNs), Ward Manager (WM), and Department Operation Manager (DOM). Staffs are recruited according to their interests and assignments by WM. They are responsible for promoting acupressure in reducing labour pain, training staff on acupressure and processing enquiries from staff.

*Communication Plan*

DOM would be invited to join the committee, as a bridge between the management and administrative level. The meetings with WM and DOM would take place within 2 months.

In following 2 months, the innovator would have meeting with Chief of Services (COS) of Obstetrics and Gynaecology, GMN and HCE with DOM. Formal approval
from them is critical in implementation of acupressure in labour room, as they hold the highest authority in the hospital. A well-written proposal would be prepared, and presented in the meeting, which includes comparison of current practice, the necessity of, the benefits resulting from, and potential costs of implementation of the innovation. Financial expenses would be concerned as they are the gatekeeper of the expenditure in the hospital. At the same time, the committee would promote acupressure in reducing labour pain by preparing posters and boards. Moreover, they would attend a 2-hours introductory course as mentioned in Chapter 3.

Once the innovation is approved by administrative level (estimated to be week 9), obstetricians and nurse midwives would be informed of the innovation through electronic mail. 2 identical sessions of 2-hours training course about acupressure would be launched, to train the remaining nursing staff in the department the implementation of acupressure. The innovator would be speaker while committee would be assistant, teaching theory of the acupressure in reducing labour pain. Besides, the assistants would teach hands-on techniques on locating the acupoints, duration and forces of implementation. The evidenced based guidelines developed would be distributed and placed in ward for reference. The committee training and train-the-trainers would last for 2 months. Implementation of acupressure would start from 6 months after initial proposal to WM.
**Sustain the change**

Continuous support and evaluation would be conducted by the committee. The committee members would collect feedbacks and problems raised from clinical staff throughout the implementation. Committee meetings would be held monthly to discuss the issues of implementation and problems faced, suggesting solutions and modifications. Improvements would be made with results of evaluation and adjustments on implementation.

**4.2 Pilot Study Plan**

**Objective**

A pilot study would be conducted before implementation of innovation to test the feasibility of and detect potential problems (Porta, 2008).

**Outcome measure**

The study will be conducted in labour room of a local hospital in Kowloon, over a period of 2 months.

**Target population**

The pilot study will target on 30 primigravida women in labour. Participants will be recruited into the study according to the criteria set in the clinical guideline. All of the participants will be aged over 18 and of gestational age 37 weeks or above.
Study design and sampling

The pilot study will be designed as a quasi-experimental study. Convenience sampling would be used to recruit participants. Participants will be divided into two groups, intervention group and control group. The sample size will be 15 in each group.

For the intervention group, participants receive acupressure by qualified staff with certificate. The acupressure is applied by thumb, onto Sanyinjiao acupoints (Spleen 6, SP6) on both feet during uterine contractions for 1 minute and rest for 30 seconds, repeat for 5 minutes. Then change to pressure on Hegu acupoints (Large Intestine 4, LI4) on both hands for 5 minutes. Repeat the cycle for 20 minutes.

For those in control group, they receive light touch without pressure on the acupoints with same pattern as the intervention group.

Outcome Measures

The outcome measure of the pilot study is the severity of labour pain of labouring women. Moreover, the nursing compliance of innovation, staff satisfaction on implementing the innovation, and use of guideline would be evaluated. All data would be collected by the project committee.

Data collection

The pain intensity was documented by asking subjective perception of the
participants with visual analogue scale, with reference to reviewed studies (Lee et al., 2004; Hjelmstedt et al., 2010; Hamidzadeh et al., 2012). Apart from it, staff feedback from implementation of the innovation is concerned. Questionnaires would be distributed to nurse midwives in labour room to evaluate their compliance and satisfaction on implementation.

**Analysis and evaluation of pilot study results**

The data collected will be processed and computerized by the innovator within 2 weeks after collection. The report of the pilot study will include the pilot study results, and discussion of problems or resistance encountered if any. Besides, possible solutions and suggestions could be written.

**Revision of guidelines**

Based on the recommendations in the report, the existed evidence-based guideline would be modified to suit the clinical field. The reviewed guidelines would be submitted to administrative level of the hospital for final approval at week 12 of pilot study.

**4.3 Evaluation plan**

Evaluation is important to assess whether the objectives are met and further refinement of guidelines are required after implementation of the innovation.
4.3.1 Identifying outcomes

The outcomes are identified in three aspects, patient, healthcare provider and system.

1) Patient outcomes

The aim of patient outcome evaluation is to assess the clinical benefits of the innovation. The goal of the innovation is to use acupressure to reduce severity of labour pain of primigravida women, therefore it is taken to be the primary outcome. Patient outcome of the proposed innovation is to measure the pain intensity of labour pain related to acupressure. In addition, the use of pharmacological pain relief methods is aimed to be reduced.

Clients' satisfaction during labour with application of acupressure would be the secondary outcome. Furthermore, the effectiveness of the guideline would be tested in the process.

2) Healthcare provider outcomes

Healthcare providers are essential component in carrying out the innovation. The acupressure is applied by trained nurse midwives in labour room, the implementation would not be possible without them. Therefore, the acceptance and compliance level of the staff would greatly influence the effectiveness of innovation, and should be measured. The primary outcome measurements would be in form of staff (i) skills, (ii)
satisfaction and (iii) confidence of implementing acupressure on labouring women. Last but not least, their knowledge in addition to updated evidence should be assessed.

Labour pain management committee members would attend the target place on once a week. They would observe the staff skills and compliance on implementation of acupressure. Short questions would be asked for satisfaction and feedback about the innovation and use of guidelines.

3) System outcomes

Apart from clients and healthcare providers, the adoption of innovation requires support from the system. The system outcome aims at measuring the effectiveness of the hospital. The outcome focuses on the costs and benefits of implementing acupressure, and it measures by calculating (i) the costs of utilizing the innovation, (ii) human resources. Nevertheless, the benefits resulting from the implementation of acupressure would be documented, which are the costs reduced from purchasing pain killers and client's positive impression towards the hospital image.

