THE EFFECT OF SELF-PERINEAL CARE EDUCATION ON KNOWLEDGE, EPISIOTOMY PAIN AND WOUND HEALING AMONG PRIMIPARA MOTHERS

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THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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ORIGINAL LITERARY WORK DECLARATION

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THE EFFECT OF SELF-PERINEAL CARE EDUCATION ON KNOWLEDGE, EPISIOTOMY PAIN, AND WOUND HEALING AMONG PRIMIPARA MOTHERS

ABSTRACT

A nurse-midwife ensures all mothers receive the best care to be safe and healthy throughout pregnancy and childbirth. However, it is challenging for midwives to provide holistic nursing care as postpartum mothers spend only a brief period in the postnatal ward due to the high demand for the facilities there. The primary objective of this study was to investigate the effect of self-perineal care education (SPC education) on knowledge, episiotomy pain, and wound healing outcomes among primipara mothers and explore their opinions regarding self-perineal care education and their challenges and practices at home. Mixed-methods research using the embedded design was conducted to address the research questions. A quasi-experimental study with a non-equivalent control group pre-test and post-test design was employed, supported by a qualitative study. A total of 130 primipara mothers were selected using consecutive sampling and were placed into the intervention group (n=65) and the control group (n=65). The structured self-perineal care education was given in two phases during the antenatal and postnatal periods. Self-perineal care knowledge was assessed using 16 multiple-choice questions with a single response. The Numerical Pain Rating Scale (NPRS) was used to record pain scores, and the REEDA scale (Red, Oedema, Ecchymosis, Discharge, Approximation) was used to assess wound healing outcomes. As for the qualitative, a face-to-face, in-depth interview session was done. Structured questions were asked to 12 primipara mothers from the intervention group to explore their self-perineal care practice and the challenges they faced at home.

This interview was carried out six weeks post-delivery follow-up in Maternal Child Health Clinic. The findings showed no significant difference in the SPC knowledge

scores between the two groups at baseline (p=.155). Post-analysis, there was a significant increase in the SPC knowledge score in the intervention (p < .001*)* but not in the control group (p= .133). There was no significant association between the primipara mothers' demographical variables and the change in their knowledge score in the intervention group. The overall pain score and REEDA score were significantly lower in the intervention group than in the control group for the first seven days post-delivery, with a p-value < .001 except for 4 hours of baseline observation. For each activity associated with daily living, the scores were lower in the intervention group for the seven days post-delivery. Two main themes emerged from the study: "perceived benefit" and "challenges of self-perineal care." Seven sub-themes identified from the main themes such as "self-awareness," "boosted confidence level," "self-empowerment, "enhancement of wound healing," "lack of family support, "and "lack of knowledge and resources in using mobile applications," and "traditional beliefs." The primipara mothers perceived the benefit of self-perineal care education during antenatal as increasing their knowledge and improving their practice. However, some barriers to good practice persisted. These should be anticipated in the future to facilitate self-perineal care education in the clinical setting and to improve outcomes. Using a mobile application to provide accurate, reliable, consistent information and to allow self-reporting on pain scores and wound healing outcomes empowers women to take responsibility for their own health.

Keywords: self-perineal care education, knowledge, episiotomy pain, wound healing, primipara mother

KESAN PENDIDIKAN PENJAGAAN PERINEUM KENDIRI TERHADAP PENGETAHUAN, SAKIT EPISIOTOMY DAN PENYEMBUHAN LUKA DALAM KALANGAN IBU PRIMIPARA

ABSTRAK

Seorang jururawat bidan memastikan kesemua ibu mendapat perawatan terbaik agar selamat dan sihat sepanjang kehamilan dan proses kelahiran. Bagaimanapun, jururawat bidan menghadapi cabaran memberi penjagaan holistik semasa post natal kerana ibu hanya tinggal di wad dalam tempoh yang singkat selepas bersalin berikutan permintaan yang tinggi terhadap fasiliti tersebut. Objektif utama kajian ini adalah untuk mengkaji keberkesanan pendidikan penjagaan perineal kendiri terhadap pengetahuan, kesakitan luka episiotomi dan hasil penyembuhan luka di kalangan ibu primipara dan untuk meneroka pendapat mereka mengenai pendidikan penjagaan perineum kendiri cabaran dan praktik mereka di rumah. Kajian kaedah campuran menggunakan reka bentuk terkandung telah dijalankan untuk menangani soalan soalan kajian. Satu penyelidikan kuasi eksperimen dengan reka bentuk kawalan (tidak setara) praujian-pascaujian telah digunakan dan disokong oleh kajian kualitatif. Sejumlah 130 ibu primipara telah dipilih menggunakan persampelan berturut-turut ke dalam kumpulan intervensi (n=65) dan kumpulan kawalan (n=65). Pendidikan berstruktur penjagaan perineum kendiri diberikan dalam dua fasa semasa tempoh antenatal dan selepas bersalin. Pengetahuan tentang penjagaan diri perineum dinilai menggunakan 16 soalan aneka pilihan dengan satu respon. Skala Penilaian Kesakitan berangka (NPRS) digunakan untuk merekod skor kesakitan, dan skala REEDA digunakan untuk menilai hasil penyembuhan luka. Bagi kualitatif, sesi temu bual mendalam telah dilakukan secara bersemuka. Soalan berstruktur telah ditanya kepada 12 ibu primipara dari kumpulan intervensi yang telah melakukan

penjagaan perineum sendiri di rumah untuk meneroka amalan penjagaan perineum diri mereka dan cabaran mereka di rumah. Temu bual ini dilakukan pada minggu ke enam post-natal kepada ibu-ibu terpilih dari kumpulan intervensi yang datang untuk lawatan susulan di Klinik Kesihatan Ibu dan Anak. Hasil kajian menunjukkan tiada perbezaan yang signifikan dalam tahap pengetahuan SPC antara kedua-dua kumpulan pada amnya (p=.155). Selepas analisis, terdapat peningkatan ketara dalam skor pengetahuan SPC dalam kumpulan intervensi (p <.001) tetapi tidak dalam kumpulan kawalan (p=.133). Tidak terdapat perkaitan yang signifikan antara pembolehubah demografi ibu primipara dan perubahan skor pengetahuan dalam kumpulan intervensi. Skor kesakitan dan skor REEDA adalah jauh lebih rendah dalam kumpulan intervensi berbanding kumpulan kawalan untuk 7 hari pertama selepas bersalin dengan nilai p <.001 kecuali untuk pemerhatian pada 4 jam yang dilakukan sebagai perbandingan. Bagi setiap aktiviti kehidupan seharian, skor kesakitan lebih rendah dalam kumpulan intervensi untuk tujuh hari selepas penghantaran. Dua tema utama hasil daripada kajian itu, termasuk "faedah yang diperolehi" dan "cabaran penjagaan perineum diri". Tujuh subtema telah dikenalpasti dari tema utama, termasuk "kesedaran diri", "meningkatkan tahap keyakinan", "memperkasakan diri", "meningkatkan penyembuhan luka", "kurang sokongan keluarga", dan "kurang pengetahuan dan sumber dalam menggunakan aplikasi mudah alih ", dan "kepercayaan kaedah tradisional". Ibu-ibu primipara mendapati pendidikan penjagaan perineum kendiri memberi manafaat semasa antenatal untuk meningkatkan pengetahuan dan amalan mereka. Namun terdapat pelbagai faktor yang harus ditangani untuk melaksanakan pendidikan penjagaan perineum kendiri di klinikal dan untuk mendapat hasil yang optima di kalangan ibu primigravida.

Maklumat yang konsisten dan pelaporan diri menggunakan aplikasi mudah alih mengenai skor kesakitan dan hasil penyembuhan luka memperkasakan wanita terhadap penjagaan kesihatan diri.

Kata kunci: penjagaan perineum kendiri, pengetahuan, sakit luka episiotomi, penyembuhan luka , ibu primipara.

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ANC	:	Antenatal Clinic
CONSORT	:	Consolidated Standards of Reporting Trials
CVI	:	Content Validity Index
GEE	:	Generalized Estimating Equation
MCH	:	Maternal Child Health
MDG	:	Millennium Development Goal
MMR	:	Mixed-Method Research Approach
MOH	:	Ministry of Health Malaysia
NMRR	:	National Medical Research Registry
NPRS	:	Numerical Pain Rating Scale
RCT	:	Randomised Control Trial
REEDA	:	Redness, Oedema, Ecchymosis, Discharge, Approximation
SDG	:	Sustainable Development Goals
SPC Education	:	Self-Perineal Care Education
SPSS	:	Software Statistic Package of Social
VAS	:	Visual Analog Scale
WHO		World Health Organisation

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The postnatal period begins immediately after the birth of a child and extends for about six weeks (Joseph et al., 2020). The postnatal period is an essential phase in the mother's life. Postnatal care is one of the most important aspects of maternal healthcare not only for the prevention of impairment and disabilities but also for the reduction of maternal mortality (Kanwar et al., 2018). Maternal and child care is paramount in the health service delivery system because the mother and her new-born are vulnerable to society related to the childbearing process (Salgaonkar, 2020).

The postpartum period is crucial for a woman as physiological and psychological changes occur and she takes on new roles and responsibilities (Zaki et al., 2019) . Most maternal morbidity and mortality are preventable. Previous studies have shown that mothers usually experience considerable distress and discomfort in the postpartum period following childbirth (Priddis et al., 2014; Zaki et al., 2019). During this period, self-care is crucial to maintain the good health of the mother.

The Malaysian Ministry of Health is exerting great effort to improve maternal health and childcare. Health promotion such as breastfeeding, pap smear and maternal nutrition during antenatal and postnatal periods are given regularly at the maternal-child health clinic. A recent trend in our healthcare system is self-care. Self-care refers to an individual's actions to promote their health, prevent diseases, limit their illness, and restore their health without help (Farrell et al., 2001; Lalitha, 2016). Self-care in the postpartum period includes personal hygiene, perineal care, breast care, nutrition, and postpartum care. Postpartum self-care ensures mother and baby are free from infection (Lalitha, 2016).

Therefore, nurse midwives must provide sufficient information and knowledge about self-care activities, healthy practices, and lifestyles to pregnant mothers. Self-care strategies should be considered as part of a comprehensive treatment plan.

Self-perineal care is one of the elements of self-care that the mother should practise reducing maternal mortality and morbidity during postpartum. Based on the researcher's observation, structured self-perineal care education is not practised in many government settings during the antenatal phase but is only given as routine advice to postnatal mothers on perineal care before being discharged. Lack of self-perineal care knowledge leads to complications such as puerperal perineal infection, wound breakdown, and other genital tract infections (Gadade et al., 2018). Midwives have a significant role in preventing puerperal complications by empowering mothers with knowledge, and providing early intervention and treatment by continuously monitoring their progress.

Health education is an essential component of maternal and child health nursing care. The midwives should use the pregnancy phase to educate mothers as pregnancy is the only time in a woman's life when she has frequent contact with her health care providers. The midwives must take this opportunity to create awareness among the primigravida mothers as pregnancy is a powerful "teachable moment" (Phelan, 2010). The quality of antenatal care is a precursor to a positive experience of quality of care during birth (Cornish & Siassakos, 2021).

The nurse-midwives can play a vital role in providing supportive educative care to women, such as promoting a healthy lifestyle and maintaining good personal hygiene. This is supported by Orem's Theory by Hartweg (1991), that the nursing agency's supportive educative function might improve information-education-communication to meet the client's needs. Establishing a positive network with a mother will allow for more

effective communication and the opportunity to address perineal care and early detection of a delay in healing and possible infection.

Self-perineal care education (SPC education) is a good alternative in an environment with a high nurse-patient ratio. SPC education supplemented with mobile application engages mothers in the educational process and enables the collection of feedback from mothers more efficiently. The mobile application has been described in previous studies as an effective tool for knowledge sharing, interaction, and monitoring of the outcome of educational interventions (Şat & Sözbir, 2018). Primigravida women who interact with the information in the mobile application may become more engaged in their care (Ledford et al., 2016). This health education programme on self-perineal care during the antenatal period is necessary for expectant women, particularly primipara mothers.

1.2 Background of the Study

The background of the study describes the concept and context of this study, including the episiotomy wound, pain, the healing process, the concept of self-care and the maternal and child health system in Malaysia.

1.2.1 Episiotomy Wound

Over the last century, episiotomy has been recommended to facilitate the delivery of the foetus and to protect the woman's pelvic floor (Sheikhan et al., 2011). An episiotomy prevents the woman's perineum from tearing or over-stretching during labour, minimising perineal damage and long-term complications (Farrag et al., 2016). However, reviews of the scientific literature in the early 1980's concluded that there was insufficient evidence to justify the routine use of episiotomy (Thacker & Banta, 1983). Despite the evidence against the routine use of episiotomy, it is still the most common surgical procedure for women (Pillitteri, 2010).

Approximately 85% of vaginal births are related to perineal trauma, a perineal tear, or an episiotomy (Jones et al., 2019). According to Kaur et al. (2015), perineal pain due to an episiotomy wound is most commonly associated with vaginal delivery. Although episiotomy could decrease tears, the wound can lead to an inflammatory process and cause pain and other complications.

Perineal infection is associated with wound dehiscence, granulation tissue formation, dyspareunia, and pelvic floor dysfunction (Jones et al., 2019). Bacterial infection and improper episiotomy wound healing can lead to prolonged and postpartum morbidity. According to Kamel and Khaled (2014), infection in episiotomy wounds remains the most common cause of wound dehiscence, leading to major physical, psychological, and social problems if left untreated An infected episiotomy manifests as a surgical site infection and can lead to generalised sepsis (Deshpande et al., 2019).

Deshpande et al. (2019) reported that 70% of childbirth-related perineal trauma wound infection cases were diagnosed between postpartum day 7 to day 14. The chief complaint was pain at the episiotomy site. Escherichia coli and Klebsiella pneumoniae were the primary microorganisms found in infected wounds (Deshpande et al., 2019). Another study by Jones et al. (2019) reported the incidence of childbirth-related perineal trauma wound infection ranged from 0.1% to 23.6%, and wound dehiscence from 0.21% to 24.6%. However, the number of cases is relatively small, so the fundamental problem of episiotomy wound breakdown could not be explored in detail.

Perineal pain due to an episiotomy wound is debilitating and affects mobility in women. Many mothers reported pain during sitting, walking, breastfeeding, and caring for the baby (Beleza et al., 2017; East et al., 2012). Mothers that have adequate knowledge related to self-perineal care, can prevent infection and pain (Praveen et al., 2018).

1.2.2 Self-Perineal Care Education

Self-perineal care is washing the genital and rectal areas of the body. The term self-perineal care means the mother cleans the perineum four times a day with lukewarm water and bath soap to promote the healing and comfort of an episiotomy wound (Louis Shanthi, 2012).

SPC education consists of instruction on appropriate interventions such as proper cleansing of the perineum, frequent changing of sanitary pads, a regular warm shower, applying an ice pack, sitz bath, and Kegel exercise, all of which can decrease the pain associated with perineal trauma and is cost-effective as it can be done at home (Mohamed & El-Nagger, 2012; Noronha, 2004; Raman, 2015).

Following childbirth, taking good care of the perineum is crucial to prevent infection and hasten the recovery of the pelvic and rectal muscles. Poor self-perineal hygiene leads to infection and other complications like discomfort and episiotomy-related perineal pain (Gadade et al., 2018). The purpose of self-perineal care is first to make the patient clean and comfortable by removing lochia from external genitalia and preventing irritation of the vulva. Secondly, it avoids infection and promotes the healing of a perineal wound by preventing the entry of exogenous infection. Self- perineal care makes the patients clean and comfortable, preventing the entry of exogenous microorganisms into the genital tract by promoting healing of the perineum and assisting in the protection of any perineal wound and uterus (Mathews, 2020). Therefore, education on self-perineal care is crucial to preventing infection and should be imparted as early as the antenatal phase.

Mothers' awareness regarding self-care during the postpartum period is one of the most important measures to reduce maternal morbidity and mortality. SPC education can equip a woman with the knowledge to meet her health needs and seek prompt medical attention (Deshmane & Memchoubi, 2018). Self-perineal care promotes wound healing,

reduces pain (Mohamed & El-Nagger, 2012) and allows a woman to care for her child. Effective self-perineal care can reduce pain and enhance wound healing outcomes following childbirth (Ari et al., 2019)

SPC education supplemented with a mobile application to provide consistent information on perineal care is a viable option as it allows new mothers to obtain information anytime and anywhere by simply using their smartphones. The use of mobile applications can reduce the number of health education sessions as all relevant information can be accessed using the mother's smartphone. Due to limited resources and high patient loads in the maternal-child health clinic, it is difficult for nurse-midwives to consistently offer complete care to individual clients to prevent puerperal complications (Noronha, 2004).

Following an episiotomy, complications can arise due to penetration of the episiotomy incision into deeper structures and various other reasons. The primary complications are extensive blood loss, an extension of the wound, perineal lacerations, postpartum perineal pain, wound dehiscence, and dyspareunia, any of which can cause discomfort and interfere with mother and child bonding (Jovanovic et al., 2011). Following an episiotomy, activities such as sitting, walking, squatting, bending, urinating, and defecating causes great pain in the perineum muscles (Pillitteri, 2010). These factors can lead to discomfort among postpartum mothers and interfere with mother and child bonding.

1.2.3 Maternal Child Health System in Malaysia

The World Health Organisation (WHO) envisions that every pregnant woman and new-born should receive quality care during pregnancy, childbirth, and postnatal (WHO, 2016). According to the WHO (2016), the specific goals of maternal and child health care

are to reduce maternal, perinatal, new-born, and childhood mortality and morbidity, to promote reproductive health and to develop the physical and psychosocial health of children and adolescents in the family. According to the Malaysia Ministry of Health, MOH (2020), Malaysia's maternal and child health care has followed the WHO guidelines and now provides exceptional care for safe motherhood and healthy living during antenatal, intrapartum, and postpartum.

Malaysia achieved significant progress in improving maternal health care and services during the era of the Millennium Development Goals (MDG) (MOH, 2020). It continues to work toward achieving the Sustainable Development Goals (SDG), which provide an opportunity for the international community to collaborate and accelerate progress in improving maternal health for all women, in all countries, and under all circumstances. The fifth Millennium Development Goal includes reducing maternal mortality by 75% and ensuring universal access to reproductive health care. A mother's healthcare includes disease prevention, disease detection through screening tests, and treatment to maintain optimum health (MOH, 2020).