4.3.2 Nature of clients

To maintain consistency with the developed evidence-based guidelines, the selection criteria of the eligibility clients to be recruited in the evaluation
plan are based on the reviewed studies in chapter 2 (Chung et al., 2003; Lee et al., 2004; Hjelmstedt et al., 2010; Kashanian and Shahali, 2010; Hamidzadeh et al., 2012; Sehhatie-Shafaei et al., 2013). The eligibility criteria are primigravida women in labour, aged 18 or above, and of gestational age 37 weeks or above.

4.3.3 Design of outcome measurements

The implementation of innovation will be taken place for 24 weeks. Data will be collect in a cross-sectional manner according to the outcomes.

For patient outcome, the pain intensity will be recorded at two-times point, at the time right before acupressure, and 60 minutes after application of acupressure. Besides, the measurement of use of pharmacological pain relief methods during the labour process will also be measured. Clients’ demographic data, length of labour, mode of delivery and complications of labour will be measured. The data are recorded into evaluation form (Appendix 7) by nurse midwives in the labour room. These are short-term measurements. Moreover, client’s satisfaction level about the innovation and labour will be measured by a self-reported questionnaire. Questionnaires (Appendix 8) will be distributed to clients in postnatal wards, and being collected by the labour pain management committee before clients discharge.

For the healthcare provider outcome, questionnaires (Appendix 9) will be distributed to all nurse midwives in labour room, by the end of implementation stage.
Nurse midwives will be asked about their satisfaction and confidence towards the implementation of acupressure. They will be asked to give open comments on it as well. Besides, their knowledge skills on application of acupressure will be randomly audited by committee members on duty when there are available cases. This is an intermediate to long-term measurements.

For the system outcomes, long-term measurements on expenses of utilizing the innovation, and costs reduced from purchasing pain killers will be calculated by the innovator at the end of implementation period. The necessity of extra manpower will be reported.

4.3.4 Sample size

Using the online calculator software for the paired t-test (Lenth, 2006), the sample size for measuring primary outcome calculated is 12. In the target hospital, the pain intensity was about 8.6 with usual care. Therefore, the null value is 8.6. From the reviewed study (Hamidzadeh et al., 2012), the pain intensity at 60 minutes after acupressure in intervention group was 7.12. Thus, the actual value is 7.12. By using the paired t-test for testing the pain scores as sample size calculation, a sample size of at least 32 will be required to achieve a significance level of 5% and a power of 80%.
4.3.5 Data analysis

Data collected will be analyzed by the innovator in 2 months.

Descriptive statistics will be used to summarize the client’s demographic data, satisfaction level of clients. Labour pain severity is a continuous variable. In order to determine whether the labour pain severity is reduced with acupressure, a two tailed t-test will be used.

Staff knowledge, satisfaction, confidence of implementing acupressure will also be summarized with descriptive statistics. Qualitative data such as comments from staff on acupressure will be concluded by the innovator.

For cost-effectiveness analysis, the costs saved related to acupressure would be compared to the operational costs including materials, manpower.

After the analysis, the innovator would give a comprehensive written report of the results, discussion and constructive suggestions and refinement of the implementation.
CHAPTER 5: CONCLUSION

In view of the increasing interest in using non-pharmacological pain relief methods during labour, systematic and critical reviews on research studies were conducted. The evidence shows that acupressure is significantly effectively in reducing labour pain. An evidence-based guideline is developed with high level of evidence for primigravida women in labour. It includes the performer of acupressure, method and duration of application and evaluation. To eliminate unnecessary maternal or neonatal adverse effects, the guideline is limited to clients of term pregnancy. With adequate utilization of the evidence-based guideline, acupressure is likely to reduce labour pain effectively.
## Appendix 1. Table of evidence

<table>
<thead>
<tr>
<th>Bibliographic citation</th>
<th>Study Design</th>
<th>Level of evidence</th>
<th>Participant Characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Outcome measure</th>
<th>Effect size (Intervention - Control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sehhatie-Shafaie et al., 2013</td>
<td>RCT</td>
<td>1++</td>
<td>No. of participants: 84 1) Acupressure Group: 42 2) Control Group: 42 Age: 18-35 Female in active phase of first stage of labour, at least 4 cm dilation of cervix.</td>
<td>Acupressure by thumb on SP6 on both feet during contractions for 1 min and free for 30 seconds, repeat for 5 minutes. Then change to pressure on LI4 acupoint for 5 minutes, followed by SP6 on the feet. Process continued for 20 minutes.</td>
<td>Pressure applied on ineffective areas of legs and hands for same timing and condition as intervention.</td>
<td>Labour pain Measured by visual pain scale assessment with scale of 0 to 10 (0 indicating no pain and 10, intense pain) before and after the intervention at different dilatations: (a) 4 cm (b) 6 cm (c) 8 cm (d) 10 cm</td>
<td>Labour Pain (p&lt;0.001, df=82) (a) t=-6.17 (b) t=-11.15 (c) t=-16.52 (d) t=-15.54</td>
</tr>
</tbody>
</table>

RCT= Randomized Controlled Trial, SP6= Spleen 6 (Sanyinjiao acupoint), LI4=Large Intestine 4(Hegu acupoint), VAS= Visual Analogue Scale
<table>
<thead>
<tr>
<th>Bibliographic citation</th>
<th>Study Design</th>
<th>Level of evidence</th>
<th>Participant Characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Outcome measure</th>
<th>Results</th>
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<tbody>
<tr>
<td>Chung et al., 2003</td>
<td>RCT</td>
<td>1+</td>
<td>Female in first stage of labour. Age: 15-42</td>
<td>Acupressure at LI4 by thumb or eraser end of pencil on BL67. Five cycles in 1 minute, 10 seconds of sustained pressure and 2 seconds of rest. Alter acupoints each 5 minutes. Time limit: 20 minutes</td>
<td>EG: Light stroking on upper-outter arm in accordance with the breathing pattern of the participants, approximately 12-30 strokes per minute. CG: No acupressure or effleurage</td>
<td>Labour pain: measured by VAS with a scale of 0-10 by asking participants' subjective perception at different phases of labor: (a) latent; (b) active; (c) transitional</td>
<td>VAS difference was reported, which was the difference between pre- and post-intervention at three phases. (b)(i) Labour Pain between AG and CG Significant difference in decreased labour pain ($W=5.607, p=0.017$) (b)(ii) EG and CG No significant difference in decreased labour pain. ($W=1.223, p=0.268$) (a) &amp; (c): There were no significant differences in decreased labour pain among three groups. The findings of the study supports acupressure provided a greater decrease in labour pain than those with effleurage or no treatment.</td>
</tr>
</tbody>
</table>

RCT= Randomized Controlled Trial, AG=Acupressure group, EG=Effleurage Group, CG=Control Group, LI4=Large Intestine 4 (Hegu acupoint), BL 67= Bladder 67 (Zhiyin acupoint), VAS= Visual Analogue Scale
<table>
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<th>Outcome measure</th>
<th>Effect size</th>
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<tr>
<td>Hjelmstedt et al., 2010</td>
<td>RCT</td>
<td>1+</td>
<td>Female admitted labour room, in active phase of first stage of labour. (Cervical dilatation between 3-7cm)</td>
<td>Acupressure at SP6 on both legs simultaneously during each contraction over 30-minute period. Repeat intervention after 2 hours if participants were still in first stage.</td>
<td>CG: -Light touch at SP6 on both legs during contraction over 30-minute period. CG: -No acupressure or touch</td>
<td>Labour pain: measured by VAS with a scale of 100mm at minutes after intervention: (a) 30 min (b) 60min (c) 120min</td>
<td>1) Labour Pain between AG and CG The mean pain score in AG is significantly lower than the CG at (b), (c), (d). (p&lt;0.05). 2) TG and CG No significant difference in pain scores found. Therefore, positive effect of acupressure on SP6 in the active phase of labor in nulliparous women is indicated.</td>
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<tr>
<th>AG</th>
<th>TG</th>
<th>CG</th>
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<tbody>
<tr>
<td>No.</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>Age /yr</td>
<td>22.4 ±2.7</td>
<td>22.7 ±2.9</td>
</tr>
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RCT= Randomized Controlled Trial, AG=Acupressure group, TG=Touch Group, CG=Control Group, SP6=Spleen 6 (Sanyinjiao acupoint), VAS= Visual Analogue Scale,
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<th>Outcome measure</th>
<th>Effect size (Intervention - Control)</th>
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<tbody>
<tr>
<td>Kashanian et al., 2010</td>
<td>RCT</td>
<td>1+</td>
<td>Female in active phase of first stage of labour (3-4 cm dilatation of cervix).</td>
<td>Women received acupressure on the SP6 acupoints by investigator. Duration: 30 min</td>
<td>Women only received a touch on SP6 acupoint.</td>
<td>Labour pain measured by horizontal visual analogue scale (VAS) at minutes: (a) before intervention (b) 0 min after intervention</td>
<td>(1) Labour Pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1) Acupressure Group: 60</td>
<td></td>
<td></td>
<td></td>
<td>(a) 0.33 (p=0.318)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2) Control Group: 60</td>
<td></td>
<td></td>
<td></td>
<td>(b) -0.92 (p=0.003)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Age: 19-35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RCT= Randomized Controlled Trial, SP6= Spleen 6 (Sanyinjiao acupoint), VAS= Visual Analogue Scale
<table>
<thead>
<tr>
<th>Bibliographic citation</th>
<th>Study Design</th>
<th>Level of evidence</th>
<th>Participant Characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Outcome measure</th>
<th>Effect size (Intervention - Control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamidzadeh et al., 2012</td>
<td>RCT</td>
<td>1+</td>
<td>No. of participants: 100</td>
<td>Participants received simultaneous acupressure on both hands. Five pressures (about 3 to 5kg) on the LI4 acupoints were applied per minute. Each period included 10 seconds of pressure and 2 seconds of rest.</td>
<td>Participants only received a touch on LI4 acupoint, no pressure was applied.</td>
<td>Labour pain measured by horizontal VAS at minutes after intervention: (a) 0min (b) 20min (c) 60min (d) 120min (e) 180min (f) 240min (g) Second stage of labor (h) 24 hours after delivery</td>
<td>(1) Labour Pain (a) -1.1 (p&lt;0.001) (b) -1.76 (p&lt;0.001) (c) -1.8 (p&lt;0.001) (d) -1.26 (p&lt;0.001) (e) -0.5 (p=0.214) (f) -1.42 (g) -0.17 (p=0.485) (h) -2.0 (p&lt;0.0001)</td>
</tr>
</tbody>
</table>

RCT = Randomized Controlled Trial, LI4 = Large Intestine 4 (Hegu acupoint), VAS = Visual Analogue Scale
<table>
<thead>
<tr>
<th>Bibliographic citation</th>
<th>Study Design</th>
<th>Level of evidence</th>
<th>Participant Characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Outcome measure</th>
<th>Effect size (Intervention - Control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee et al., 2004</td>
<td>RCT</td>
<td>1-</td>
<td>Female admitted labour room in active phase of first stage of labour (3cm dilatation of cervix)</td>
<td>Participants received acupressure on the SP6 acupoints on both legs by research interveners. Duration: 30min, during each contraction.</td>
<td>Participants received a touch at the SP6 acupoints without pressure applied.</td>
<td>Labour pain: measured by VAS with scale of 0-10 [Higher score indicating more pain] at minutes after intervention: (a) 0 min (b) 30 min (c) 60 min</td>
<td>Labour Pain: (a) -1.2 (p=0.012) (b) -1.3 (p=0.021) (c) -1.2 (p=0.012)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>AG</th>
<th>CG</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>36</td>
<td>39</td>
</tr>
<tr>
<td>Age</td>
<td>29.5±3.2</td>
<td>29.1±3.6</td>
</tr>
</tbody>
</table>