Malaysia's main maternal health care components are antenatal, intrapartum, and postnatal care. The main objective of antenatal care is to promote and maintain the mother's health during pregnancy, ensure the birth of a mature and healthy baby, identify risk factors, and prevent complications. Intrapartum care prevents infection and prevents injuries to both mother and child. It is crucial to detect and manage complications during labour, such as antepartum haemorrhage, prolonged labour, obstructed labour, malpresentation, and cord prolapse. Resuscitation of a distressed baby is mandatory. Postnatal care promotes breastfeeding, prevents puerperal complications, and establishes good nutrition for both the baby and the mothers. Educating mothers and families on various aspects of mother and child care is also essential (Mathews, 2018).

Many health promotion programs are developed by maternal and child health clinics, such as breastfeeding, child immunisation, nutrition for pregnant mothers, and safe motherhood. Mothers are also taught when to seek medical attention for signs and symptoms such as unusual pain, per vagina bleeding, upper limb lower limb oedema or face, headache, vision, blurring, high fever, and reduced foetal movement. Mothers are also advised on family planning and psychological preparation for their role as mothers (MOH, 2020). Inadequate postnatal care can reduce the early detection and management of complications and diseases. Holistic and quality healthcare for mothers will decrease the morbidity and mortality rates among mothers and new-borns.

Maternal morbidity and mortality are preventable with timely management by skillednurse midwives working in hospitals and community setting. A nurse- midwife is a registered nurse who has completed nursing and midwifery education leading to practice as a registered nurse. In Malaysia, a nurse-midwife is certified by the Midwifery Board of Malaysia. A nurse-midwife has a significant role in preventing maternal and new-born complications by providing early health education and intervention (MOH, 2020).

During the antenatal period, a nurse-midwife should provide space for health promotion and health education activities related to pregnancy and childbirth. A nurse-midwife should also provide physical and psychological preparation for the mother during labour. During intrapartum, as most labour is spontaneous and ends with normal delivery, the nurse-midwife's primary role is to support the mother and her companion and monitor the progress of labour. The mother must be referred immediately if complications are detected (MOH, 2020). One of the main concerns of a nurse-midwife during the postpartum period is to provide comfort to the mother, help relieve pain, prevent infection, and enhance the healing of episiotomy wounds. Midwives are

responsible for affording care and health attentiveness to women during the antenatal, intrapartum, and postpartum phases (Gomathi et al., 2018). Thus, it becomes their responsibility to identify ways to prevent and reduce maternal morbidity and identify cost-effective measures for relieving pain. SPC education for primigravida mothers can be enhanced by introducing a digital phone application that provides fast, reliable, convenient access to accurate information anywhere and anytime.

1.3 Problem Statement

Perineal management is an important aspect of midwifery care. Nurse-midwives significantly contribute to the care of perineal trauma following childbirth and play a substantial role in perineal care, pain relief, infection prevention, and wound healing following an episiotomy. Inadequate postnatal education can reduce opportunities for early detection and management of childbirth-related problems, such as puerperal perineal infection, wound breakdown, and other infections associated with the genital tract (Gadade et al., 2018)

Many studies in various parts of the world have reported a moderate level of self-perineal knowledge among mothers (Gadade et al., 2018; Joseph et al., 2020; Rahayu et al., 2017; Timilsina & Dhakal, 2015). Knowledge of primipara mothers needs to be investigated as primipara mothers in the study hospital are only given routine postnatal care during the postnatal period, and no structured teaching on self-perineal care is given to the antenatal mothers.

After childbirth, it is crucial to care for the perineum to avoid infection and promote the healing of pelvic muscles. One of the primary challenges faced by midwives is educating the new mother and her family. Once discharged home, mothers are expected to do self-perineal care to clean the external genitalia and the surrounding area at the

perineum (Priddis et al., 2014). Most mothers face challenges performing self-perineal care due to perineal pain and lack of knowledge, especially with episiotomy wounds. In addition, most mothers are ignorant regarding postnatal care (Sheikhan et al., 2011).

Generally, mothers are in the postnatal ward following childbirth only for a brief time, usually a maximum of one day for a primipara mother without complications due to the high demand for the facilities. During this short time, the mothers can only be provided with brief information related to perineal care. Therefore, insufficient knowledge of self-perineal care will not empower mothers during the postnatal period. There is limited evidence of wound dehiscence as many women do not report back to the same hospitals where they were delivered, causing insufficient data on the incidence of post-episiotomy infection (Deshmane & Memchoubi, 2018).

Due to the lack of evidence, managing perineal trauma varies widely between health institutions. Even though nurse-midwives have a significant role in identifying and educating mothers (Wanchai & Armer, 2018), self-perineal care is not prioritised compared to other issues in health education. Since there was no structured teaching in the study hospitals, the knowledge of parturient related to perineal care has not been well documented.

Self-perineal care education supplemented with a mobile application is a complementary strategy to reinforce the knowledge of self-perineal care for women with consistent information via modern technology. Overall, SPC education is highly recommended to broaden a pregnant mother's knowledge of self-perineal care antenatally and to reinforce it during the postnatal period. Primigravida mothers are a significant target group since there is a strong possibility of their returning for a subsequent pregnancy; therefore, knowledge of self-perineal care imparted to them will be beneficial for a long-term purpose.

Most of the time, mothers are guided by the people closest to them, such as their mother, mother-in-law, grandmothers, and sisters, based on their own previous experience. The primipara mothers easily accept culture-related practices and taboos because they are particularly vulnerable at that moment. Cultural practices and taboos can lead to malpractices among primipara mothers, such as applying herbal medication to the wound, which may cause infection and wound breakdown (Fadzil et al., 2016). It would be preferable if the mothers were empowered with proven self-perineal care information during their contact with the midwives at the antenatal, intrapartum, and postpartum phases. Thus, this will prevent the primipara mothers from accepting any malpractice related to misinformed cultural practices and taboos.

Activities such as sitting, walking, urinating, defecating, squatting, and bending can cause great pain to the perineum muscles. An episiotomy wound is expected to heal within a short, predictable time without significant consequences. However, the perineal region is also vulnerable to the growth of pathogenic organisms due to moisture in a poorly ventilated area (Missiriya, 2016). Thus, primipara mothers who have access to information and support are likely to be discerning about their self-care

Pain and wound healing are two dominant issues that midwives recognise during post-delivery. Prolonged pain due to post-episiotomy done during childbirth will cause poor wound healing and wound breakdown. However, pain and the wound healing process may not be seen during their stay in the hospital as these usually occur later at home. Perineal pain causes physical trauma for mothers, results in emotional traumas, and influences their quality of life, mental health, and mother-child communication (Jahdy et al., 2013; Khajavi Shojae et al., 2010). The consistent practice of self-perineal care is expected to prevent infection, reduce pain and enhance wound healing outcomes.

Educating via mobile applications is growing along with communication technology and the need to deliver information consistently and reliably, especially during a pandemic. It enables mothers to obtain information anytime and anywhere using their smartphones. It is also in line with Mehl et al. (2018) who suggest that digital health strategies have the potential to strengthen healthcare systems, thereby achieving the United Nations Sustainable Development Goals (SDGs).

This study introduced personalised teaching to primipara mothers, and all the information on SPC education was uploaded onto a mobile application. Previous studies only conducted a conventional face-to-face teaching session approach during the postpartum period (Oleiwi, 2010; Shaban et al., 2018). No evidence was found on the practice of self-perineal care education in Malaysia.

1.4 Research Hypotheses

These are the hypotheses for the current study:

1.4.1 Null Hypotheses:

HOI: There is no effect of self-perineal care education on the mean total knowledge score among primipara mothers.

HO2: There is no association between primipara mothers' demographic data and the mean difference in total knowledge scores in the intervention group.

HO3: There is no effect of self-perineal care education on wound healing outcomes among primipara mothers.

HO4: There is no effect of self-perineal care education on the overall mean total pain score and pain interference during selected daily activities among primipara mothers.

1.4.2 Alternative Hypotheses

HAI: There is an effect of self-perineal care education on the mean total knowledge score among primipara mothers.

HA2: There is an association between primipara mothers' demographic data and the mean difference in total knowledge scores in the intervention group.

HA3: There is an effect of self-perineal care education on wound healing outcomes among primipara mothers.

H4: There is an effect of self-perineal care education on the overall mean total pain score and pain interference during selected daily activities among primipara mothers.

1.5 Research Questions

This study attempted to answer the following research questions:

1. What is the effect of self-perineal care education on the mean total knowledge score among primipara mothers?
2. What is the association between primipara mothers' demographic data and the mean differences in the total knowledge score in the intervention group?
3. What is the effect of self-perineal care education on wound healing outcomes among primipara mothers?
4. What is the effect of self-perineal care education on the overall mean total pain score and pain interference during selected daily activities among primipara mothers?
5. What are the primipara mother's opinions of self-perineal care education and the experiences and challenges in performing self-perineal care at home?

1.6 Objectives

1.6.1 General Objective

The primary objective of this study is to investigate the effect of self-perineal care education on knowledge, episiotomy pain, and wound healing outcomes among primipara mothers.

1.6.2 Specific Objectives

The specific objectives of the study:

1. To measure the mean total knowledge score among primipara mothers in both intervention and control groups.
2. To determine the association between primipara mothers' demographic data and mean differences in the total knowledge score in the intervention group.
3. To determine the difference in wound healing outcomes among primipara mothers in both groups.
4. To determine the difference in the overall mean total pain score and pain interference during selected daily activities among primipara mothers in both groups.
5. To explore primipara mothers' opinion of SPC education, experiences, and challenges in performing self-perineal care at home.

1.7 Significance of the Study

Perineal management is a vital element of midwifery care. Thus, SPC education is a way to improve a mother's knowledge of self-perineal care during pregnancy and post-childbirth. Nurse-midwives with structured SPC education can significantly contribute to the care of perineal trauma following childbirth and play a substantial role in perineal care, pain reduction, infection prevention, and the enhancement of wound healing

following an episiotomy. They can play an advocacy role during antenatal, intrapartum, and postpartum periods.

In the modern era, nurse-midwives must empower mothers and family members to participate in their health care. Mothers can be trained to self-report their pain score and wound healing outcomes using mobile applications in this context. They can be given such information as to prevent infection and reduce symptoms before seeking medical attention. Ignorance of self-perineal care among primipara mothers reduces the opportunity for early detection and delays the effective management of complications during the postnatal period.

This study can facilitate the midwives' teaching of regular self-perineal care as part of their routine antenatal care or other health education topics such as breastfeeding. Primigravida mothers are most likely to come back for any subsequent pregnancy. They will benefit from the knowledge in the long term.

Following SPC education in this study, a mobile application was uploaded to the participants' smartphones so they could access all the information related to perineal care. This not only dispensed with the usual pamphlet with limited space but also facilitated data collection. This study fills the gap in existing studies which used only conventional methods, such as posters and pamphlets, to teach mothers. Primipara mothers in this study had fast, reliable, convenient access to accurate information using their smartphones. Not only was this knowledge more accurate than sources they usually accessed on the internet, but also, the mothers appeared to understand the issues better than after two teaching sessions. The researcher was always there to answer their questions at any time. Utilising a mobile application also allowed the researcher to follow up with the mothers till delivery and establish a good rapport with them.

Supplementary information on self-perineal care by mobile application is a good alternative. With this option, mothers can refer to the information at any time. An added benefit is that the mothers need not spend much time at healthcare facilities for their health education sessions and therefore they are less exposed to the hospital environment, especially important during a pandemic.

Nurse educators should emphasise to students the use of non-pharmacology methods such as regular self-perineal care, ice packs, sitz baths, and Kegel exercises to reduce episiotomy pain and enhance wound healing. Implementing such an education programme and keeping a record of the incidence of wound breakdown in the postnatal to audit purposes will help reduce wound dehiscence among postnatal mothers (Jones et al., 2019).

Primipara mothers practise self-perineal care when they believe that the proposed new behaviour will reduce pain, enhance wound healing, and overcome the challenges of self-care. The knowledge of self-perineal care can empower the mother to care for the perineum after childbirth to prevent infection and promote the healing of pelvic muscles. SPC education equips the primipara mothers with the knowledge to meet their health needs and seek prompt medical attention when necessary.

Once SPC knowledge is adopted in daily practice, the primipara mothers are empowered to take charge of their health: they become more competent, independent, and confident in caring for themselves at home. Self-reporting via mobile applications increases privacy among mothers as they can key in their results using a smartphone rather than answering phone calls, leading to embarrassment in the presence of family members. Mothers with sufficient knowledge meet their health needs including maintaining hygiene and comfort, and identifying abnormalities when seeking medical assistance.

Reduced episiotomy pain and wound healing enhancement allow mothers to participate normally in daily activities, such as walking, sitting, urinating, and defecating. It also allows the mother to be involved in maternal caring for her new-born. Perineal care education can lower the prevalence of episiotomy wound dehiscence among primipara mothers during the postnatal period. Early identification of the signs and symptoms of infection can reduce mortality and morbidity among postnatal mothers. This education offers an effective strategy to reduce the cost of managing primipara mothers who return to gynaecology wards with wound breakdown complications. This study is also in line with the policy of the Ministry of Health on disease prevention.

1.8 Conceptual and Operational Definitions

The following are provided to clarify and better understand the terms used in this study.

1.8.1 Self-Perineal Care

Self-perineal care is washing the genital and rectal areas of the body (Webb et al., 2014). In this study, self-perineal care refers to regularly cleaning the perineum by practising all the elements in SPC education given to the mothers.

1.8.2 Self-Perineal Care Education

SPC education equips the childbearing woman with the knowledge to meet her health needs and seek prompt medical attention when needed (Deshmane & Memchoubi, 2018). In this study, SPC education was given in two phases to the primigravida mothers in the intervention group only at a tertiary care hospital in the Klang Valley. The first lesson on the theoretical aspect of perineal care was given to mothers at 32 to 36 weeks of gestation.

Later, the SPC education was reinforced for mothers and hands-on practice was given at 4 hours post-delivery. All the information on SPC education was uploaded to the mobile application and was made available to the primigravida mothers in the intervention group who could access the information at any time. SPC education included the ten steps of practising self-perineal care, sitz bath, Kegel exercise, a balanced diet, and the benefits of perineal care. Each session lasted about 45 minutes to an hour.

1.8.3 Knowledge

The acquisition of cognitive information related to a specific topic is sufficient for meeting health-related goals and can be strengthened (Venes, 2017). As for this study, validated questionnaires were used and adapted from Gadade et al. (2018) to assess the primipara mothers' knowledge of self-perineal care. This tool consists of 16 multiple-choice questions with a single correct answer. A score of "1" was given for each correct answer, and a score of "0" was given for every wrong answer. Total scores in the 16 questions were summed, and the total score ranged from 0 to 16. It was graded as poor knowledge level if the scoring was in-between 1 to 5, average knowledge level if the scoring was between 6 to11, and good knowledge level if the score was in-between 12 to 16.

1.8.4 Pain

Pain is predominant symptoms, is of such severity to warrant clinical attention, and interferes with function. Psychological factors are important in the onset of pain and its severity, exacerbation, or continuation. The condition is not intentionally produced or feigned (Venes, 2017). In this study, pain refers to unpleasant feelings caused by episiotomy wounds and is measured by a Numerical Pain Rating Scale (McCaffery & Beebe, 1989). The pain scores were self-reported by the primipara mothers using a mobile

application. Pain intensity was measured using the mean total pain score. The pain score intensity was 0 for no pain and was given a green colour coding. A score of 1 to 3 was categorised as mild pain and was given a yellow colour coding. Scores 4 to 6 were categorised as moderate pain and coded with an orange colour. A score of 7 to 10 points was categorised as severe pain with a red colour coding.

1.8.5 Wound Healing

Wound healing refers to a process of replacing destroyed or damaged tissue with newly produced tissue. Tissue healing usually occurs in predictable stages: Blood clot formation at the wound plasma proteins will be developed at the injured part. Cellular repair, regrowth of the blood vessels, synthesis, and collagen fibres then take place (Venes, 2017). This study measured the episiotomy wound healing outcome using the REEDA scale. Participants self-report using a mobile application on the wound healing outcome. Primipara mothers used a mirror to observe the wound. A paper tape was used to measure any abnormalities such as redness, oedema, ecchymosis, discharge, and approximation.

1.8.6 Primipara

This is defined as a woman who has given birth to a foetus of more than 28 weeks gestation, live, or stillborn (Winson & McDonald, 2015). In this study, the primipara mother is a woman who has delivered for the first time via spontaneous vaginal delivery with an episiotomy done and was then nursed in the postnatal ward.

1.8.7 Mobile Application

Mobile apps are a collection of software programs that operate on a mobile device and execute activities for the user. Mobile apps are a relatively new and rapidly growing area

of worldwide information and communication technology. The mobile app is simple to use, inexpensive to download, and compatible with most mobile phones, even low-cost and entry-level models (Islam et al., 2010). In this study, a mobile application was downloaded to the primigravida mother's smartphone to provide information on SPC education and collect data on knowledge scores for pre-test and post-test, pain scores, and wound healing outcomes.

1.9 Conceptual Framework of the Study

This study consists of SPC education as an exposure variable, while knowledge, pain score, and wound healing as an outcome variable. Knowledge, pain score, and wound healing were measured using appropriate tools. For knowledge, a questionnaire was adapted from a previous study (Gadade et al., 2018). For the pain score, the Numerical Pain Rating Scale was utilised (McCaffery & Pasero, 1999). For wound healing outcome, the standardised REEDA scale was used (Davidson, 1974). This study had a control group for comparison with the intervention group.

For the dependent variable of knowledge, a pre-test was conducted for all the mothers in both groups during the antenatal phase before the first phase of SPC education was implemented. All the information related to SPC education was uploaded to the mobile application, and the researcher ensured that all mothers in the intervention group could access it. Before the second phase of SPC education at four hours post-delivery occurred, a post-test was done to determine the differences between the intervention and control groups. After the intervention, overall pain scores and pain interference during daily activities such as walking, sitting, urinating, defecating, and lying down were measured. The primipara mothers self-reported pain scores and wound healing observations for seven days post-delivery.

The primipara mothers who participated in this study had either SPC education (intervention group) or routine antenatal and postnatal care (control group). They had different demographical characteristics such as ethnicity, age, educational level, occupation, income, family type, and source of information. SPC education was implemented for the primigravida mothers during the antenatal phase at 32 weeks to 36 weeks and at 4 hours post-delivery to reinforce hands-on practice to increase knowledge, reduce episiotomy pain and enhance wound healing outcomes. The outcomes were measured using questionnaires consisting of demographic information, knowledge of self-perineal care, wound healing outcomes using the REEDA scale and a checklist to observe pain scores using the Numerical Pain Rating Scale. To follow up and evaluate the intervention, opinions, experiences, and challenges perceived by the primipara mothers were explored using an in-depth interview. Figure 1.1 describes the conceptual framework of this study.