RCT= Randomized Controlled Trial, AG=Acupressure group, CG=Control Group, SP6= Spleen 6 (Sanyinjiao acupoint), VAS= Visual Analogue Scale
### Methodology Checklist 2: Controlled Trials

Study identification (Include author, title, year of publication, journal title, pages)

<table>
<thead>
<tr>
<th>Guideline topic:</th>
<th>Key Question No:</th>
<th>Reviewer:</th>
</tr>
</thead>
</table>

**Before** completing this checklist, consider:

1. Is the paper a **randomised controlled trial** or a **controlled clinical trial**? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a **controlled clinical trial** questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

Reason for rejection: 1. Paper not relevant to key question □ 2. Other reason □ (please specify):

### Section 1: Internal validity

*In a well conducted RCT study…*  

<table>
<thead>
<tr>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes □  No □  Can’t say □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1.1 The study addresses an appropriate and clearly focused question.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes □  No □  Can’t say □</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1.2 The assignment of subjects to treatment groups is randomised.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes □  No □  Can’t say □</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1.3 An adequate concealment method is used.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes □  No □  Can’t say □</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1.4 Subjects and investigators are kept ‘blind’ about treatment allocation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes □  No □  Can’t say □</td>
<td></td>
</tr>
</tbody>
</table>
1.5. The treatment and control groups are similar at the start of the trial.  
   - Yes ☐  No ☐  Can’t say ☐

1.6. The only difference between groups is the treatment under investigation.  
   - Yes ☐  No ☐  Can’t say ☐

1.7. All relevant outcomes are measured in a standard, valid and reliable way.  
   - Yes ☐  No ☐  Can’t say ☐

1.8. What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?  
   - Yes ☐  No ☐  Can’t say ☐

1.9. All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).  
   - Yes ☐  No ☐  Can’t say ☐  Does not apply ☐

1.10. Where the study is carried out at more than one site, results are comparable for all sites.  
      - Yes ☐  No ☐  Can’t say ☐  Does not apply ☐

**SECTION 2: OVERALL ASSESSMENT OF THE STUDY**

2.1. How well was the study done to minimise bias?  
   Code as follows:  
   - High quality (++) ☐  
   - Acceptable (+) ☐  
   - Unacceptable – reject 0 ☐

2.2. Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?  

2.3. Are the results of this study directly applicable to the patient group targeted by this guideline?  

2.4. **Notes.** Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.
## Appenidix 3. Quality Assessment for individual study

### Methodology Checklist 2: Controlled Trials

<table>
<thead>
<tr>
<th>Study identification (Include author, title, year of publication, journal title, pages)</th>
</tr>
</thead>
</table>

**Guideline topic:**

**Key Question No:**

Before completing this checklist, consider:

1. Is the paper a randomised controlled trial or a controlled clinical trial? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a controlled clinical trial questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

Reason for rejection: 1. Paper not relevant to key question ☐ 2. Other reason ☐ (please specify):

### Section 1: Internal validity

*In a well conducted RCT study...*

<table>
<thead>
<tr>
<th></th>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>The study addresses an appropriate and clearly focused question.</td>
</tr>
<tr>
<td>1.2</td>
<td>The assignment of subjects to treatment groups is randomised.</td>
</tr>
<tr>
<td>1.3</td>
<td>An adequate concealment method is used.</td>
</tr>
<tr>
<td>1.4</td>
<td>Subjects and investigators are kept ‘blind’ about treatment allocation.</td>
</tr>
<tr>
<td>1.5</td>
<td>The treatment and control groups are similar at the start of the trial.</td>
</tr>
<tr>
<td>1.6</td>
<td>The only difference between groups is the treatment under investigation.</td>
</tr>
<tr>
<td>1.7</td>
<td>All relevant outcomes are measured in a standard, valid and reliable way.</td>
</tr>
<tr>
<td>1.8</td>
<td>What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
</tr>
<tr>
<td>1.9</td>
<td>All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
</tr>
<tr>
<td>1.10</td>
<td>Where the study is carried out at more than one site, results are comparable for all sites.</td>
</tr>
</tbody>
</table>

**SECTION 2: OVERALL ASSESSMENT OF THE STUDY**

| 2.1 | How well was the study done to minimise bias? | High quality(++) Good randomization, clear statement of study's aim, concealment, double blinding, similar participants' |
### 2.2 Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?

**Yes.**

The study was conducted in a systematic manner. It was of high methodological quality.

### 2.3 Are the results of this study directly applicable to the patient group targeted by this guideline?

**Yes.**

### 2.4 Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

- In the experimental group results of the paired t-test indicated that the mean (SD) intensity of pain in 4 cm dilation before and after the intervention were 5.88 (1.72) and 4.04 (1.51), respectively. In the control group the mean (SD) intensity of pain in 4 cm dilation before and after the intervention were 5.78 (1.99) and 6.38 (1.92), respectively.

- The mean intensity of pain after intervention had significantly decreased in the acupressure group, and increased in the control group significantly.
Methodology Checklist 2: Controlled Trials

Study identification  
Include author, title, year of publication, journal title, pages


Guideline topic:  
Key Question No:

Before completing this checklist, consider:

1. Is the paper a randomised controlled trial or a controlled clinical trial? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a controlled clinical trial questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

Reason for rejection: 1. Paper not relevant to key question □ 2. Other reason □ (please specify):

Section 1:  Internal validity

In a well conducted RCT study…  
Does this study do it?

| 1.1 | The study addresses an appropriate and clearly focused question. | Yes.  
The purpose of the study is clearly stated in the introduction. |
| 1.2 | The assignment of subjects to treatment groups is randomised. | Yes.  
Participants are randomly allocated to groups by two-step selection process. |
| 1.3 | An adequate concealment method is used. | No.  
No concealment method was reported. |
| 1.4 | Subjects and investigators are kept ‘blind’ about treatment allocation. | Yes. Triple blinding was adopted. |
| 1.5 | The treatment and control groups are similar at the start of the trial. | Yes. There were no significant difference between two groups such as parity (p=0.331), maternal age (p=0.379) and gestational age (p=0.603). |
| 1.6 | The only difference between groups is the treatment under investigation. | Yes. There were no important differences between treatment groups other than the treatment being studied. |
| 1.7 | All relevant outcomes are measured in a standard, valid and reliable way. | Yes. The outcome measures were clearly stated. Level of pain was measured by visual analogue scale at 3 points of time after intervention. The scale is a valid and reliable tool on estimating intensity of labor pain. |
| 1.8 | What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed? | Acupressure group: 14% Effleurage group: 16% Control group: 16% Participants dropped out for caesarean sections or pain medications. |
| 1.9 | All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis). | Not applicable. All participants are accounted for and none are lost to follow-up. |
| 1.10 | Where the study is carried out at more than one site, results are comparable for all sites. | Not applicable. The study was taken in only one site. |
## SECTION 2: OVERALL ASSESSMENT OF THE STUDY

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **2.1** | How well was the study done to minimise bias? | **Acceptable (+)**  
Clear statement of study's aim, good randomization, triple blinding, similar participants' characteristics.  
However, concealment method was unclear, where effect of intervention could be overestimated. |
| **2.2** | Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention? | **Yes.**  
The study was conducted in a systematic manner.  
It was of high methodological quality. |
| **2.3** | Are the results of this study directly applicable to the patient group targeted by this guideline? | **Yes.** |
| **2.4** | **Notes.** Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above. | -An open-ended questionnaire was also used to gather qualitative data about labor pain experience  
-Acupressure group reported significantly lower subjective pain scores at immediately (F=6.646, p=0.012), 30-min after (F=5.657, p=0.021), and 60-min after (F=6.783, p=0.012) the intervention. |
Methodology Checklist 2: Controlled Trials

### Study identification

*Include author, title, year of publication, journal title, pages*


### Guideline topic: Key Question No:

**Before** completing this checklist, consider:

1. Is the paper a *randomised controlled trial* or a *controlled clinical trial*? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a *controlled clinical trial* questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

**Reason for rejection:** 1. Paper not relevant to key question □ 2. Other reason □ (please specify):

### Section 1: Internal validity

*In a well conducted RCT study…*  

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Does this study do it?</th>
</tr>
</thead>
</table>
| **1.1** | The study addresses an appropriate and clearly focused question. | **Yes.**  
The purpose of the study is clearly stated in the introduction. |
| **1.2** | The assignment of subjects to treatment groups is randomised. | **Yes.**  
A computerized program was used to allocate the participants to one of three groups. |
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1.3 | An adequate concealment method is used. | **Yes.**

Paper strip of the allocation was put in consecutively numbered sealed opaque envelops. |
| 1.4 | Subjects and investigators are kept ‘blind’ about treatment allocation. | **Yes.**

The data collector was blinded to subject's allocation. Subjects were not blinded as they had been informed the aim of the study and those in control group could be aware of receiving no treatment. |
| 1.5 | The treatment and control groups are similar at the start of the trial. | **Yes.**

There were no significant differences between three groups such as age, educational level, gestational age, cervical dilatation before randomization. |
| 1.6 | The only difference between groups is the treatment under investigation. | **Yes.**

There were no important differences between treatment groups other than the treatment being studied. |
| 1.7 | All relevant outcomes are measured in a standard, valid and reliable way. | **Yes.**

The outcome measures were clearly stated. Level of pain before and after intervention was measured by visual analogue scale by data collector. |
| 1.8 | What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed? | Control group: 1.41% |
All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis). Intention-to-treat analysis was not mentioned.

Where the study is carried out at more than one site, results are comparable for all sites. Not applicable. The study was taken in only one site.

**SECTION 2: OVERALL ASSESSMENT OF THE STUDY**

| 2.1 | How well was the study done to minimise bias? | Acceptable (+)  
Clear purpose of study stated, good randomization, concealment, similar participants' characteristics. Although intention-to-treat was not observed, the effect of 1.41% missing values was relative small. |
| --- | --- | --- |
| 2.2 | Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention? | Yes.  
Statistical power was estimated on the principal outcome.  
Groups were compared regarding differences in pain intensity at different time intervals by ANOVA and post hoc Bonferroni tests to avoid Type I error. |
| 2.3 | Are the results of this study directly applicable to the patient group targeted by this guideline? | Yes. |
| 2.4 | Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above. |  
- Except immediately after treatment, the pain score of acupressure group is significantly lower than control group at all follow-up assessments (30, 60 and 120 minutes after treatment, p < 0.05).  
- There were no significantly higher mean pain ratings in the touch group in comparison to the acupressure, and in the control group in comparison to the touch group.  
- Effect of reducing pain by acupressure may not be absolutely conclusive as pharmacological pain relief was used during labour in different groups. |
Methodology Checklist 2: Controlled Trials

Study identification  
(Include author, title, year of publication, journal title, pages)

Guideline topic:  
Key Question No:  

Before completing this checklist, consider:

1. Is the paper a randomised controlled trial or a controlled clinical trial? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a controlled clinical trial questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+.  
2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

Reason for rejection: 1. Paper not relevant to key question □ 2. Other reason □ (please specify):