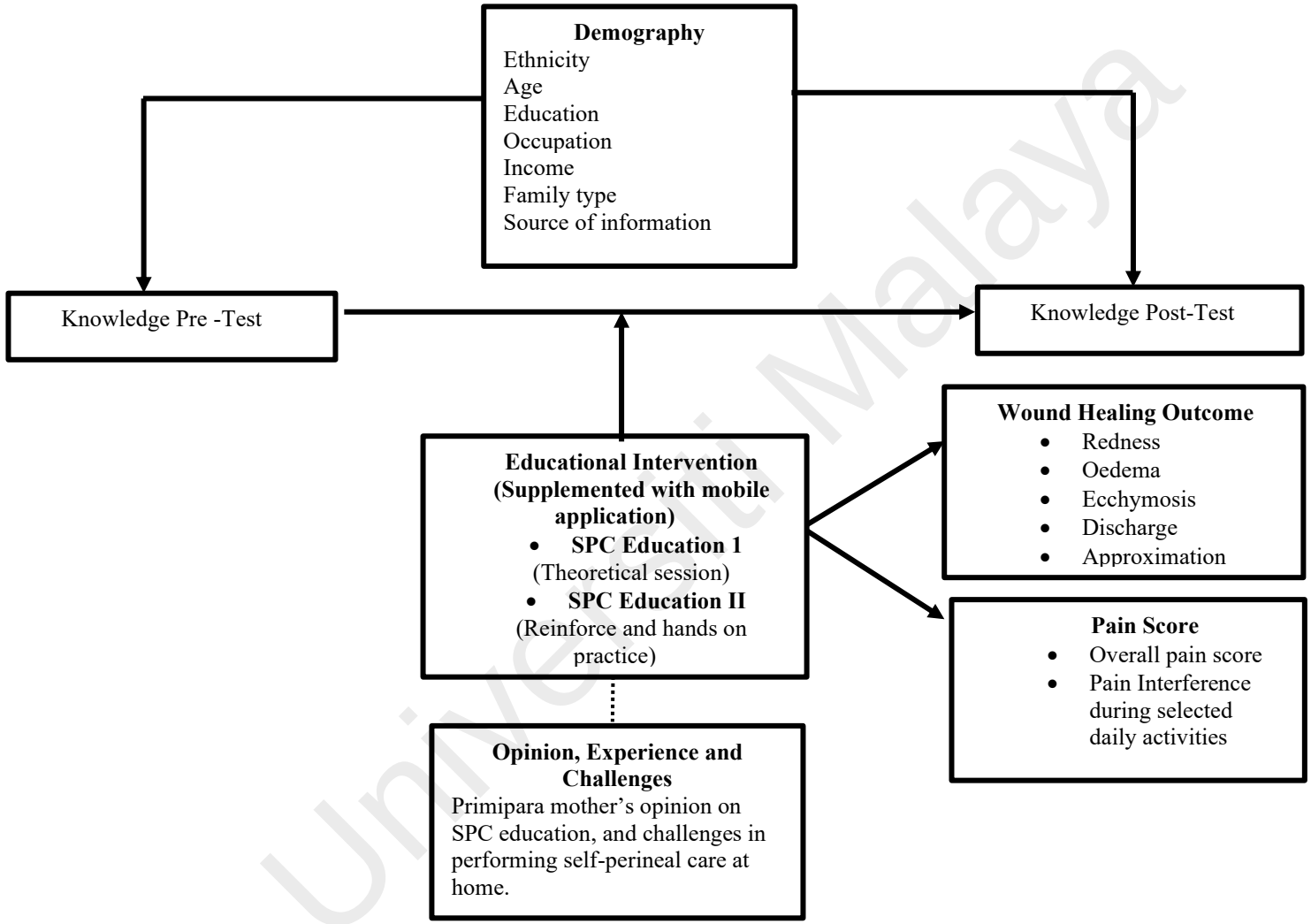

Figure 1.1: Conceptual Framework of the Study.

1.10 Outline of the Thesis

This thesis is divided into seven chapters to facilitate clarity and understanding of the research.

Chapter One introduces the study and is followed by the background of the study. Subsequently, the problem statement is addressed to justify the need for this study to be carried out. This chapter includes research hypotheses, research questions, general objectives, and specific objectives. The significance of the study's conceptual framework is explained. Conceptual and operational definitions are also explained, followed by the conceptual framework which is elaborated for better understanding. Finally, the structure of the thesis is outlined.

Chapter Two explores the literature on self-perineal care critically and comprehensively, including a theoretical framework and the impact of self-perineal care. There is also a review of the evidence on self-perineal care, episiotomy pain, and wound healing outcomes.

Chapter Three discusses the methodology used in this study. The research design and the research setting of the study are explained. Following that, the population and sample selection are presented. The tools used in this study, as well as their previous validity and reliability, are described. The development and implementation of SPC education intervention are also described. Ethical approval from the relevant institutions is presented. Finally, data analysis on quantitative and qualitative data is described.

Chapter Four presents the quantitative findings of the main study to answer the study's specific objectives. This includes the outcome of the SPC education on knowledge, pain score, wound healing, and a comparison of the intervention and control groups in these variables.

The association between the participants' demographic characteristics and increased knowledge in the intervention group is also presented.

Chapter Five discusses the qualitative results, including two themes and seven sub-themes. The themes that emerged from the thematic analysis plus selected textual descriptions included to support the themes are presented in detail.

Chapter Six discusses the study's findings quantitatively and qualitatively and integrates both findings. Previous research results are used to support the present study's findings.

Chapter Seven concludes the study, followed by the study's strengths and limitations. The study's implications on nursing education, nursing practice, and future research are discussed. Future recommendations are also proposed. Finally, the study's conclusion is presented.

1.11 Summary

The relevance of self-perineal care and its impact on increasing knowledge, reducing pain, and improving wound healing outcomes among primipara mothers has been briefly addressed in this chapter. As presented in the problem description, this new knowledge highlights the research gap, lists the research questions, and the study's objectives emphasise the need for this study to be done. The operational definitions of the exposures and outcome variables employed in this investigation have also been presented. Finally, the study's conceptual framework has been described, which provides the overall direction of the study. A literature review related to this study is discussed in Chapter Two to understand the knowledge in this field.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The aim of this study is to investigate the effect of self-perineal care education on knowledge, episiotomy pain, and wound healing outcomes among primipara mothers. This chapter contains an extensive literature review to provide the background information for this study. The chapter incorporates literature published over the previous 15 years, and in particular the many studies on this topic published from 2006 to 2021. Most studies refer to one variable only, such as knowledge, or two variables, such as pain score and wound healing outcome. Therefore, articles from the last 15 years were reviewed to acquire more literature on the three variables of the current study: knowledge, pain score, and wound healing outcome. An appropriate search strategy was used to retrieve the required evidence. An extensive study was made on self-perineal care, episiotomy pain, and wound healing outcomes. The selection process of self-perineal care education studies was based on inclusion and exclusion criteria. This study applies a theoretical framework of nursing theory for self-perineal care education for primipara mothers. The literature was reviewed systematically.

2.2 Search Strategy

A literature search was conducted to identify articles related to this study. The search engine included Cumulative Index to Nursing and Allied Health Literature (CINAHL), Science Direct, MEDLINE, EMBASE and EBSCOhost. The search focused on quantitative, qualitative, and mixed-methods studies.

The keywords that were used were “self-perineal care instructions”, “self-perineal care teaching”, “plan postnatal education program”, “post episiotomy pain” and “episiotomy wound care”. Boolean “and” and “or” were used to search the articles. Other terms used

were “self-perineal care”, “episiotomy wound”, “primipara mothers”, “pain”, “numerical pain rating scale”, “wound healing”, and “REEDA scale”. The data search was carried out comprehensively by looking for full-text articles on systematic reviews, meta-analyses, and evidence-based medical reviews. The literature search revealed many articles on self-perineal care, self-perineal care, knowledge, pain score, and wound healing outcomes. A total of 1,702 articles were identified, and further filtration was done. The articles were filtered according to the inclusion and exclusion criteria discussed below.

2.2.1 Selection Criteria

The inclusion criteria for the literature on self-perineal care intervention were studies that were available in full-text articles that described self-perineal care education as an intervention. The articles written only in English and published between 2006 to 2021 were included. Participants of the study could be either antenatal or postnatal mothers. Studies on antenatal or postnatal mothers were included regarding episiotomy knowledge, pain, and wound healing outcomes. The researcher screened the titles, abstracts, and full texts with PDF content related to the research topic. Selected articles that met the inclusion criteria were exported into the EndNote 20.0 database.

2.2.2 Exclusion Criteria

The exclusion criteria were the articles written in any language other than English. Articles with abstracts only or any article on postnatal care and extended perineal tear were also excluded.

2.2.3 Results of Key Studies

Figure 2.1 shows the selection process of the studies using the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) flow diagram (Moher et al., 2015). A total of 1,702 articles were retrieved from the search engines Cumulative Index to Nursing and Allied Health Literature (CINAHL) (385), Science Direct (345), MEDLINE (400), OVID EMBASE (471), and EBSCOhost (101).

Nine hundred and twenty articles were removed. Seven hundred and eighty-two articles were screened based on their title and abstracts. Seven hundred and sixty-two abstracts were excluded for not meeting the inclusion criteria. Thus, left with 20 original studies identified as relating to this study and in PDF form. A further ten full-text articles were then excluded as they did not fulfil the inclusion criteria, such as those about tool development articles and those not in English.

As a result, ten articles were reviewed; these will be explained in the next section. Four of the studies were conducted using a qualitative approach, two of them applied mixed methods, and the rest employed a quantitative study design. The selected relevant articles on self-perineal care support this thesis's literature review as shown in Table 2.1.

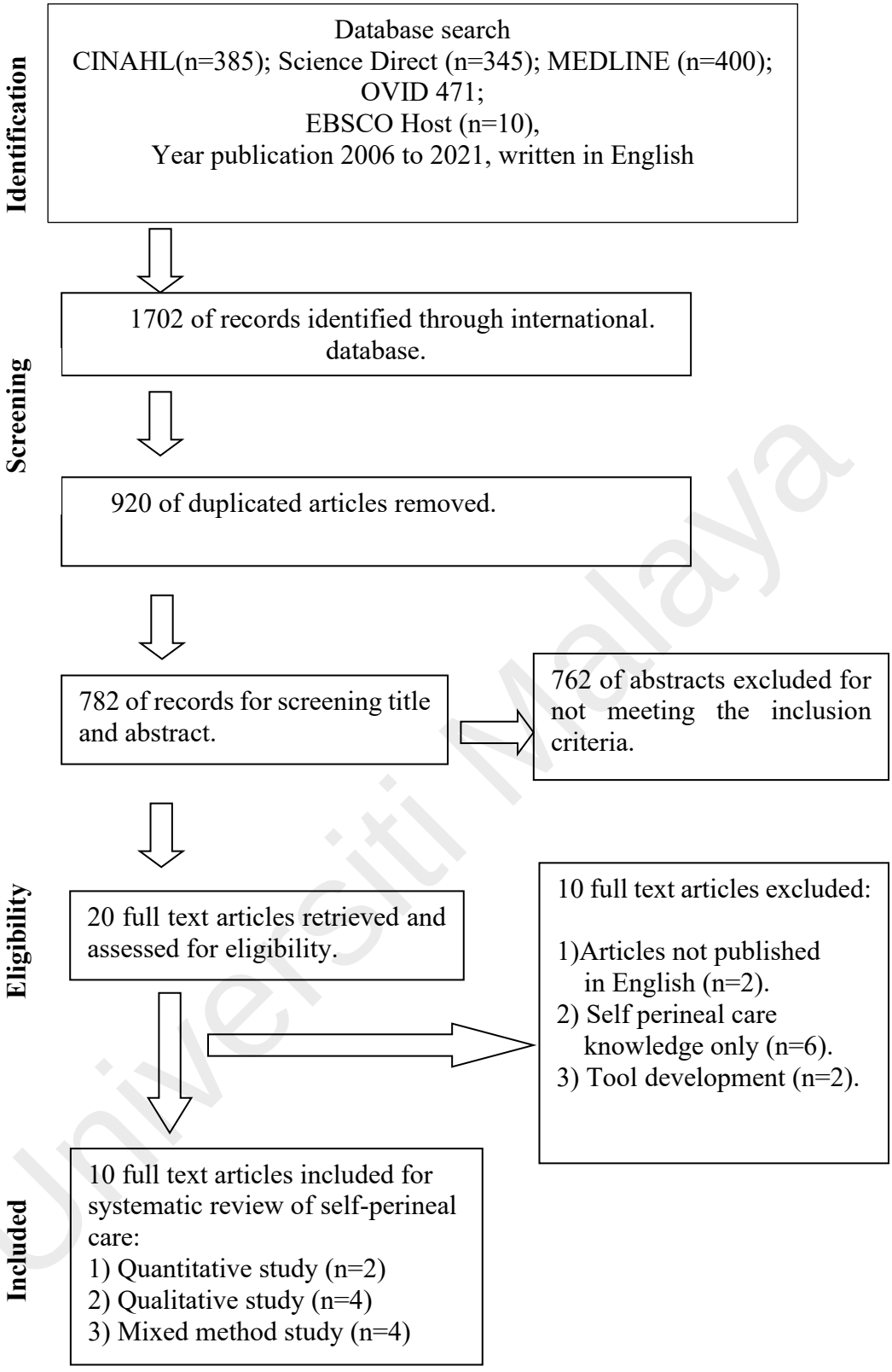

Figure 2.1: Screening and selection process of the systematic review using a PRISMA (Stovold et al., 2014)

2.3 Knowledge of Self-Perineal Care

Structured self-perineal care education equips the childbearing woman with the knowledge to meet her health needs and the confidence to seek prompt medical attention when necessary (Deshmane & Memchoubi, 2018). According to Raman (2015), self-perineal care knowledge leads to good practice of self-perineal care, and this promotes wound healing and is cost-effective for mothers as it can be done at home. Another study by Noronha (2004) also stated that self-perineal care promotes wound healing and is cost-effective for mothers as it can be done at home, reduces pain and allows mothers to be involved in maternal-child caring. Self-perineal care education improves mothers' self-esteem, empowerment, and confidence (Gadade et al., 2018). Furthermore, teaching postnatal mothers proper perineal care may help reduce puerperal infections (Mankar et al., 2021). The knowledge imparted to mothers should create awareness regarding the importance of self-perineal care during postpartum (Zaki et al., 2019) and empower them to bring positive behaviour changes in their daily practice.

Several studies have been conducted in different countries to assess mothers' knowledge of self-perineal care. Four studies were conducted in India (Gadade et al., 2018; Praveen et al., 2018; Raman, 2015; Salgaonkar, 2020) Indonesia (Rahayu et al., 2017) and Iraq (Mohamed & El-Nagger, 2012; Oleiwi, 2010).

Gadade et al. (2018) evaluated the knowledge of perineal care among postnatal mothers in selected hospitals in Pune City, India. A non-experimental research, cross-sectional design was adopted to conduct the study. A total of 100 samples were determined using non-probability purposive sampling. This study found that 4% of postnatal mothers had poor knowledge, 76% had average knowledge, and only 20% had good knowledge of perineal care. The overall results show that postnatal mothers had average knowledge regarding perineal hygiene. Unfortunately, the author did not mention

the existing practice of the aforementioned hospital which led to the above findings. However, the author revealed a need to create awareness, instil a positive approach regarding perineal care, and remove the misinformation of perineal care among mothers.

A descriptive study was conducted in India by Joseph et al. (2020) among 100 postnatal mothers admitted to the postnatal wards. Non-probably techniques were used in the study to select the sample. A structured knowledge questionnaire was used to assess the knowledge of postnatal mothers on self-perineal care. The study findings showed that the majority of the postnatal mothers (55%) had average knowledge of self-perineal care and that there was no significant association between the knowledge scores and selected demographic variables. The study concluded that most postnatal mothers had inadequate knowledge regarding self-perineal care. Hence, there is a need to conduct health education programs to enhance the knowledge of postnatal mothers about self-perineal care (Joseph et al., 2020). Other information related to the mother, such as the source of information and parity, was not mentioned as these factors can also contribute to the above findings. Knowledge can differ between the primipara, and multipara mothers, therefore experience should be considered when measuring the mother's knowledge.

Many quasi-experimental studies have revealed that the knowledge level has improves from poor to moderate or good after self-perineal care teaching (Gadade et al., 2018; Praveen et al., 2018; Raman, 2015; Salgaonkar, 2020). A study was conducted in India by Salgaonkar (2020) on planned perineal care teaching to postnatal mothers to compare pre-test and post-test knowledge scores. The data collection process was done in three phases: a pre-test was conducted by using a semi-structured questionnaire schedule, and health teaching was administered on the second day of the pre-test. In the second phase, a post-test was conducted on the eighth day using the same knowledge questionnaire schedule as in the third phase. The overall pre-test mean was 11.083 and the post-test

mean was 19.00, whereas t = 14.88 and p = .01, which was < .05. The researchers concluded that planned health teaching was effective.

The study mentioned that the teaching was done on the second day, and the post-test was administered with the same questionnaire on the seventh day, post-delivery. The mother's location and how the post-test was done were not mentioned as the spontaneous vaginal delivered mothers were discharged home within one or two days. The inclusion criteria for the above study included mothers in the postnatal ward and mothers in the first week of the postnatal period only.

The efficiency of a structured teaching programme (STP) on perineal care was assessed by Praveen et al. (2018) with 60 primipara mothers. A quasi-experimental, non-equivalent control group pre-test post-test design was used. Thirty mothers in the experimental group and another 30 mothers in the control group were recruited using a convenient sampling technique. A pre-test using a structured knowledge questionnaire was given to both to both experimental and control group followed by a structured teaching program was additionally administered using charts and posters to the experimental group. A post-test was conducted after seven days of intervention using the same questionnaire.

The study showed that the mean post-test knowledge score was 23.73 ± 1.41 for the experimental group and 12.63 ± 2.87 for the control group. This study concluded that teaching perineal care enhanced the knowledge of primigravida mothers in the experimental group. The study had the control group for comparison, and the groups' homogeneity was maintained. The researcher measured the perineal pain at different intervals to assess the effectiveness of a structured teaching programme.

However, the number of samples in this study was small, and the study was only conducted in one setting (Praveen et al., 2018).

2.3.1. Demographic Factors Influenced the Knowledge of Self-Perineal Care

Demographic factors such as age, race, education level, occupation, parity, family type, as well as the source of information, may have an effect of primipara mothers' knowledge of self-perineal care.