Section 1:  Internal validity

In a well conducted RCT study…

<table>
<thead>
<tr>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes. The purpose of the study is clearly stated in the introduction.</td>
</tr>
<tr>
<td>Yes. Blocks of 4 were used in randomization of women into the case and control groups</td>
</tr>
</tbody>
</table>

<p>| 1.1 | The study addresses an appropriate and clearly focused question. |
| 1.2 | The assignment of subjects to treatment groups is randomised. |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>An adequate concealment method is used.</td>
<td>Yes. Concealment was used in the study by using sealed, sequentially distributed envelopes opened by investigator.</td>
</tr>
<tr>
<td>1.4</td>
<td>Subjects and investigators are kept ‘blind’ about treatment allocation.</td>
<td>Yes. Single blinding was used. The patients were blinded about the intervention.</td>
</tr>
<tr>
<td>1.5</td>
<td>The treatment and control groups are similar at the start of the trial.</td>
<td>Yes. There were no significant difference between two groups such as maternal age (p=0.447), maternal BMI (p=576), gestational age (p=0.597) and education level.</td>
</tr>
<tr>
<td>1.6</td>
<td>The only difference between groups is the treatment under investigation.</td>
<td>Yes. There were no important differences between treatment groups other than the treatment being studied.</td>
</tr>
<tr>
<td>1.7</td>
<td>All relevant outcomes are measured in a standard, valid and reliable way.</td>
<td>Yes. The outcome measures were clearly stated. Levels of pain before and after intervention were measured by visual analogue scale. The scale is subjective as the severity of pain, but it is a reliable tool on calculating pain level.</td>
</tr>
<tr>
<td>1.8</td>
<td>What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>1.9</td>
<td>All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
<td><strong>Not applicable.</strong> All participants are accounted for and none are lost to follow-up.</td>
</tr>
<tr>
<td>1.10</td>
<td>Where the study is carried out at more than one site, results are comparable for all sites.</td>
<td><strong>Not applicable.</strong> The study was taken in only one site.</td>
</tr>
</tbody>
</table>

**SECTION 2: OVERALL ASSESSMENT OF THE STUDY**

<p>| | | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>How well was the study done to minimise bias?</td>
<td><strong>Acceptable (+)</strong> Adequate randomization, concealment, similar participants' characteristics.</td>
</tr>
<tr>
<td>2.2</td>
<td>Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?</td>
<td><strong>Yes.</strong> The study was conducted in a systematic manner. It was of high methodological quality.</td>
</tr>
<tr>
<td>2.3</td>
<td>Are the results of this study directly applicable to the patient group targeted by this guideline?</td>
<td><strong>Yes.</strong></td>
</tr>
</tbody>
</table>
| 2.4 | **Notes.** Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above. | -The severity of pain was significantly lower among patients received acupressure in labor.  
- Statistical analysis was performed using SPSS 15. Student’s t test and Chi square test were used.  
-Frequency on measuring severity of pain could be increased. |
Methodology Checklist 2: Controlled Trials

Study identification  (Include author, title, year of publication, journal title, pages)

Guideline topic: | Key Question No:
--- | ---

**Before** completing this checklist, consider:

1. Is the paper a randomised controlled trial or a controlled clinical trial? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a controlled clinical trial questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

Reason for rejection: 1. Paper not relevant to key question ☐ 2. Other reason ☐ (please specify):

### Section 1: Internal validity

*In a well conducted RCT study…*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>1.1</strong></td>
<td>The study addresses an appropriate and clearly focused question.</td>
</tr>
<tr>
<td></td>
<td>Yes.</td>
</tr>
<tr>
<td></td>
<td>The purpose of the study is clearly stated in the introduction.</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.2</strong></td>
<td>The assignment of subjects to treatment groups is randomised.</td>
</tr>
<tr>
<td></td>
<td>Yes.</td>
</tr>
<tr>
<td></td>
<td>A stratified randomization with a block size of 2 was used for recruitment of case and controls.</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>1.3</strong></td>
<td>An adequate concealment method is used.</td>
</tr>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td></td>
<td>Concealment was not reported in the study.</td>
</tr>
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<td></td>
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</tr>
</tbody>
</table>
| 1.4 | Subjects and investigators are kept ‘blind’ about treatment allocation. | Yes.  
Single blinding was used.  
The observer was blinded about the intervention. |
| 1.5 | The treatment and control groups are similar at the start of the trial. | Yes.  
There were no significant difference (p>0.05) between two groups such as  
gestational age, previous pregnancies or births,  
education level, occupation. |
| 1.6 | The only difference between groups is the treatment under investigation. | Yes.  
There were no important differences between treatment groups other than  
the treatment being studied. |
| 1.7 | All relevant outcomes are measured in a standard, valid and reliable way. | Yes.  
The outcome measures were clearly stated. Level of pain before and after  
intervention was measured by visual analogue scale through questionnaires. |
| 1.8 | What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed? | 0% |
| 1.9 | All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis). | Not applicable.  
All participants are accounted for and none are lost to follow-up. |
| 1.10 | Where the study is carried out at more than one site, results are comparable for all sites. | Not applicable.  
The study was taken in only one site. |
| 2.1 | **How well was the study done to minimise bias?** | Acceptable (+)  
Randomization, similar participants' characteristics, single blinding. |
| 2.2 | **Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?** | Yes.  
The study was conducted in a systematic manner. It was of high methodological quality |
| 2.3 | **Are the results of this study directly applicable to the patient group targeted by this guideline?** | Yes. |
| 2.4 | **Notes.** Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above. | - Pain intensity was lower in acupressure group, from immediately to 120 minutes after the intervention, with P<0.001 by the Fisher exact test  
- Pain intensity noted by the acupressure group was less than that noted by the control group. |
Methodology Checklist 2: Controlled Trials

**Guideline topic:**

**Key Question No:**

**Before** completing this checklist, consider:

1. Is the paper a **randomised controlled trial** or a **controlled clinical trial**? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a **controlled clinical trial**, questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