A descriptive study by Missiriya (2016) was conducted to determine the knowledge and practice of postnatal mothers regarding personal hygiene and new-born care. Sixty postnatal mothers were randomly selected to assess their knowledge and practice. Of these, 38 (63.3%) were between the ages of 21 and 25 years, 38 (63.3%) studied as far as primary school, and 39 (65%) were housewives and 52 (86.7%) were from a nuclear family. Regarding knowledge of personal hygiene, 42 (70%) had inadequate knowledge, 18 (30%) had moderately adequate knowledge, but none had adequate knowledge. About their practice, 38 (63.3%) had poor practice, the remaining 22 (36.7%) had a moderately good practice, but none had a very good practice. There was a statistically significant association between the mother's knowledge and age, education, and family type at $p < .05$, $p < .001$, and $p < .01$, respectively (Missiriya, 2016). This is probably because the participants had different levels of education, and their exposure to and source of information can differ in their society.

Salunkhe and Katti (2015) conducted a quasi-experimental study in Pune City with 60 postnatal mothers who were selected using convenient sampling. The data were collected using a structured questionnaire. The study concluded that 68% of the mothers had average knowledge, whereas 22% had good knowledge regarding perineal care. After the administration of planned teaching, there was an increase from the pre-test knowledge

score of 23.56 % to the post-test knowledge of 95%. After the administration of planned teaching, it was found that the post-test mean percentage knowledge score in all the content areas was higher than the pre-test means percentage knowledge scores. This difference was statistically highly significant at a *p*-value of .01. There was an association with a mother's characteristics like religion, residence, educational status, occupation, and total income of per family per month, whereas there was no association with age, type of family, or parity.

Oluwasola and Folasade (2017) implemented a cross-sectional descriptive study of consenting pregnant women attending antenatal clinics in Ibadan, Nigeria. Information on their socio-demographic data, knowledge, and perception of episiotomy was obtained using interview-administered questionnaires. A total of 304 women were interviewed. The study revealed that parity had a statistically significant association with knowledge of episiotomy with $p < .001$, unlike age, educational status, and occupation. Age was significantly associated with the experience of episiotomy with a $p <. 001$. This study concluded that a mother's parity and age increase the mother's knowledge and improve the episiotomy experience. In this study, the researcher recruited all the pregnant mothers irrespective of their parity (Oluwasola & Folasade, 2017). Therefore, the knowledge level differed among pregnant mothers and was very much related to their exposures during their pregnancy. Mothers also might have gained new knowledge during each pregnancy.

Another study done in Odisha by Mousumi Pradhan (2019) utilised a validated structured interview schedule to collect data about knowledge of perineal hygiene. The study involved 100 primipara mothers. Data was collected from the samples by administering a structured interview schedule after obtaining consent from participants. A significant association was found between knowledge level and demographic variables of marital status and religion at the *p*-value of .05. The most significant association was

found between the level of knowledge and the demographic variable of the mother's age at *p* value of .05. This indicates that a mother's knowledge level varies according to education, type of family, income, and occupation.

2.4 Episiotomy Pain

Episiotomy is a surgical incision made in the perineum to enlarge the vaginal opening for birth and is one of the most commonly performed procedures in obstetrics (Sheikhan et al., 2011). Episiotomy pain is always difficult and stressful for primiparous women and it can result in a negative first experience of motherhood and the mother's inability to care for the infant (Joseph et al., 2020). A delay in healing may increase the duration of perineal pain. This is also supported by another study by Inyang Etoh and Umoiyoho (2012) who discovered that episiotomy was associated with more intense pain, excessive bleeding, wound hematoma, wound infection, and wound breakdown. Additionally, episiotomy wounds have the most significant risk of infection due to defecation, micturition, and lochia, all of which are good media for bacteria growth and infection (Missiriya, 2016).

A Malaysian Ministry of Health Malaysia circular (2008) reported that episiotomy was routinely performed on primigravida in 57% of government hospitals with specialists and 70% in hospitals without specialists in government settings, in Malaysia. According to a retrospective review by Selvadurai, the episiotomy rate in Malaysia was highest among women in the age group 10 to 20 years (38.5%), primigravida (45.12%), and of Chinese ethnicity (32.75%) compared to Malay (23.43%) and Indian (28.98%). The episiotomy rate in Malaysia in 2010 was 22.33% which is within the recommendation of the World Health Organization.

Another study by Karalasingam et al. (2020) highlighted the fact that the episiotomy rates in Malaysian tertiary hospitals from 2010 to 2017 dropped from 36% to 34.1%. Data revealed seven out of ten primiparous women received an episiotomy, while only one out of ten multiparous women had an episiotomy. Pillitteri (2010) stated that although episiotomy is not routinely done in the current healthcare settings, around 30% to 60% of primipara mothers undergo an episiotomy to facilitate childbirth.

A range of tools have been used to measure pain levels and record mean pain scores post-intervention. The Visual Analog Scale (VAS) and the Numerical Pain Rating Scale (NPRS) are valid and reliable for clinical use for adults with good cognitive function and pain scores. These tools are often used to measure perineal pain studies. The afore-mentioned tools utilised a self-reporting method that is regarded as the gold standard for reporting pain (Hawker et al., 2011).

Many authors have published their studies using the Numerical Pain Rating Scale (NPRS) to measure pain scores post episiotomy. Using NPRS, the individuals rate their pain on an eleven-point numerical scale. The scale is 0 for no pain to 10 for the worst imaginable pain (McCaffery & Beebe, 1989). The participant is asked to indicate the numeric value on the segmented scale that best describes the intensity of their pain (Abalos et al., 2021). The disadvantage of NPRS is that only one component of the pain experience and intensity does not capture the complexity and idiosyncratic nature of the pain experience or improvements due to symptoms and fluctuations (Abalos et al., 2021). Validity scores for NPRS and reliability were confirmed to be 0.76 and 0.90, respectively (Khadra et al., 2020; Schinkel et al., 2010).

Post-operative pain following episiotomy is stressful for primiparous women, negatively impacting their first motherhood experience and mother-child communication (Jahdy et al., 2013).

Pain is the most common factor impacting mothers' function after childbirth which can lead to urinary tract and bowel elimination dysfunction, bowel elimination, dyspareunia, and marital problems (Macarthur et al., 2010). Episiotomy pain often interferes with basic daily activities for the woman, such as walking, sitting, and passing urine (Mohamed & El-Nagger, 2012).

Alleviating perineal pain is an important aspect of maternal health care. Many studies have been implemented to evaluate interventions to reduce perineal pain among mothers following an episiotomy. A combination of pain relief methods, systemic and localised, may be required to alleviate perineal pain associated with an episiotomy (Steen & Cummins, 2016). Both pharmacology and non-pharmacological methods are used to reduce perineal pain. An analgesic such as acetaminophen, aspirin, brufen, and diclofenac sodium are among the pharmaceutical agents (Minassian et al., 2002), but these impose expenses on the health care systems and can lead to severe side effects for some users (East et al., 2020). Non-pharmacology methods include hot compression, cold compression, massage and relaxation techniques (East et al., 2020).

A previous study that applied cold gel pads instead of betadine for episiotomy wound care was conducted by Sheikhan et al. (2011). It involved 60 primiparous women in labour who were admitted to a hospital in Iran. They were randomly allocated into two groups, the intervention group using gel pads and the control group following the hospital routine. After the episiotomy, the pain score was evaluated at four hours, at twelve hours, and on day five. The participant's pain and discomfort were recorded on the Visual Analog Scale (VAS). There was a statistical difference in pain intensity scores between both groups at four hours, at twelve hours, and on day five with a p-value $< .05$ after episiotomy. This study concluded that applying cold gel pads as a non-pharmacology method is an effective non-invasive method of relieving discomfort. In the study, the

author stated that less oral analgesic consumption in the experimental group might have been another reason that supported the efficiency of cold gel pads (Sheikhan et al., 2011). However, during the study's data analysis, the analgesic intake was not controlled to examine the effect of the cold gel pads on perineal pain.

A single-blind randomised control trial by Chacko et al. (2013) assessed the intensity of pain experienced by postnatal mothers due to episiotomy wounds before and after infrared lamp therapy. Twenty postnatal mothers were selected from maternity wards in Belgaum, India. A purposive sampling technique assigned 30 postnatal mothers to the study group and 30 postnatal mothers to the control group, all of whom met the inclusion criteria. For the study group, infrared therapy was applied for episiotomy wounds for 10 minutes, twice a day, on three consecutive days. The pain level of the episiotomy wound was assessed by a modified numeric pain rating scale once a day for three consecutive days. In contrast, the control group participants received routine hospital care. The result showed a significant difference in episiotomy pain between the study and the control group on days two and three. The limitation of the study was that it was conducted in a single setting, and the intervention period was of short duration only. The author recommended that future research be replicated in different settings with a prolonged intervention period and with a larger sample (Chacko et al., 2013).

A quasi-experimental study by Mohamed and El-Nagger (2012) evaluated the effect of self-perineal care instructions on episiotomy pain and wound healing in postpartum women. Of a total of eighty postpartum women randomly recruited from a postpartum ward in Egypt, forty were placed in the experiment group and forty in the control group. Tools used for data collection consisted of an interviewing sheet, the numerical rating scale (NRS), the standardised REEDA Scale, and a follow-up sheet. The study results revealed a statistically significant reduction in the level of perineal pain between the two

groups at four hours, at 24 hours, at 48 hours and seven days postpartum. There was a statistically significant difference between the groups in relation to pain interference when walking, sitting, and urination at 24 hours, 48 hours and seven days postpartum (Mohamed & El-Nagger, 2012).

This study concluded that women who received and practised self-perineal care instructions on episiotomy pain and wound healing during the postpartum period had lower postpartum episiotomy pain scores and decreased pain related to perineal episiotomy, which meant that it interfered less with women's daily activities postpartum, such as walking, sitting, urination and defecation, and better wound healing progress (Mohamed & El-Nagger, 2012). However, in the study, the knowledge level among the postpartum women was not assessed following the teaching but only focused on the pain score and wound healing outcome of the self-perineal care teaching. It was noticed that, all the analgesics consumed by the mothers were recorded by the postnatal mothers; however, it was analysed separately without controlling the analgesic consumed. This is important as this can have an impact on the recorded pain score.

An observation checklist was prepared to assess the performance of self-perineal care. The episiotomy wound pain score was lower in the self-perineal care group than aseptic perineal care. This is significant at $p < .05$. The study revealed that self-perineal care gives better wound healing, making every postnatal mother independent in taking care of herself, effectively practising even at home. The limitation of this study was that self-perineal care was taught to mothers on the first day but not directly supervised following the intervention. Data was not collected to determine the efficacy of 'wound healing' such as haemoglobin, nutritional status, socioeconomic condition, sitz bath, and antibiotics administered during labour were not included or collected during the study. The study

recommended that midwives identify the extent of injury, pain relief, and persistent self-perineal care management (Raman, 2015).

2.4.1 Factors that Influence Episiotomy Pain

Many factors influence episiotomy pain post-birthing. The policy of selective episiotomy among primiparous women increases the possibility of maintaining the perineum intact. In contrast, routine use of this procedure significantly increases the intensity of perineal pain at 24 and 48-hours following delivery (Joseph et al., 2020). Perineal pain is debilitating and affects the mobility of women (Praveen et al., 2018). There have been innumerable reported episodes of pain when sitting, walking, breastfeeding, and caring for the baby (Beleza et al., 2017) . The discomfort experienced varies from mild to extreme (Declercq et al., 2014) and may negatively impact the experience of motherhood.

Perineal pain affects approximately one-third of primiparous women and is associated with perineal trauma. A cross-sectional study by Francisco et al. (2014) identified the association between perineal trauma and pain in 473 primiparous women. The study measured pain using a numerical scale of 0 to 10. On the numeric scale, the prevalence and mean pain intensity were 33 % and 4.7 points (SD = 2.0). Episiotomy represented the most frequent trauma (46.7%). Having perineal trauma tripled the chance of pain. Each hour elapsed following the birth reduced the chance of pain by 4.8% (Francisco et al., 2014). The study should have compared pain among the mothers with the same length of episiotomy following a normal delivery. The author noted that the most serious pain was recorded when more than one type of trauma occurred simultaneously. The severity of the pain score can differ in different types and lengths of an episiotomy cuts. In an Australian study regarding pain intensity, women with episiotomy or sutured lacerations

reported more intense perineal pain than those with intact perineum or non-sutured lacerations (East et al., 2012).

Another study by Bozdag et al. (2021) in Turkey examined the angle of mediolateral episiotomy at the time of cut, after primary repair, and six months postpartum, and the incidence and severity of perineal pain and anal incontinence six months after delivery. The study measured the incision angle of episiotomy at 60° before cutting, after primary repair, and after six months. At follow-up, perineal pain was evaluated by a verbal rating score, and St Mark's score assessed anal incontinence. The angles differed significantly among the incision (60°), repair (45°), and 6-month (48°) measurements with $p < .001$. The study concluded that an incision angle of mediolateral episiotomy of 60° resulted in a low incidence of perineal pain. No severe perineal tear was diagnosed in the cohort (Bozdag et al., 2021) .

Aradmehr et al. (2015) conducted an analytical, descriptive study on 119 eligible mothers in Iran. Childbirth-related information was collected using a questionnaire. The McGill Pain Questionnaire was used to collect data for perineal pain on days 1, 7, 10, and 14 after delivery. On day 7, a significant direct relationship was found between the severity of episiotomy pain and length of wound cut ($p= .034$), neonatal weight ($p = .040$), and the number of sutures ($p= .028$). On day 10, there was also a significant relationship between the severity of episiotomy pain and the duration of the active phase during the second stage of labour ($p= .047$), the duration of the sitting position ($p= .011$), and the number of sutures ($p= .020$). The limitation of the study was that the first, second, and third stages of labour and delivery of the placenta for each delivery could not be conducted by one person due to the study environment. Therefore, the observation skill of different individuals may have differed, one from another.

Shojae et al. (2009) in Tehran conducted a descriptive study on 510 primiparous women in teaching hospitals in Tehran. The data were collected using interviews on days 1, 10, 40, and 90 after delivery and recorded in particular forms. The study reported episiotomy was performed in 97.3 % of primiparous women who gave birth vaginally, 32.3 % of women had midline episiotomy, and 67.7 % had a mediolateral episiotomy. Episiotomy complications included perineal pain which was reported by 96.4 % of the new mothers on day 1, 63 % after ten days, 25 % after 40 days, and 12 % at three months after birth. After day 10, day 40, and 3 months after delivery, dyspareunia was reported to be 100 %, 66 %, and 31.2 %, respectively (Shojae et al., 2009).

Farrag et al. (2016) examined the effect of postnatal Kegel exercises on episiotomy pain and wound healing among primiparous women. An intervention research design (time series) was adopted. The study was conducted in Egypt where a total of 152 postnatal mothers were randomly recruited, although only 138 completed the study. The study utilised a structured interviewing questionnaire, a wound healing assessment tool standardised REEDA scale, and a Numerical Analogue Scale (NAS). The study revealed that postpartum mothers in the study group had lower mean pain intensity scores than those in the control group. A statistically significant difference was found between both groups on the 8^{th} and the 14^{th} days after the intervention (Farrag et al., 2016). Practising postnatal Kegel exercises had a significant effect in decreasing perineal pain after episiotomy and accelerating the healing of the incision. Other studies have reported congruent findings including Beckmann and Stock (2013) and Dönmez and Kavlak (2015).

2.5 Episiotomy Wound Healing

Episiotomy, a common procedure in obstetric care, is associated with the need for suture and healing complications in the postpartum period, such as blood loss, oedema, hematoma, infection, wound dehiscence, and perineal pain (Bharathi et al., 2013).

Inflammatory signs, such as oedema, ecchymosis, redness, and pain, occur from the first hours after delivery and may remain beyond the hospitalisation period (Deshpande et al., 2019). Therefore, suitable tools must be used to measure the episiotomy wound healing outcome.

The REEDA scale has been used in many studies to assess postpartum perineal trauma (Ari et al., 2019; Mohamed & El-Nagger, 2012; Raman, 2015). The REEDA scale is a tool for assessing perineal healing that was primarily developed by Davidson (1974). It includes five items related to the healing process: hyperaemia, oedema, ecchymosis, discharge, and coaptation of the wound edges. It can be used to assess all types of postpartum perineal trauma. This reliable instrument for assessing perineal healing is valuable to midwives, and other caregivers, as a concise evaluation tool may help facilitate measures to improve perineal care. A minimum score of 0 and a maximum score of 3 are assigned to each section. There is a total of 15 points: no infection is scored as zero, mild infection. It is scored as no infection zero, mild infection from 1 to 5, moderate infection from 6 to 10, and severe infection from 11 to 15. Measurement of the wound is done by using a paper centimetre scale.

The REEDA scale has been used in recent studies that have investigated interventions toward episiotomy wound healing, such as to evaluate perineal suture techniques (Kindberg et al., 2008), perineal pain with suture (Kindberg et al., 2009), postpartum perineal care (Mohamed & El-Nagger, 2012; Raman, 2015; Sheikhan et al., 2011) the effect of laser irradiation (Santos et al., 2012) and the impact of Kegel exercise (Farrag et

al., 2016). The tool's reliability was established using Cronbach's alpha technique in a study by Steen and Mary (2007). The reliability was calculated to be 0.9, which shows that tool is significantly reliable for assessing healing related to episiotomy wounds.

There have been several studies conducted in different countries to assess wound healing outcomes following an educational program on self-perineal care, including Nigeria, Egypt, India, and Iran (Ari et al., 2019; Mohamed & El-Nagger, 2012; Noronha, 2004; Raman, 2015; Zaki et al., 2019). All these studies indicated improved knowledge, which led to better wound healing.

A quasi-experimental study by Ari et al. (2019) evaluated the impact of an educational intervention on the practice of postpartum perineal wound care and wound healing. A total of 200 mothers, 100 in the intervention group and 100 in the control group, were recruited in antenatal clinics. The instruments used for data collection consisted of a questionnaire and an assessment tool. Participants in the intervention group were given instructions on postpartum perineal wound care, while those in the control group received routine teaching on postpartum perineal wound care. The study lasted for 12 weeks.

Perineal wound care practice was found to influence pain reduction in both groups because as a good practice was implemented on day 1 in the intervention group, there was a simultaneous decrease in pain intensity (r= -0.910, $p < .05$) in the control group as the practice increased the second day, there was a reduction in pain intensity (r= -0.547, p= .002). About 12.5 % of the women in the intervention group experienced significant pain on the first postpartum day compared to 20 % in the control group, indicating that they had better-wound healing. On day seven, none in the intervention group had a gaped wound, but 66.70% of them had a gaped wound in the control group (Ari et al., 2019).

The perineal care practice after the mothers were discharged from the hospital was reported via phone calls, which was a study limitation. Only seven days post-delivery were used to evaluate wound healing, and no other assessment was made before the 7th day, making it difficult to determine the causes of several wound gaps among mothers in the control group.

In Uganda, Pebolo et al. (2019) compared REEDA (Redness, Oedema, Ecchymosis, Discharge and Approximation) scores between primiparous parturient who had an episiotomy with those who had not during the first two postpartum weeks. On the first postnatal day, prospective cohort research was carried out by systematically enrolling primiparous women and categorising them into groups. The study included primiparous women who gave birth naturally or assisted vaginal birth at 28 weeks and above. The REEDA scales were assessed at baseline and two weeks post-delivery. The results revealed that the mean total REEDA score for primiparous women in the episiotomy group was significantly higher on day 1 and day 14, with *p*-values < .0001 and < .0001, respectively. The study concluded that an episiotomy, a traumatic obstetric procedure, heals more slowly and with more persistent pain than spontaneous perineal contusion or tears (Pebolo et al., 2019).

The week of gestation and weight of the baby influenced the length of mother's episiotomy or tear. A mother with term baby generally had a normal episiotomy cut compared to a mother with a premature baby who had a smaller episiotomy cut due to the smaller size of the baby. Therefore, the healing process can take longer in a mother experiencing term labour compared to a mother experiencing premature labour.

Zaki et al. (2019) conducted quasi-experimental research which was conducted at the postpartum unit in Egypt. It comprised 80 postpartum women divided into two groups (study and control group).

Three tools were utilised for data collection; a socio-demographic and obstetric data sheet, a pain intensity visual analogue scale (VAS), and the standardised REEDA scale. Instructions on self-perineal care were given to women in the intervention group. Results revealed statistically significant differences regarding perineal redness and oedema between both groups after 48 hours postpartum. It was concluded that puerperal women who had received perineal self-care instructions experienced lower episiotomy pain and faster episiotomy healing than those who had not received instructions (Zaki et al., 2019).

The observations for the wound healing were conducted at three-points, during immediate postpartum, after 48 hours, and on day seven post-delivery. The observation was done at home. However, no observation was recorded between day three and day six, which is the critical time to observe wound healing. An opportunity was missed to observe on day five post-delivery to detect complications.

2.5.1 Factors That Influenced Episiotomy Wound Healing

Wound healing is a natural process. According to Guo and DiPietro (2010) wound healing involves haemostasis, inflammation, proliferation, and remodelling. All four phases must occur in the correct order and time for a wound to heal properly. Many factors such as oxygenation, sex, hormones, infection, stress, diabetes, obesity, pharmaceuticals, alcoholism, smoking, and nutrition can obstruct one or more phases of the wound-healing process (Guo & DiPietro, 2010). Following childbirth, episiotomy causes many women a great deal of anxiety, discomfort, and pain. A delay in healing may increase the duration of perineal pain (Manjula et al., 2012). Episiotomy wounds are at risk of infection because of bacteria colonisation of the wound (Missiriya, 2016).

A descriptive study by Manjula et al. (2012) examined the factors influencing episiotomy wound healing among 60 postnatal women in India. A purposive sampling

technique was used to select the sample. Demographic proforma of postnatal women and an observational checklist on episiotomy wound healing were used to collect the data. The age of the women, the number of vaginal examinations done during labour, the head circumference of the new-born, and the haemoglobin level before delivery were collected. The study concludes that episiotomy wound healing is influenced by parity, frequency of self-perineal care, length of episiotomy wound and the absence of episiotomy sutures present. The study findings suggest a need for nurses to provide more thorough and consistent information about perineal hygiene for all mothers during pregnancy and after giving birth. The study provides valuable information to health care providers who need to consider the influential factors in treating episiotomy wounds (Manjula et al., 2012).

Pore (2014) studied the effectiveness of moist heat and dry heat application on healing episiotomy wounds. The study aimed to assess the effectiveness of moist heat (sitz bath) and dry heat (infra-red light) application on the healing of episiotomy wounds. Episiotomy wound healing was assessed for redness, oedema, ecchymosis, discharge, and approximation using the REEDA scale before and after each application of 30 moist and 30 dry heat applications. The application of moist heat showed a greater effect on oedema and redness, whereas it was less effective for ecchymosis, discharge, and approximation. The application of dry heat shows an equal effect on redness and oedema, whereas it is less effective on ecchymosis, discharge, and approximation. The study's finding shows that the REEDA scale score was higher before applying dry heat and moist heat, but after applying dry heat and moist heat, the REEDA scale score was lower (Pore, 2014).

A quasi-experimental study by Amandeep et al. (2015) was conducted to assess the effectiveness of a sitz bath in reducing episiotomy pain and wound healing among postnatal mothers admitted to postnatal units in Punjab. A sitz bath is a warm, shallow bath that cleanses the perineum, which is the space between the rectum and

the vulva which can provide relief from pain or itching in the genital area (Kaur, 2020). The sample consisted of 60 postnatal mothers with episiotomy wounds, with thirty mothers in each group. The experimental group received a sitz bath, and the control group received routine care. Assessment of wound healing was done using the REEDA scale. The experimental and control group's pre-interventional mean scores for episiotomy wound healing were 8.26±2.03 and 7.74 ±1.62, respectively. On the 3rd day of post-intervention, the mean score of the episiotomy wound of the experimental group (2.70 ± .65) was significantly less than that of the control group (3.23 ± 1.48), which shows that the application of the sitz bath was effective in improving episiotomy wound healing over days. The findings revealed that the sitz bath improved wound healing *p*-value =.001.

In Egypt, Farrag et al. (2016) conducted a quasi-experimental study to examine the effect of postnatal Kegel exercises on episiotomy pain and wound healing among primiparous women. Kegel exercises are done to strengthen the pelvic floor muscles. An intervention research design (time series) was adopted and a total of 138 women completed the study. The study revealed a statistically significant difference in wound healing outcomes with a *p*-value = .01 between the intervention and control groups on the 8^{th} and 14^{th} days after the intervention. Practising postnatal Kegel exercises had a significant effect in decreasing perineal pain after episiotomy and accelerating the healing of the incision. The study recommended integrating the Kegel exercises as the main part of the routine hospital postnatal instructions for the women for their important role (Oleiwi, 2010) in improving the quality of women's lives in the postnatal period (Farrag et al., 2016). However, in the study, the primiparous mothers were asked to register the duration and frequency of the exercises performed daily in the exercise diary developed by researchers. The information on whether mothers had performed was only checked by telephone calls, although over-reporting or under reporting could have skewed the results.

A quasi-experimental study was done by Raman (2015) in Bangalore, India. Using the purposive sampling technique, one hundred postnatal mothers were selected, 50 of whom were assigned to the intervention group (self-perineal care) and fifty to the control group (aseptic perineal care). The data was collected using the REEDA observation checklist for episiotomy wound healing. An observation checklist was used to assess the performance of self-perineal care. Results revealed a significant difference in episiotomy wound score between aseptic perineal care and self-perineal care on the second and third postnatal days ($p < .05$). The episiotomy wound score was lower in the self-perineal care group compared to that of the aseptic perineal care group. This was significant at $p < .05$. However, there was a significant relationship between the episiotomy wound score and baby weight ($p < .001$). The study revealed that self-perineal care gives better wound healing and is a cost-effective method of perineal care, which means that every postnatal mother can be independent in taking care of herself if she practises this at home (Raman, 2015). According to Blackburn (2017), most healing occurs within the first two weeks, but it may take four to six months for the episiotomy wound to heal completely.

Table 2.1: Summary of Selected Studies for Literature Review

Author (year), country	Aims	Design	Sample/ sampling method	Power Calculation, Tools, and analysis data	Outcomes	Limitation	Suggestions
Ari et al. (2019) Nigeria	Impact of an educational intervention on postpartum perineal wound care among antenatal mothers in Jos Nigeria	A quasi experimental study	A total of 200 mothers (100 mothers in the interventions and 100 mothers in the control group) Purposive sampling	A checklist on self-perineal care practise and REEDA Scale. Descriptive statistics include frequency tables, percentages, bar charts, and mean and standard deviations. Inferential statistics such as Chi-square and Pearson correlation were used in testing hypotheses.	In conclusion, women who were taught postpartum perineal wound care practised it, and this resulted in better wound healing progress,	The practise of perineal wound care after mothers were discharged from the hospital was done through phone calls. Wound healing for only seven days postpartum.	To conduct parturient experiences of perineal trauma.

Table 2.1, continued.

Author (year), country	Aims	Design	Sample/ sampling method	Power Calculation, Tools, and analysis data	Outcomes	Limitation	Suggestions
Mohamed and El-Nagger (2012) Iran	To evaluate the effect of self-perineal care Instructions on episiotomy pain and wound healing of postpartum women.	Quasi experimental design	A convenient random sample was composed of 80 postpartum women; each group consisted of 40 experimental and 40 control groups.	The power of calculation is not mentioned. An Interviewing Sheet, The Numerical Rating Scale (NRS) The Standardized REEDA Scale. Follow Up Sheet Descriptive statistics T-test	There is a significant reduction in the level of perineal pain and a highly statistically significant difference between groups	They are conducted in one setting only.	To be introduced to the women antenatally and postnatal.
Oleiwi (2010) Iraq	To identify the effectiveness of instruction-oriented intervention for primipara mothers upon episiotomy and self-perineal care.	A quasi-experimental study	30 primipara mothers in the study group and 30 primipara mothers in the control group	Power calculation 0.80. REEDA Scale. Follow-up sheet for wound healing outcome. Mean and Standard Deviation Logistic Regression	The study concluded that self-perineal care is effective in episiotomy wound healing.	Small sample size. Done in one set only	To conduct a study with a larger sample size

Table 2.1, continued.

Author (year), country	Aims	Design	Sample/ sampling method	Power Calculation, Tools, and analysis data	Outcomes	Limitation	Suggestions
Raman (2015) India	To compare the effectiveness of self-perineal care and aseptic perineal care in healing episiotomy wounds among postnatal mothers	A quasi-experimental study	Purposive sampling, 100 postnatal mothers were selected, 50 mothers in aseptic perineal care, and 50 mothers in self-perineal care.	REEDA scale observation checklist for episiotomy wound healing. An observation checklist to assess the performance of self-perineal care. Descriptive and inferential statistics	The study reveals that self-perineal care gives better wound healing and is cost-effective.	Self-perineal care was instructed to mothers on the first day only. Some of the data related to wound healing, such as haemoglobin, nutritional status, socioeconomic condition, sitz bath, and antibiotic administered during labour, were not included and not collected during the study.	Suggested for the midwife to identify the extent of injury, pain relief, and persistent self-perineal care management.

Table 2.1, continued.

Author (year), country	Aims	Design	Participant selection/ the number of participants	Assessment measures	Outcomes	Suggestions
Priddis et al. (2014)	Women's experiences following severe perineal trauma: a qualitative study	Qualitative-phenomenology.	Twelve women in Sydney, Australia, who had experienced severe perineal trauma during vaginal birth	Semi-structured face-to-face interviews. Thematic Analysis	Women are cared for during their labour, birth, and the postnatal period has a direct impact on how they process, understand and rediscover a new sense of self	Evaluating current services for women who experience ongoing physical morbidities is also important.
Razurel et al. (2011) Sao Paulo	To explore stressful events, social support, and coping strategies of primiparous women during postpartum.	Qualitative study	Sixty women were interviewed six weeks after the birth of their first child.	Data were collected via semi-structured interviews. Analysed using a content analysis method.	Interaction with caregivers was an important source of perceived stress. Upon returning home, the partner was considered the primary source of social support.	The underpinning philosophy of care for the postnatal period should encapsulate a holistic approach was physical symptoms of perineal pain and discomfort experienced by women should be studied.

Table 2.1, continued.

Author (year), country	Aims	Design	Participant selection/ the number of participants	Assessment measures	Outcomes	Suggestions
Shoorab et al. (2019)	Women's Experiences of Emotional Recovery from Childbirth-Related Perineal Trauma: A Qualitative Content Analysis	Qualitative	22 postnatal women with perineal trauma during labour	Semi-structured face-to-face interviews. Thematic Analysis The MAXQDA software (Ver.10) defines emotional recovery after birth trauma as a journey from negative emotions to subjective well-being.	Emotional recovery in women with perineal trauma was a two-phase process. In the first phase, mothers experienced negative emotions and then improved mood due to physical health,	A study should address social and financial supports and their possible effects on emotional recovery.
Way (2012) England	To explore the feelings, perceptions, and experiences of women concerning their perineum following childbirth in the early postnatal period.	Grounded Theory	Eleven participants aged 20–42 years had a vaginal birth.	Data were collected using diaries and interviews Analysed using a content analysis method.	'Striving for normality' was where women wanted to do normal things and feel like their normal selves soon after the birth of their baby.	Inclusion of more diverse of group women, differing ethnic and cultural backgrounds would lead to further the development of the categories.

Table 2.1, continued.

Author (year), country	Aims	Design	Sample/ sampling method	Power Calculation, Tools, and analysis data	Outcomes	Limitation	Suggestions
Briscoe et al. (2015) England	Mixed methods study to explore women and clinician's responses to **p**ain associated with sutu**r**ing second-degree perineal te**a**rs and ep**is**iotomi**e**s **[praise]**	Mix method pragmatic approach	Participated by 40 women and 21 clinicians Purposeful sampling	No power calculation. McGill Pain Questionnaire–Short Form (MCPQ-SF) and psychological status (Hospital Anxiety and Depression Scale (HADS) Descriptive; Kendall's correlation, Kruskal–Walli's test) NVivo 9 computer software	Women who scored higher on self-reported pain and psychological distress measures had experienced a previous psychologically distressing event and were concerned about future functioning and the style of communication to increase women's satisfaction with perineal suturing.	Higher pain scores around episiotomy and those who had two doses of opiates were not included in the inclusion criteria.	Future research should review and broaden the inclusion criteria. Explored further in a larger study.

Table 2.1, continued.

Author (year), country	Aims	Design	Sample/sampling method	Power Calculation, Tools, and analysis data	Outcomes	Limitation	Suggestions
Wiseman et al. (2019) England	Infection and wound breakdown in spontaneous second-degree perineal tears: An exploratory	An exploratory mixed-method	Prospective observational study Case-control study Qualitative Study Fourteen women suffered an infection during Purposive sampling.	Electronic patient records data Microbiology results and data from interviews. The logistic regression chi-square statistic Interviews	2892 vaginal births during the study period, 76.8% sustained perineal trauma, sixteen (1.9%) had a documented infection/wound breakdown Women complained lack of information about their perineum, and poor postnatal surveillance. Diagnosis and treatment were often delayed by clinicians.	The small number of participants interviewed reflected that perineal infection in spontaneous second-degree tears is uncommon.	Prospective longitudinal observational studies are needed to explore modifiable risks for infection/wound breakdown and long-term sequelae of second-degree tears.

2.6 Theoretical Framework of SPC Education

This current study used Orem's self-care deficit nursing theory as a theoretical framework. It comprises four interrelated theories: nursing agencies, self-care agencies, self-care deficit, and self-care demands (Hartweg, 1991). Orem's self-care deficit theory was chosen because it could guide the nurse-midwives in preparing primipara mothers for self-perineal care after discharge from the hospital. Nurse-midwives could provide more support to the mother upon discharge from the hospital before the latter can assimilate all the information offered during her short hospital stay (Lye et al., 2022).

2.6.1 Dorothea Orem's Self-Care Theory

Dorothea Elizabeth Orem (1914-2007) was a nursing theorist and the pioneer of the self-care nursing theory. Orem defined nursing as an art, a helping service, and a technology. Orem's health vision is marked by the wholeness of developed human systems and bodily and mental activity. It covers elements of physics, psychology and the interpersonal and social aspect. She declared that a person's knowledge of potential health problems is necessary for promoting self-care behaviours. The prevalent belief was that people in their families should assist them. Orem's philosophy was "man has the innate ability to care for himself," defined self-care as "the activities of a person who initiates and performs on his behalf to maintain life, health and well-being" pp.143-145. This explains that a patient requires wholly compensatory care as his abilities were more minor. In this study, mothers were initially unable to fulfil their activities of daily living on their own following the childbirth process, but gradually, with a supportive and educative system, they were able to care for themselves.

Orem's self-care deficit nursing theory comprises three related parts: a theory of self-care, a theory of self-care deficit, and a theory of the nursing system (Hartweg, 1991). Self-care theory includes self-care, which is the practice of activities that individuals initiate and perform on their behalf to maintain life, health, and well-being. Self-care agency refers to a human's innate ability that is to engage in self-care conditioned by age, developmental state, life experience, socio-cultural orientation, health, and available resources (Hartweg, 1991).

Therapeutic self-care demand is the total self-care actions performed over a specific duration to meet self-care requisites using valid methods and related operations. The development of self-care requisites is an important component of primary care prevention and disease. It also emphasises that a person's knowledge of potential health problems is necessary to promote self-care. Self-care and dependent care are the behaviours learned within a socio-cultural context, as shown in Figure 2.2.

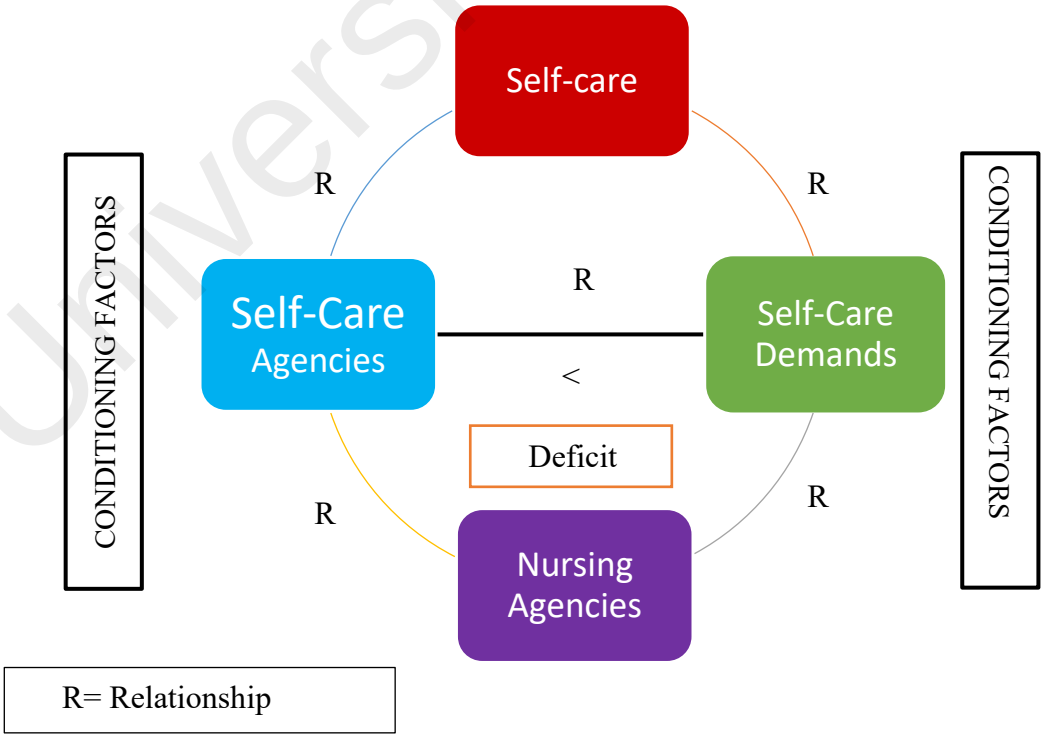

Figure 2.2: Theoretical Framework of Orem's Theory (Hartweg, 1991)

2.6.2 Application of Orem's Theory of Self-Care Deficit Nursing Theory

Orem's self-care deficit nursing theory was also employed in a quasi-experimental study done by Ari et al. (2019) in Jos Nigeria on the impact of an educational intervention on postpartum perineal wound care among antenatal mothers. Orem's self-care deficit nursing theory suggests focus that individuals learn self-care practices through education, scientific knowledge, growth, and development. In this framework, primiparous mothers are the dependent self-care agents for performing self-perineal care who have power, self-care capability, and act independently and willingly. Nurse midwives still need to have the power to educate them on self-perineal care and recognise complications such as localised perineal infection signs.