**Reason for rejection:** 1. Paper not relevant to key question 2. Other reason (please specify):

### Section 1: Internal validity

**In a well conducted RCT study...**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>The study addresses an appropriate and clearly focused question.</td>
<td>Yes. The purpose of the study is clearly stated in the introduction.</td>
</tr>
<tr>
<td>1.2</td>
<td>The assignment of subjects to treatment groups is randomised.</td>
<td>Can't say. Randomization was mentioned but method was not specified.</td>
</tr>
<tr>
<td>1.3</td>
<td>An adequate concealment method is used.</td>
<td>No. No concealment method was reported.</td>
</tr>
</tbody>
</table>


<p>| 1.4 | Subjects and investigators are kept ‘blind’ about treatment allocation. | Yes. Double blinding was used. Both participants and nurses (data collectors) were blinded to the group assignment. Participants were told either treatment could alleviate pain. |
| 1.5 | The treatment and control groups are similar at the start of the trial. | Yes. There were no significant difference between two groups such as parity (p=0.465), maternal age (p=0.643) and gestational age (p=0.814). |
| 1.6 | The only difference between groups is the treatment under investigation. | Yes. There were no important differences between treatment groups other than the treatment being studied. |
| 1.7 | All relevant outcomes are measured in a standard, valid and reliable way. | Yes. The outcome measures were clearly stated. Level of pain was measured by visual analogue scale at 3 points of time after intervention. The scale is a valid and reliable tool on estimating intensity of labor pain. |
| 1.8 | What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed? | Whole study: 15.7% Number of participants dropped out from each treatment arm was not specified. |
| 1.9 | All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis). | No. Intention-to-treat was not mentioned in text. |</p>
<table>
<thead>
<tr>
<th>1.1</th>
<th>Where the study is carried out at more than one site, results are comparable for all sites.</th>
<th>Not applicable. The study was taken in only one site.</th>
</tr>
</thead>
</table>

**SECTION 2: OVERALL ASSESSMENT OF THE STUDY**

| 2.1 | How well was the study done to minimise bias? | Low quality (0)  
Clear statement of study's aim, double blinding, similar participants' characteristics.  
But randomization, concealment methods are unclear. |
|-----|---------------------------------------------|--------------------------------------------------|

| 2.2 | Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention? | Yes.  
The study was conducted in a systematic manner.  
It was of high methodological quality. |
|-----|-------------------------------------------------|--------------------------------------------------|

<table>
<thead>
<tr>
<th>2.3</th>
<th>Are the results of this study directly applicable to the patient group targeted by this guideline?</th>
<th>Yes.</th>
</tr>
</thead>
</table>

| 2.4 | Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above. | - No significant differences between two groups on using analgesics in labor ($\chi^2 = 1.616, p = 0.204$) proportion of women using analgesics is lower in acupressure group.  
- Acupressure group reported significantly lower subjective pain scores at immediately (F=6.646, $p=0.012$), 30-min after (F=5.657, $p=0.021$), and 60-min after (F=6.783, $p=0.012$) the intervention. |
### Appendix 4. Set-up costs of implementing the acupressure to labouring women

<table>
<thead>
<tr>
<th>Manpower Costs</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Items</strong></td>
<td><strong>Item description</strong></td>
<td><strong>Item Cost</strong></td>
<td><strong>Amount</strong></td>
</tr>
<tr>
<td>Project director</td>
<td>Salary</td>
<td>$200/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Salary of ward manager</td>
<td>$335/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meeting Ward manager</td>
<td>$(200+335)/hr x 2 hr</td>
<td>$1070</td>
</tr>
<tr>
<td></td>
<td>Meeting project committee (3 times, 1 hour each)</td>
<td>$200/hr x 3 hr</td>
<td>$600</td>
</tr>
<tr>
<td>Chinese Medicine Practitioner</td>
<td>Salary 2-hr training</td>
<td>$235/hr x 2-hr</td>
<td>$470</td>
</tr>
<tr>
<td>Trainers</td>
<td>Salary of Registered midwives</td>
<td>$200/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Salary of Advanced Practice Nurses</td>
<td>$309/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attend training sessions</td>
<td>$(200+309)/hr x 2 hr x 2</td>
<td>$2036</td>
</tr>
<tr>
<td></td>
<td>Train the staff in 2 sessions</td>
<td>$(200+309)/hr x 1.5 hr x 2 x 2</td>
<td>$3054</td>
</tr>
<tr>
<td>Labour room staff</td>
<td>Salary of 10 Advance Practice Nurses</td>
<td>$309/hr x 10 = $3090</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Salary of 40 Nurse Midwives</td>
<td>$200/hr x 40 = $8000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attend training session</td>
<td>$(3090+8000)/hr x 1.5 hr</td>
<td>$16635</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Sub-total: $23,865</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material Costs</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Items</strong></td>
<td><strong>Item description</strong></td>
<td><strong>Item Cost</strong></td>
<td><strong>Amount</strong></td>
</tr>
<tr>
<td>Training</td>
<td>Photocopy of 10-page notes (50 copies)</td>
<td>$0.1 x 10 x 50</td>
<td>$50</td>
</tr>
<tr>
<td></td>
<td>VCD (5 copies)</td>
<td>$5 x 5</td>
<td>$25</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Printing of pain assessment forms</td>
<td>Provided by hospital</td>
<td>$0</td>
</tr>
<tr>
<td>Promotion</td>
<td>Posters (10 copies)</td>
<td>$20 x 10</td>
<td>$200</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Sub-total: $275</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set-up costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manpower</td>
<td>$23,865</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>$275</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Estimated total: $24,140</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix 5. Operational costs for implementing the innovation (3-month period)

<table>
<thead>
<tr>
<th>Operational Costs</th>
<th>Item Description</th>
<th>Item Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff</td>
<td>Salary</td>
<td>$200/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acupressure for 20min to 100 labouring women</td>
<td>$200/hr x20/60 min x100</td>
<td>$6,667</td>
</tr>
<tr>
<td>Evaluation of</td>
<td>Photocopies of evaluation forms (100 copies)</td>
<td>$0.1 x100</td>
<td>$10</td>
</tr>
<tr>
<td>the program</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Estimated total: $6,677
Appendix 6. Evidence-based guideline

Evidence-based protocol:

Using acupressure to reduce labour pain of primigravida women

First edition on 23 December 2014

Introduction

Intended users:

Nurse midwives in the labour room of the target hospital

Target population:

1) Primigravida women in labour;

2) Aged 18 or above;

3) Gestational age 37 weeks or above.

Aim

1) To provide an evidence-based guideline of using acupressure to reduce labour pain of primigravida women.

2) To standardize the nursing care offered to clients

Recommendations

Recommendation 1

*Obtain women's verbal consent before application of acupressure.*
Grade of recommendation:  A

Evidence: Clients' have rights to understand the treatment they are going to receive, the indication, procedure, and risks of it thoroughly. (Sehhatie-Shafaie et al., 2013) [1++] (Chung et al., 2003; Hjelmstedt et al., 2010; Hamidzadeh et al., 2012) [1+] (Lee et al., 2004) [0].

Recommendation 2

*Acupressure is applied by thumb on acupoints.*

Grade of recommendation:  A

Evidence: Four of the reviewed studies applied pressure onto specific acupoints with thumb (Sehhatie-Shafaie et al., 2013) [1++] (Hjelmstedt et al., 2010; Hamidzadeh et al., 2012) [1+] (Lee et al., 2004) [0], one applied thumb pressure and easer end of pencil alternatively (Chung et al., 2003) [1+].

Recommendation 3

*Performers of acupressure are trained in course.*

Grade of recommendation:  A

Evidence: To make sure the right acupoints are stimulated, acupressure was performed by those who had previously received acupressure training
Recommendation 4

Acupressure is applied onto acupoints Spleen 6 (SP6, Sanyinjiao) on both feet during uterine contractions for 1 minute and rest for 30 seconds, repeat for 5 minutes. Then change to pressure on Large Intestine 4 (LI4, Hegu acupoints) on both hands for 5 minutes. Repeat the cycle for 20 minutes.

Grade of recommendation: A

Evidence: Acupressure was applied during uterine contractions in four studies (Sehhatie-Shafaie et al., 2013) [1++] (Chung et al., 2003; Hjelmstedt et al., 2010; Hamidzadeh et al., 2012) [1+] (Lee et al., 2004) [0]. Acupressure was applied on SP6 acupoints only in three studies (Hjelmstedt et al., 2010; Kashanian and Shahali, 2010) [1+] (Lee et al., 2004) [0]. While a combination of SP6 and LI4 in one study, which was of high quality (Sehhatie-Shafaie et al., 2013) [1++]. The acupoints SP6 and LI4 are both related to labour pain relief, so a combination of them would be more suitable.
**Recommendation 5**

Evaluate the effectiveness of acupressure by documenting pain intensity at pre- and 60 minutes after the acupressure.

Grade of recommendation: B

Evidence: Ratings of pain level were performed prior to acupressure and 60 minutes afterwards (Hjelmstedt et al., 2010; Hamidzadeh et al., 2012) [1+] (Lee et al., 2004) [0]. The pain intensity was documented by asking subjective perception of the participants with VAS scale.

**Reference**


# Appendix 7. Evaluation form of using acupressure to reduce labour pain

<table>
<thead>
<tr>
<th>Evidenced-based guidelines of using acupressure to reduce labour pain</th>
<th>Case Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation form</td>
<td>(Patient Label)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date:</th>
<th>Time:</th>
</tr>
</thead>
</table>

## Part 1: Demographics

1. Age: __________________
2. Body weight: __________________
3. Education level: __________________

## Part 2: Labour

1. Start time of acupressure: __________________
2. Pain score (0-10) at start: __________________
3. Duration of acupressure: __________________
4. Pain score (0-10) at 60 min: __________________
5. Use of other analgesics: Entonox / Pethidine / Epidural Analgesia
6. Length of labour: __hr__min (1\(^{st}\) stage)  
                        __hr__min (2\(^{nd}\) stage)  
                        __hr__min (3\(^{rd}\) stage)
7. Mode of delivery: NSD / V/E / Forceps / Caesarean Section
8. Total blood loss: __________________ mL
9. Complications (Please specify): __________________

## Part 3: Remarks
**Appendix 8. Questionnaire on using acupressure to reduce labour pain**

Dear all,

We would like to know your comments about acupressure in labour. Please rate by circling the 5-point scale.

(1= totally disagree; 2= slightly disagree; 3 neutral; 4= slightly agree; 5 = totally agree)

Thank you for spending time to give us valuable comments.

<table>
<thead>
<tr>
<th>Statements</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acupressure is useful in reducing labour pain.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I am satisfied with the acupressure treatment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I shall use acupressure in labour to reduce pain in the future.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I would recommend other people to use acupressure when they are in labour.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other comments:**
Dear all,
We would like to know your comments about the new guidelines for using acupressure to reduce labour pain in labour room.
Please rate by circling the 5-point scale.
(1= totally disagree; 2= slightly disagree; 3 neutral; 4= slightly agree; 5 = totally agree)

<table>
<thead>
<tr>
<th>Statements</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I understand the reason of the acupressure guidelines.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The acupressure guideline is well structured.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The guidelines are easy to understand.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The guidelines are easy to follow.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I am satisfied with the guideline.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I can get assistance from the labour pain management committee.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I think acupressure helps to reduce labour pain in women.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I think the acupressure guidelines add my workload.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. The acupressure guideline increases my job satisfaction.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Recommendations:
REFERENCES


Bibliography