The theory addresses the relationship between the nursing system, self-care agency, and self-care, thereby meeting one of Orem's strategies, like the supportive educative system that empowers pregnant mothers with knowledge. This will positively influence the mothers' practice of postpartum self-perineal wound care, especially when they sustain perineal trauma thereby resulting in better wound healing progress. This is shown in Figure 2.3

The theory is beneficial in practice since it serves as the basis for improving the quality of patient-nurse communication. Furthermore, the framework encourages nurses' acquisition of information and skills as they need to deal with a wide range of mothers' issues. Therefore, the theory can be considered very practical and helpful for nurses. In addition to enhancing communication, it also provides an opportunity to predict and improve outcomes significantly. Mainly, Orem's theory tends to avoid scenarios in which the symptoms of a disease or a disorder are ignored until a patient develops a severe complication. Instead, the framework helps to locate a problem at the earliest stages of development (Hartweg, 1991).

Nurse-midwives should adopt Orem's theory to motivate mothers to be involved in self-perineal care. It is important to inform pregnant mothers and their families of the benefits of self-perineal care and to assist mothers in forming realistic and specific goals. Mothers should be motivated to perform self-perineal care to prevent complications and achieve better postpartum outcomes.

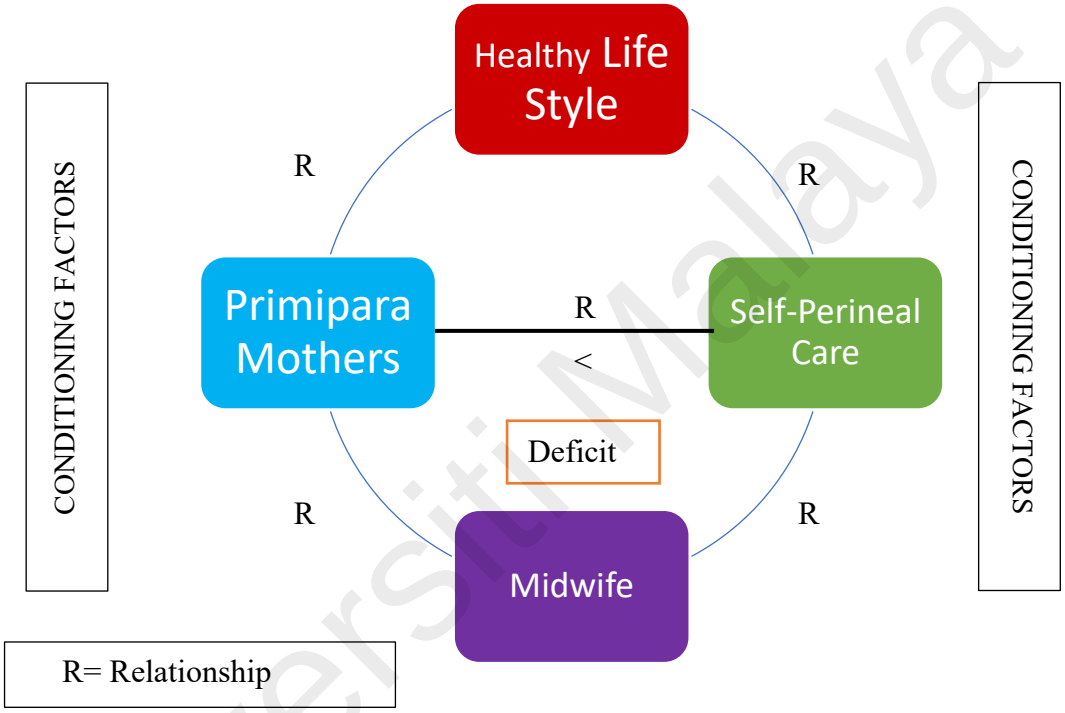

Figure 2.3: Application of the theoretical concept of self-care to the mothers

2.7 Summary

In summary, self-perineal care education affects primigravida mothers during the postnatal period. It appears to increase knowledge, reduce episiotomy pain and improve wound healing outcomes besides maintaining good hygiene and comfort of primipara mothers throughout the postnatal period. Almost all of the programmes conducted for postnatal mothers were conducted face-to-face. Most studies used the Numerical Pain Rating Scale and Visual Analogue Scale to measure episiotomy pain, recorded as a score.

Many studies have utilised different knowledge questionnaires; however, most used the REEDA scale for episiotomy wound healing outcomes. Orem's theory of nursing is beneficial in practice since it serves as the basis for improving the quality of communication between nurse midwives and primipara mothers.

Most of the self-perineal care education studies examined in this review were quantitative and qualitative. According to the researcher's knowledge, a mix-method study has neither been explored nor have studies been published in the Southeast Asian region. Hence, the current study fills this gap.

Applying a theoretical framework, namely Dorothea Orem's self-care deficit theory, primiparous mothers themselves become care agents for performing self-perineal care who have power and self-care capability and act independently and willingly. The focus is that individuals learn self-care practices through education, scientific knowledge, growth, and development. The methodology of this current study is discussed in Chapter Three to explain the reasoning behind the approaches taken to conduct the study.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter addresses the research methodology used to carry out this study. The design, study setting, population, sample, sampling method, instrument used, and pilot study are all described. The study's SPC education intervention, data collection method, and ethical considerations are outlined.

3.2 Research Design

Research design is defined as the overall plan for acquiring new knowledge or confirming existing knowledge. It incorporates a plan for the systematic collection of information in a manner that assures the answers found will make the study as meaningful and as accurate as possible (Polit & Beck, 2021) . The research design and methodology used in the current study are discussed in the following sections.

3.2.1 Mixed Methods Research Methodology

This study used mixed methods research to gather numerical (quantitative) and textual (qualitative) data related to the research questions. A mixed-methods research approach was used for this study. Mixed methods research (MMR) is the third major research approach or paradigm, along with qualitative and quantitative research. Creswell and Poth (2017) define it as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or languages into a single study. In this study, mixed-methods research involves collecting and analysing quantitative and qualitative data.

Quantitative methods involve collecting information using questionnaires, tests, and specific surveys aimed at producing generalised results, while qualitative methods involve collecting information to explore people's beliefs or perceptions and to understand complex dynamic phenomena, as they are expressed naturally by people within the normal context of their lives (Creswell & Poth, 2017).

3.2.2 Types of Mixed Methods Research (MMR) Design

According to Crabtree and Miller (2022) to, there are four major types of MMR design: triangulation, embedded, explanatory, and exploratory. The researcher applied the embedded sequential MMR approach to address the research questions. The embedded design, also known as a nested approach, prioritises one of the methods that dominate the study and embeds the other. This is useful when it is necessary to embed a qualitative component within a quantitative design or vice versa. The purpose is to address questions that seek information from different types of data (Black et al., 2016).

3.2.3 MMR Design and Approach in the Current Study

In the present study, the qualitative data provided a supportive role while the quantitative data played a primary role. The priority of the quantitative study was to examine the effect of self-perineal care education on knowledge, episiotomy pain and wound healing outcomes among primipara mothers. In other words, the qualitative data is embedded within the quantitative data. Creswell and Poth (2017) outlined several reasons for embedding the qualitative components within the quantitative design in an experiment following the results of an experiment. The primary reason for embedding the qualitative component in this study was to explore the participants' opinions, experiences, and challenges to self-perineal care at home. Therefore, the embedded sequential design of MMR provided more information about and insight into the intervention outcomes. Figure 3.1 provides the flow chart of the embedded design of MMR applied in this study.

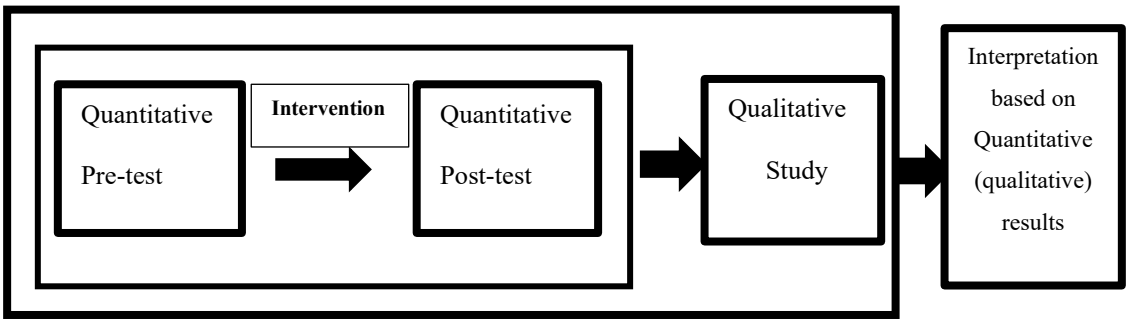

Figure 3.1: Embedded sequential mixed method design (Creswell & Poth, 2017)

In this study, the data collection and analysis of quantitative data occur first, followed by the collection and analysis of qualitative data. Supplementing the quantitative data collection with qualitative data by sequential embedding in this study allowed the researcher to explore participants' experiences after the intervention. The primary reason for embedding the collection of qualitative data after the intervention was to assess participants' opinions, experiences, and challenges of self-perineal care practices and to identify potential opportunities for improvement in the clinical area.

3.2.3.1 Quantitative Methods

A quasi-experimental design is appropriate for examining the cause-and-effect relationship between selected independent and dependent variables when a truly experimental or randomised controlled trial (RCT) design is not feasible (Parahoo, 2014). A quasi-experimental study with a non-equivalent control group pre- and post-test design was applied to examine the effect of self-perineal care education on knowledge, episiotomy pain and wound healing outcomes among the primipara mothers.

The present study used a pre and post non-control group design and repeated measure design with elements of a within-group design and between-group design to assess the effect of self-perineal care education on knowledge, pain score and wound healing among primipara mothers.

Between group-design compared the outcome of interventions between the control and intervention group participants. Repeated measures and a within-group design determined whether participants changed significantly across time.

3.2.3.2 Qualitative Methods

Following the quantitative approach, a qualitative study was conducted after self-perineal care education in the intervention group to explore their opinions, experiences, and challenges in performing self-perineal care at home. In-depth interviews were used to explore the primipara's opinion regarding self-perineal care teaching and their challenges in practising perineal care at home.

This qualitative study played a supportive and secondary role in a quasi-experimental study and was not meant to explain the significant quantitative results. Thus, the qualitative findings were embedded within the quantitative results of the study (Creswell & Poth, 2017; Rebar et al., 2011). The primary reason for embedding the qualitative data collection after the intervention was to assess participants' opinions, experiences, and challenges in performing self-perineal care. Data integration is about at which phase of the research process the mixing of quantitative and qualitative data occurs during the interpretation stage, which enriches each other.

3.3. Stages of Study Design

This research was conducted in four stages. The first stage was instrument validation which was achieved by conducting a pilot study and reassessing the validity and reliability of a knowledge questionnaire.

The second stage was planning self-perineal care education, which began with an extensive search and review the literature to construct the planning and development of

the SPC education content. The expert panel discussion was on planning and developing the SPC education module. The teaching material and the PowerPoint slides were prepared. The mobile application was developed in English and Bahasa Malaysia, and components such as self-perineal care education and pamphlets were designed.

The third stage was conducting a quantitative study by pre-testing the mothers and measuring knowledge scores at the baseline level, followed by the SPC education phase I. The final stage of this study was a qualitative study on the opinion of the volunteer primipara mothers from the intervention group on the SPC education given and their experiences and challenges in performing self-perineal care at home. This stage was concurrent with stage III of the quantitative study as the primipara mothers who had completed seven days of scoring their pain and posting their observations of wound healing came to a postnatal follow-up at the maternal and child health clinic. Qualitative data was collected using in-depth interviews with the participants from the intervention group. An in-depth interview was conducted with each mother six weeks after delivery at the maternal-child health clinic. The summary of the current research stages consisting of activities and tools is presented in Table 3.1

Table 3.1: The stages of the study

Stages	Activities	Tools	Duration
1. Instrument validation	Pre-testing the questionnaire.	Questionnaires on knowledge	Three months
	Evaluating validity and reliability of self-perineal care knowledge instrument.	Kuder-Richardson Formula 20 Content validity Face validity	
II. Development of SPC educational package	Searching and reviewing the literature to construct SPC education content.	Searching literature.	Four months
	Planning and developing health education module.	Expert panel evaluation.	
	Preparing the learning material for the session.	PowerPoint slide Pamphlet (soft copy)	
	Developing mobile application by Android developer specialist Incorporation in English and Bahasa Malaysia.	SPC education mobile application.	
III. Quantitative study	Measurement of outcomes variable on knowledge score among primipara mothers before and after the intervention.	Questionnaires on knowledge adapted from (Gadade et al., 2018)	Six months
	Self-Perineal Care Education stage I- Theoretical Education.	PowerPoint slides On-line pamphlet Mobile application	
	Self-Perineal Care Education stage II- reinforcement and hands-on practical sessions.	Hands-on practice Mobile application	
	Measurement of outcomes variables on pain and wound healing at 4 hours, day 1 to day 7 post-delivery.	Numerical Pain Rating Scale REEDA Scale	
IV. Qualitative study	Explore primipara mothers' opinions about self-perineal care and challenges in practising self-perineal care at home.	In-depth interview Structured questionnaires	Three months

3.4 Research Setting

According to Grove and Gray (2018) the setting is where the research is conducted. It is divided into three types: (1) a natural setting, that is, the researcher does not manipulate the environment for the study; this is suitable for descriptive and correlational quantitative and qualitative studies; (2) the researcher modifies the environment in a partially controlled setting; this is usually used in correlational, quasi-experimental studies , and experimental studies; and (3) highly controlled setting in which the researcher constructs the environment artificially and uses it for conducting the study. This study was conducted in a natural setting for both the intervention and control groups.

This study was focused on hospitals that provide maternal and childcare in the Klang Valley. There are seven hospitals with similar characteristics in the Klang Valley, categorised as government hospitals, teaching hospitals, and referral hospitals. The researcher conducted two-stage sampling methods using the draw lot method to choose two hospitals among these seven hospitals. The selected hospitals were assigned as the intervention group and the other one as the control group using simple random sampling methods.

The selected hospitals were Hospital A for the intervention group and Hospital B for the control group to prevent information contamination among the mothers, as could occur if conducted in the same hospital and also unethical to teach mothers in one group and not to teach mothers in the other group as it can lead to selection bias. The selected hospitals are similar given inpatient care management and hospital policies. Both hospitals provide tertiary care services and act as referral centres for other hospitals in Malaysia. The mean birth rate per month in both selected hospitals at the time of the study was 1,200 per month.

Hospital A is located about 25km from Kuala Lumpur at Mukim Batu, Daerah Gombak, and Selangor. This hospital has 620 beds and provides various secondary and tertiary medical services. Hospital A receives referral cases from the surrounding district, such as Gombak, Petaling, Hulu Langat, and Kuala Selangor, covering a population of more than 2.8 million. The antenatal clinic operates five days per week and deals with around 1,200 patients per month. The obstetric unit consists of four wards: Ward 6A and 6C are postnatal wards with 28 beds in each; Ward 6B is a high-risk antenatal ward with 28 beds; and Ward 6D is a low-risk antenatal ward with 14 beds. The researcher on the intervention group took place in two postnatal wards, Ward 6A an Ward 6C, and the antenatal clinic.

Hospital B has 960 inpatient beds and 20 clinical disciplines in Gombak District, Selangor. This hospital provides secondary and selected national tertiary care services. This hospital has been designed, constructed, and equipped with a Total Hospital Information System (T.H.I.S.) which is an environment for paperless and filmless hospital operations. This is the first hospital in the world to operate with a T.H.I.S, which covers all aspects of the hospital's operation (MOH, 2020). The obstetric unit consists of Obstetric Clinic, Labour Room, Patient Assessment Centre (PAC), and three obstetric wards, 5A, 5B, and 5C, with a total of 28 beds in each ward. The research on the control group was conducted in postnatal Ward 5A, 5B and 5C and also in the antenatal clinic.

3.5 Population, Sample, and Sampling Methods

According to Grove et al. (2012) , the population is defined as "all elements such as individuals, objects, events or substances that meet the criteria for inclusion in a study" (p.703). There are two types of population: the target population and the accessible population.

The former is used to generalise, while the latter is applied to anyone that meets the study's criteria and can be accessed by the researcher (Parahoo, 2014).

The target population of this study was all primigravida mothers who visited the antenatal clinic in both study hospitals. The accessible population in this study was all the primigravida mothers at 32 to 36 weeks of gestation and attending antenatal clinics at the respective hospitals. Mothers were selected in the third trimester because this study included two phases of SPC teaching with four to six weeks between each session. This allowed theoretical knowledge to be integrated into practice. Furthermore, the selection of mothers in the third trimester can minimise the dropout rates as mothers could be identified as a pregnancy without complications at this stage.

3.5.1 Quantitative Sampling Method

Primigravida mothers were allocated based on the hospital where they attended their antenatal care. In this quasi-experimental study, non-probability-sampling methods, and consecutive sampling was used. The consecutive sampling method is a technique in which every subject meeting the inclusion criteria is selected until the required sample size is reached (Brannen, 2017; Tappen, 2022). This enables the researcher to use subjects available in the right place and right time until the sample size is achieved. This sampling method was applied in this quantitative study where all the primigravida mothers that fulfilled inclusion and exclusion criteria were included.

The researcher screened the participants in both hospitals based on inclusion and exclusion criteria. The inclusion criteria were: primipara mothers in normal pregnancy; mother at 32 to 36 weeks of gestation; those able to communicate and read in Malay or English; and those who owned a smartphone.

The exclusion criteria were primipara mothers with hematoma or abscess at the perineum region; mothers with systemic disorders in pregnancy like Diabetes Mellitus, Hypertension, Pulmonary Tuberculosis, and Impaired Thyroid Function; obese mothers; and those mothers who were smokers and/or consumed alcohol. These were excluded because these variables would delay wound healing and thus affect the study outcome.

3.5.2 Qualitative Sampling Method

To recruit samples for the qualitative part of this study, purposive sampling, a non-probability sampling method, was employed. Purposive sampling is commonly used in qualitative studies as it enables the researchers to select specific participants. Since these participants experience the phenomenon being studied first-hand, they can provide the richest information, allowing for an in-depth understanding of complex experiences from the participants (Crabtree & Miller, 2022).

3.6 Sample Size

To conduct a quantitative study, the sample size was calculated to ensure the power of the study. The qualitative study's sample size was determined by data saturation when no new information emerged during the data collection process. Therefore, no sample size calculation was performed.

3.6.1 Quantitative Sample Size

The sample size was determined using mean and standard deviation as the parameter of the study. The sample size was determined using the formula G*Power 3.1 software. This study aimed to measure between- and within-group differences; therefore, the sample size was calculated using G*Power 3.1 software with a moderate effect size (0.5),

α error probability of .05, a power of 0.80 and allocation ratio N2/N1 of 1. An example is shown in Table 3.2.

Table 3.2: Calculation using power analysis formula

T Tests-Means Knowledge Difference Between Two Independent Means (Matched Pairs)	
Analysis: a priori: compute the required sample size	
Input: Tails (s)	Two
Effect size	0.5
No centrality parameter δ	3.6742346
α error probability	0.05
Power (1-β error probability)	0.80
Critical t	2.0057460
df	53
Total sample size	54
Actual power	0.95

Using the formula above, the sample size was calculated for the three dependent variables of this study using the mean and SD of priori studies: knowledge (Praveen et al., 2018), pain score (Mohamed & El-Nagger, 2012), and wound healing (Somu et al., 2017) (Table 3.3). Knowledge level was measured using a questionnaire, pain score by the Numerical Pain Rating Scale (NPRS), and wound healing by the REEDA scale.

Table 3.3: Total sample size for each dependent variable

Dependent variable	Total sample size	Previous study	Mean ±SD
Knowledge	50	Praveen et al. (2018)	23.73±1.41
Pain Score	40	Mohamed and El-Nagger (2012)	4.675±0.99
Wound Healing	54	Somu et al. (2017)	2.55±0.83

The total sample size of each dependent variable was knowledge (n=50) and pain score (n=40) and wound healing (n=54), respectively. It resulted in a minimum sample size of 54 participants for each group. Considering the 20% attrition rate, the total sample size was 65 after adding 11 prospective participants, which resulted in 65 participants in both intervention and control groups using a 1:1 ratio. Thus, 130 prospective participants of the primigravida mothers were needed to retain 65 participants in each group by the end of the study.

The Consolidated Standards of Reporting Trials (CONSORT) (2010) guideline explains the interventional study. 186 participants were enrolled in the study. However, 34 participants did not meet the inclusion criteria. Ten of the participants declined to participate for various reasons and 12 participants were unable to participate due to not owning a smartphone. Thus, the final total sample size of the study was 130 primigravida mothers. The total sample size of the intervention group was 65 primigravida mothers. Meanwhile, 65 primigravida mothers were assigned to the control group.

Three participants from the intervention group subsequently dropped out from the study as these primigravida mothers had a caesarean section for foetal distress. Two participants from the control group also dropped out due to instrumental delivery and caesarean section. Finally, this study consisted of 62 participants in the intervention group and sixty-three primipara mothers in the control group, as shown in Figure 3.2.

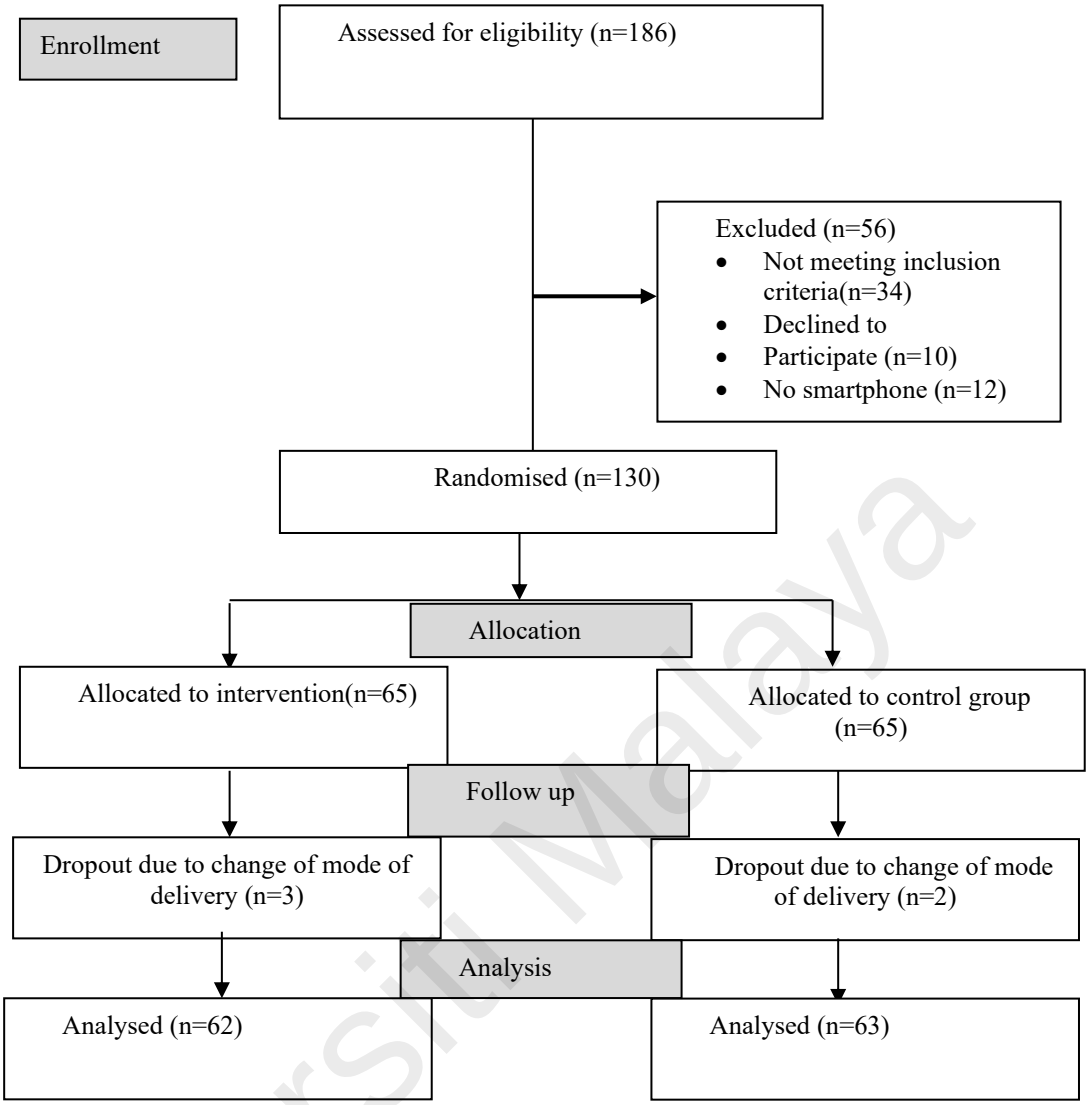

Figure 3.2: Flow chart of participant enrolment for each group based on CONSORT 2010

3.6.2 Qualitative Sample Size

The qualitative study's sample size was determined by data saturation when no new information emerged during the data collection process, and there was only redundancy of previously collected data (Crabtree & Miller, 2022). Thus, the calculation of the sample size was not performed.

12 primipara mothers from the intervention group who had attended the self-perineal care education were invited to an in-depth interview, which they attended voluntarily. These primipara mothers were interviewed as data saturated after the tenth participant,

and no new information was obtained from the in-depth interview session. The number of participants was determined by achieving “data saturation, " sampling to the point at which no new information is obtained, and redundancy is reached (Crabtree & Miller, 2022; Creswell & Poth, 2017; De Chesnay, 2014; Poopan, 2016). The researcher added two more participants for the in-depth interview to make 12 participants. However, the diversity of participants from various backgrounds was considered when selecting the in-depth interview participants.

3.7 Research Instruments

The questionnaire consisted of three sections, including demography information, questionnaires on knowledge, and an observation chart for the pain score and wound healing outcome, as shown in Appendix B. The authors obtained a letter of permission from (Gadade et al., 2018) to utilise their instrument on knowledge of perineal care in the current study (Appendix C). All these data were collected using a mobile application.

3.7.1. Demographic Characteristics

Demographic characteristics were collected in this section. There were seven items related to the mothers’ background: age, race, education level, occupation, type of family, awareness of self-perineal care, and source of information. These variables were determined from previous studies (Gadiya et al., 2014; Mohamed & El-Nagger, 2012).

3.7.2. Knowledge of Self-Perineal Care

A questionnaire was used to assess the primipara mothers' knowledge of self-perineal care. This tool consisted of 16 multiple-choice questions with a single correct answer about the meaning, purpose, process, rationale, complications, and tips for performing

perineal care. A literature review and findings from a prior study were used to adapt the questionnaire (Gadade et al., 2018).

The questionnaire was worded both positively and negatively. A score of "1" was given for each correct answer, and a score of "0" was given for wrong answer. Scores from 16 questions were summed, and the total score ranged from 0 to 16. The questionnaire was written in English and then back-to-back translated into Bahasa Malaysia, Malaysia's native language by a linguistic professional and the Bahasa Malaysia to English by another independent linguistic professional. The translation process followed the recommendation of the World Health Organisation (WHO, 2009). This translation process aims to achieve different language versions of the English instrument that are conceptually equivalent in each of the target countries /cultures. The translation of both languages was included in the final version of the questionnaire and checklists. The instrument used in this study was reassessed for its validity and reliability by pretesting the instruments.

3.7.3 Observation Chart on Pain Score Using Numerical Pain Rating Scale

A self-report Numerical Pain Rating Scale (NPRS) vis mobile application was used to assess pain score. The NPRS measured the intensity of postnatal mothers' overall pain score and during daily activities. It is a 0 to 10-point pain intensity scale developed by McCaffery and Beebe (1989) (Appendix D). This tool has been evaluated psychometrically and has been used in many previous studies to report pain scores among participants with episiotomy wounds (Essa & Ismail, 2016; Farzana, 2020; Mohamed & El-Nagger, 2012; Praveen et al., 2018).

The NPRS was modified for easy understanding and scoring among primipara mothers was facilitated by use of colour coding. The pain score intensity was 0 for no pain and colour-coded green.; scores 1 to 3 were categorised as mild pain and were color-coded yellow; scores from 4 to 6 were categorised as moderate pain and colour-coded as orange. Severe pain was defined as from 7 to 10 points, with a red colour coding.

Primipara mothers were assessed on their pain score at 4 hours after episiotomy was performed as a baseline assessment and then 24 hours before the mother was discharged home. The researcher taught the mothers how to observe pain scores and wound healing outcomes. The same observation would be done by the participant from day 2 to day 7 post-delivery, at the same time every day. The number of analgesic tablets taken from post-delivery till day 7 was recorded, a factor which can interfere with the pain score.

3.7.4 Observation Chart on Wound Healing Outcome Using REEDA Scale

The REEDA scale was used to measure wound healing outcomes in the primipara mothers with an episiotomy (Davidson, 1974) (Appendix E). The REEDA scale is described in Table 3.4. Many studies have used this scale to assess the episiotomy wound healing outcome (Abedian et al., 2020; Esmaeili Vardanjani et al., 2012; Farrag et al., 2016; Kanwar et al., 2018; Mohamed & El-Nagger, 2012; Sarbaz et al., 2019). The REEDA scale is a reliable instrument for assessing perineal healing and is valuable to nurses-midwives, midwives, and other caregivers as a concise evaluation tool (Alvarenga et al., 2015).

All the observation-related wound healing outcome done by the participants were self-reported. The mothers from both groups also reported whether they used any traditional method during the first seven days of confinement by using the mobile application as this could interfere with the wound healing outcome.

Table 3.4: REEDA Scale scoring (Davidson, 1974)

Points	Redness	Oedema	Ecchymosis	Discharge	Approximation
0	None	None	None	None	Close
1	Within 0.25 cm of the incision bilaterally	Perineal, less than 1 cm from the incision	Within 0.25 cm bilaterally or 0.5 cm unilaterally	Serum	Skin separation 3 mm or less
2	Within 0.5 cm of the incision bilaterally	Perineal and/or between 1 to 2 cm from the incision	Between 0.25 cm to 1 cm bilaterally or between 0.5 to 2 cm unilaterally	Serosanguinous	Skin and subcutaneous fat separation
3	Beyond 0.5 cm of the incision bilaterally	Perineal and/or vulvar, greater than 2 cm from the incision	Greater than 1 cm bilaterally or 2 cm unilaterally	Bloody, purulent	Skin, subcutaneous fat, and fascial layer separation
Score					
				Total Score 15	

3.7.5. In-Depth Interview

As for the qualitative method, an in-depth interview was employed with the primipara mothers from the intervention group who had done self-perineal care to gather the participants' experience of practice at home. Informed consent was obtained from the primipara mothers before the interview session (Appendix F). Based on the literature and discussion with the experts, the following questions were asked: (1) What is your opinion of self-perineal care education? (2) How well did you perform the practice of self-perineal care at home? (3) What were the challenges of performing self-perineal care at home?

3.8 Validity

Validity in quantitative research determines whether the research truly measures what it was intended to measure or how truthful the research result are (Grove et al., 2012).

3.8.1 Content Validity

Content validity is one of the methods to measure the validity of instruments. The index of an interrater agreement to produce a content validity index (CVI) was then calculated (Hennink et al., 2020). The final version of the translated instruments was distributed to six experts including doctors, ward sisters and nurse educators from the Obstetrics and Gynaecology speciality who extensively reviewed the items on the self-perineal care knowledge questionnaire. The panel of experts were selected based on their expertise and experience in the obstetrics field. The instruments were emailed to the experts with the attachment of the cover letter and the guidelines on assessing the items' appropriateness, accuracy, and representativeness. Each expert made an independent assessment of content validity by rating the content relevance of each item using a 4-point ordinal scale; 1= not relevant with current practice; 2= somewhat

relevant with current practice ; 3 = relevant with current practice; and 4 = highly relevant to current practice (Polit & Beck, 2021).

The Content Validity Index (CVI) was calculated based on the assessment of the panel of experts. The CVI is widely used and reported among nurse researchers who compute two types of CVIs: the content validity of individual items (I-CVI) and the overall scale (S-CVI). I-CVI is calculated from the rating of the experts, either 3 or 4 relevant divided by the total number of experts. Researchers usually use this calculation as guidance to revise, delete or substitute items. Most researchers report that the S-CVI is divided into two types; S-CVI/UA is the proportion of items on a scale that achieves a relevance rating of 3 or 4 by all experts, and S-CVI/Ave that is the "average of the I-CVIs for all items on the scale (Polit & Beck, 2021).

According to Polit and Beck (2021), it is recommended that the instruments having excellent content validity should consist of the composition of the I-CV'Is minimum of .78 for 6 to 10 experts and S-CVI/Ave = .90 or higher. In this study, the six experts scored 19 items on the knowledge of self-perineal care for primigravida mothers, including the meaning, purpose, process, rationale, complications, and tips for performing perineal care, including background characteristics of the participants, based on four attributes (not relevant, somehow relevant, relevant and highly relevant).

Three items, however, did not meet a satisfactory I-CVI. The three items were item number 16, "When should the ointment be applied on the episiotomy wound?", item 14 "What can provide comfort to the perineal area?", and item 8 "Which type of woman needs to do perineal care"? The latter had the lowest scores of the I-CVI as four experts rated it as 2. The panel unanimously agreed that these three items were inappropriate for the local culture. Hence the three items were deleted with the permission from the authors. The questionnaire was worded both positively and negatively.

Thus, a total of 16 items were calculated for content validity. From the calculation using a Microsoft Excel formula derived from Polit and Beck (2021), the knowledge instrument was proven to have excellent content validity, where I-CVI ranged from 0.84 to 1.00 and S-CVI/Ave = .89. Therefore, the knowledge instrument could be considered to have excellent content validity.

3.8.2 Face Validity

Face validity requires that the questionnaire appear acceptable in terms of for the nature of the research and the field of material (Grove & Gray, 2018). This assesses the questionnaire's presentation in terms of effectiveness, readability, design accuracy, and formatting and comprehension of the vocabulary used. In this study, the questionnaire's content validity was approved by an experienced and professional panel of experts who reviewed the material.

The final version of the translated instruments was distributed to five prospective participants who were not involved in the main study. They were asked to read the instruments and then evaluate whether the content reflected the concept the researcher intended to measure. The purpose of this activity was to provide face validity (LoBiondo-Wood & Haber, 2014). Although face validity is now viewed as basic validation and is no longer considered acceptable evidence for validity, it is still suitable to assess the willingness of prospective participants to complete the questionnaires (Grove et al., 2012). The participants agreed that the tools reflected what the researcher intended to measure; hence, they were willing to fill out the questionnaire.

3.8.3 Reliability

Reliability means measuring the study instruments to check whether they produce consistent results when used in similar circumstances by different researchers (Polit & Beck, 2021). The reliability of the knowledge score was accessed in this study through Kuder-Richardson Formula 21 as in the questionnaire there are dichotomous items.

Thirty primigravida mothers were recruited to participate in the pilot study. The self-perineal care knowledge questionnaire consisted of 16 items. The Kuder Richardson 21 reliability test was used to measure the internal consistency of the instruments. The internal consistency was 0.70 for all the 16-items utilised in this study.

3.9 Health Education Intervention

Health education has been defined as activities which raise an individual's awareness giving the individual the health knowledge required to enable him or her to decide on a particular action (Raingruber, 2014). The teaching material for the primigravida mothers was created and developed by the researcher, including PowerPoint slides, pamphlets, and the mobile application design of the self-perineal care content.

3.9.1 Self-Perineal Care Education

A search and review of the literature on self-perineal care education related to knowledge, episiotomy pain, and wound healing outcomes was done.

3.9.1.1 Preparation of Teaching Material

The researcher adapted the content based on the review of the literature (Ari et al., 2019; Gadiya et al., 2014; Mohamed & El-Nagger, 2012; Raman, 2015).

The SPC education tool consisted of a PowerPoint presentation and pamphlets (soft copy). PowerPoint slides were used in a presentation that taught the ten steps of practising self-perineal care, the sitz bath, Kegel exercises, a balanced diet, and the benefits of perineal care. A soft copy of the pamphlet was designed and produced. The content of the teaching material was further discussed with the supervisor until a consensus was reached (Appendix G).

Five prospective mothers also accessed the final version of the SPC education intervention for face validity. These mothers (who were not involved in the main study) were asked to read the information and evaluate whether it reflected the concept the researcher intended to measure. The researcher conducted two face-to-face health education sessions on perineal care for the intervention group and uploaded all the information onto the mobile application for the intervention group. Meanwhile, the control group adhered to routine care at the study hospital.

The two sessions with the mothers were conducted at different times. The first session was conducted at the antenatal clinic when mothers were between 32 weeks and 36 weeks of gestation. The second session was done 4 hours following the childbirth. Each session lasted from 30 to 45 minutes. An agreement was reached through the discussion for SPC education to be introduced and implemented during the antenatal phase in the antenatal clinic and reinforced in the postnatal ward to create self-perineal care awareness and empower primigravida mothers.

3.9.1.2 Expert Panel Evaluation

Before the teaching session to the primigravida mothers took place, learning material was prepared. The lesson plan highlighted the background, learning outcomes, learning material, and relevant activities. Teaching materials such as PowerPoint slides and

pamphlets (softcopy) were designed to include the concept of ten steps of practising self-perineal care, the sitz bath, Kegel exercises, a balanced diet, and the benefits of perineal care.

The six expert panels, comprised of two doctors and four nursing personnel from the Obstetrics and Gynaecology Department, reviewed and validated the SPC education. They were chosen based on their expertise and experience in the field of obstetrics. To ensure appropriateness and accuracy, the content of the SPC was sent electronically to the experts with the cover letter attachment and the evaluation guidance. The experts carried out an independent evaluation of the quality of the content using an ordinal four-point scale: 1= not relevant to current practice; 2= somewhat relevant to current practice ; 3 = relevant to current practice; and 4 = highly relevant to current practice (Grove & Gray, 2018). The Content Validity Index (CVI) was determined based on the experts' assessments, which proved to be excellent content validity where I-CVI was 0.89 to 1.00 and S-CVI/Ave was 0.89.

3.9.1.3 Mobile Application Design Process

The mobile application was an electronic alternative to standard practice designed for the mothers of the intervention group, containing SPC education teaching material such as PowerPoint and pamphlets. The following is a description of the process of developing the mobile application. The mobile application consisted of three sections for all the mothers in both groups and each session had an English and a Bahasa Malaysia version. The modules included demographic information, a pre-test / post-test questionnaire on self-perineal care knowledge and an observation chart for the pain scores and wound healing outcome. The content of the mobile application can be found in Appendix H.

The web application was self-constructed and validated by two experts from the Computing and Creative Media Department from one of the private universities in the Klang Valley. CodeIgniter was used as the template for creating the website. Later WAMP (Windows, Apache, MySQL, PHP) was also implemented alongside it to be used for the database, while a Virtual Machine (VM) from Google Console was used to create the server which holds the resources and data necessary to deploy and run the website. The question-and-answer data were stored in the database previously mentioned.

The development process of this web application involved front-end and back-end technologies. For the front-end technology, HTML, JavaScript, and Cascading Style Sheets (CSS) were used to display the pages and handle user interactions. For the back-end, it utilised Hypertext Pre-processor (PHP) was utilised to act as a framework to handle the data and pages of the website. The environment was set in a Virtual Machine (VM) in Google Console and was used to create a server to deploy the website. The database was used to store the general structure of the questions, the study results, and information on SPCE. The main coding languages involved in this part were PHP, JavaScript, and HTML. The design of the website took inspiration from other medical websites.

Cascading Style Sheets were used to improve the style of the web page. The database used was MySQL. Lastly, the questionnaire, teaching material on perineal care, and observation charts for the pain scores and wound healing outcomes based on the REEDA scale were developed and uploaded onto the mobile app. The development phase included Information Collection, Functional Modules Definitions, Prototype Development, and Deployment and Evaluation.

Stage 1: Information Collection

Designing a user-friendly app requires end users' evaluation of the proposed app and their input application, allowing the developer to build an app from the start with the end-user in mind. An app consisting of all the information on SPC education given to primigravida mothers face-to-face was included. The rationale behind this was that the primipara mothers had to be able to assess the report anytime and anywhere.

Stage 2: Functional Modules Definitions

The functional module of SPC education was defined at this stage to meet participants' requirements and to enhance their compliance, and also the domain experts could verify design results. Following the development of the SPC modules and uploading and installing them onto the smartphone, a pilot study was carried out to validate the usability and functionality of the app.

Following the pilot study, one particular session in the module was corrected, namely the user registration page where the handphone number was chosen as a password for each mother rather than an email address, as many mothers did not have an email address.

Stage 3: Prototype Development

This stage focused on the design and implementation of the prototype of the SPC education programme, which was based on the defined functional modules. Two domain experts from the Computing and Creative Media Department gave their valuable suggestions to make the mobile application more user-friendly. It is noteworthy that both the developer's and mothers' feedback played an important part in the development process of the SPC programme.

Firstly, the login interface was developed. The participants used their handphone numbers as passwords to generate each participant's ID numbers. Later, the home interface was designed, including Session A with the participants' demographic information. Session B with the knowledge questionnaire and Section C with the observation chart for the pain score and wound healing outcome. The second main interphase was all the information regarding SPC education, Power Point slides, and the pamphlet. Figure 3.3 shows the components in the main interphase and the sub-interfaces.

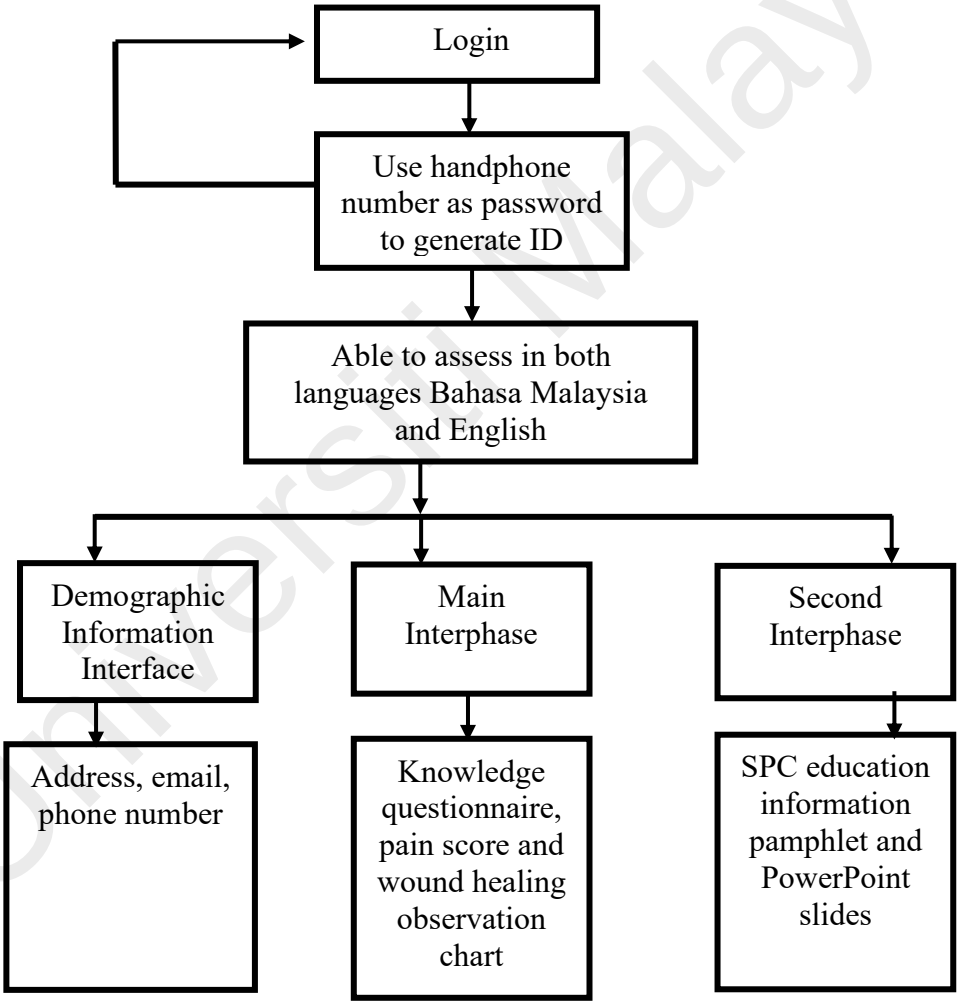

Figure 3.3: Flow chart of mobile application on SPC education

Stage 4: Deployment and Evaluation

The SPC education application was pre-tested before it was used using with the actual mothers. All the primigravida mothers' information was recorded and saved on the server for the researcher to access. The app's usability and functionality were validated by conducting a pilot study to ensure that it was user-friendly, and the mobile app content was subsequently improved. Eventually, the programme was installed onto the mothers' phone during the first meeting with them at the antenatal clinic. The researcher helped the mothers install the mobile application on their smartphones with their permission. Once the trial period was over, the usability of the recorded data was checked. As self-reporting compliance was good, an interview session was arranged with the participants in which they were asked for their opinion about the mobile app. The participants said that they were happy with the app as it was straightforward to understand and very user-friendly.

3.9.1.4 Teaching SPC Education

This teaching was done individually to the mothers to explain self-perineal care in the antenatal and postnatal phases, as shown in Table 3.5.

Table 3.5: SPC education for the intervention group

Antenatal **(32-36 weeks of gestation)**		**Postnatal** **(4 hours post-childbirth)**	
Install the application and enter demographic data **Pre-test.** (10 minutes)	**Phase 1- SPC education-theory** (35 minutes)	**Post-Test** 4-hour observation -Pain Score -Wound Healing Self-perineal care practice. (10 minutes)	**Phase 2-SPC education Hands-on practical session.** (35 minutes)
Demographic data - ethnicity - age, - education, - occupation, - family - income - family type - awareness of self perineal care -source of information.	• Handwashing • Remove soiled pads from front to back. • Pour warm water from front to back. • Regular perineal care every four hours. • After washing, pat dry using tissue from the front to back • Air-dry the perineum. • Wound observation. • Change sanitary pad every four hours. • Fixing the sanitary pad. • Ice pack every four hours for 24 hours. • Sitz bath • Balanced diet • Kegel exercise	i. Self-perineal care practice checklist ii. Numerical Pain Rating Score -overall perineal pain score - during selected daily activities iii. REEDA scale	• Handwashing • Remove soiled pads from front to back. • Pour warm water from front to back. • Regular perineal care every four hours • After washing, pat dry using tissue from the front to back. • Air-dry the perineum. • Wound observation. • Change sanitary pad every four hours. • Fixing the sanitary pad. • Ice pack every four hours for 24 hours. Sitz bath • Balanced diet • Kegel exercise

3.9.2 SPC Education Content

SPC education consists of hand washing, Kegel exercise, sitz bath, use of an ice pack, tips to clean and dry the perineum, frequent change of sanitary pad, the technique of removing the soiled sanitary pad and the proper method of fixing a clean, sanitary pad.

Firstly, the mothers were taught how to do handwashing properly. They were advised to wash their hands before and after going to the toilet and changing their sanitary pad. The primipara mother was shown how to remove the soiled pad from front to back to avoid contamination of the episiotomy wound. The mothers also were advised to clean the perineum by pouring warm water from front to back towards the anus, following the concept of washing from clean to dirty areas.

The mothers were advised to clean the perineal area with warm water and to pat dry after showering, voiding, and bowel movements. They were told to perform perineal care every four hours, during bathing, after urinating, defecating, and patting dry using tissue from the front to back after washing. Mothers were encouraged to air-dry the perineum after washing and patting dry the perineum.

They were taught how to observe the wound using a mirror to detect signs and symptoms of infection such as foul smell, redness, swelling, discolouration, wound discharge, wound gapping, and fewer. A regular change of every four hours of the sanitary pad was compulsory. Mothers were shown how to fix the sanitary pad from front to back without touching the inner part, which can contact the episiotomy wound. The mother was also taught how to record pain scores using the Numerical Pain Rating Scale.

The primipara mothers were advised to use an ice pack every four hours to reduce perineal oedema and to continue applying the ice pack to the perineum from 4 hours until 48 hours. A sitz bath was recommended as this therapy is done by sitting in warm, shallow

water. It can help soothe pain, itching, and other symptoms in the anal and genital areas. Similarly, a balanced diet with high protein-rich foods, including milk, cheese, yoghurt, meat, fish, and legumes was promoted. Protein-rich diets are essential for recovery following childbirth and maintaining physical strength.Water, milk, and fruit juice are the recommended beverages.

The researcher encouraged all mothers to perform gentle pelvic floor (Kegel exercise) within 24 hours of birth. Before performing the Kegel exercise, it was suggested that mothers empty the bladder and then sit or lie down. They were told to tighten their pelvic floor muscles, and to hold these tight for 3 to 5 seconds, followed by 3 to 5 second of relaxation. They were asked to repeat this exercise ten times, three times a day (in the morning, in the afternoon, and at night).

3.9.3 Routine self-perineal care in a clinical setting

In current practice, mothers are exposed to unstructured self-perineal care post-delivery or upon discharge home. The nurse-midwife or a doctor discusses episiotomy care with the mother. Most of the time, advice will be given to the mother during discharge or stitching of the episiotomy or perineal tear in the labour room. The episiotomy wound is checked before discharge home. Any mother who returns to the hospital with wound dehiscence will be nursed in the gynaecology ward.

3.10 Data Collection

Data collection involved both collections of quantitative and qualitative data.

3.10.1 Quantitative Method

The data were collected from July 2019 until March 2020 in the selected tertiary care hospitals. The recruitment of participants was done based on hospitals (intervention group and control group) and based on inclusion and exclusion criteria after obtaining written permission from both hospitals. Data collection started with the control group, followed by the intervention group due to logistic reasons. Firstly, the eligible primigravida mothers were recruited to each group by the study hospitals.

The participants' human rights were protected, as their participation was voluntary, and they were told that they could withdraw at any time during the intervention phase. There was no coercion, and they were assured that their involvement would have no impact on their treatment in the hospitals. All data were treated and kept anonymously and confidentially. The participants were assured that the data collected would only be used for the present study. Anonymity and confidentiality were maintained by keeping the participants' completed questionnaires and information (soft copy) in the mobile application, which only could be accessed by the researcher with password-protected data files. All questionnaires completed by the participants were labelled with ID numbers instead of their names. A cover letter was provided to each eligible participant to ensure they understood the purpose of the study and their rights. If they agreed to participate subsequently, informed consent was obtained from each (Appendix I).

The theory session of the SPC education programme was conducted during the antenatal period at 32 to 36 weeks of gestation. During this teaching phase, the study's purpose and methods were explained to the mothers in both groups at the antenatal clinic. The mobile application was downloaded on their smartphones with the mothers'

permission. The purpose of the mobile app for all the mothers involved in this study was so that they could enter their demographic information, take a pre-test and post-test and self-report on pain scores and wound healing outcomes. They were shown how to access the mobile app and its content using their smartphones.

A pre-test was conducted using the mobile app for the primipara mothers in the intervention and control groups. The SPC education programme was only uploaded to the mothers in the intervention group. All the primipara mothers were taught how to use the Numerical Pain Rating Scale (NPRS) by using the NPRS ruler and REEDA scale, which had already been uploaded to the mobile application. The mothers were shown pictures of perineal infections such as redness, oedema, ecchymosis, discharge, and approximation of the wound edges during the first session of SPC teaching. The mothers were also reminded to self-report the pain scores and wound healing outcome later once they had delivered their baby.

All the mothers in both groups were followed up till the delivery date. Upon admission to the labour ward, the researcher was notified by the mother or her husband regarding her admission and current condition. The researcher followed up with the mother till discharged from the hospital.

Four hours post-childbirth, a post-test was conducted via the mobile application for the mother in the intervention and control groups using the same questionnaire. After the post-test, a baseline assessment was done on each primipara mother for her pain score and episiotomy wound outcome. The mother was shown how to examine the episiotomy wound, such as redness, oedema, ecchymosis, discharge, and approximation of wound edges. To do this, they were told to lie down in a dorsal position and place a hand mirror beneath the perineum so that the wound could be examined easily. Since this teaching was done just 4 hours post-delivery, the mother was taught to measure the presence of

redness and oedema. The mother used a paper measuring tape in her dominant hand to measure abnormalities.

All the mothers in the intervention group were given the SPC teaching (second phase) consisting of instructions and advantages of perineal care, tips to relieve the swellings, signs, and symptoms of infection, sitz bath, Kegel exercise, and information regarding diet during postpartum. The hands-on session included how to do proper handwashing. how to fix a sanitary pad from front to back, how to remove the soiled pad and how to wash and pat dry the perineal area from front to back.

This was followed by applying an ice pack wrapped with gauze to the perineal area for 10 minutes with the participant in a dorsal recumbent position. Each ice pack and gauze were used only once and discarded after use. To ensure effectiveness, the mother was advised to apply four-hourly ice packs for the first 24 hours in the ward and continue at home until oedema subsided. Lastly, the mother was shown how to do the Kegel exercise, advised to take a sitz bath, and showed how to do these at home. The mother also taught how to self-report the 4-hour post-delivery pain score and wound healing outcome via the mobile app. The duration of this phase was around 30 to 45 minutes.

Mothers in both groups reported their pain score and wound healing outcomes every morning, from day 1 to day 7, using the mobile app. In the case where the researcher had doubts about the reporting process, she would call the mother to clarify the condition of the wound in case of any signs and symptoms of infection. The researcher did the scoring with the help of the REEDA scale. Mothers with poor wound healing obtained the maximum score. The REEDA scale was explained to them in both sessions of SPC education. Personal messages were sent to the mothers of both groups to remind them to provide feedback on their pain scores and wound healing outcomes in case there was a delay in their reports.

Since all the primipara mothers in both groups received analgesic medication routinely every six hours, they were advised to record the number of analgesic tablets taken and any traditional methods they practised from childbirth till day seven postpartum as these could both interfere with pain scoring and wound healing outcome. These were recorded in the mobile application. The SPC education was not given to the control group after the 7th day because their wounds had healed. If there had been any complications, the mother would have been referred to a clinic. Therefore, no further teaching was done to the control group after the study period.

The researcher identified the nearest government maternal child clinic to collaborate with the community nurse in charge of any primipara mother who lived in her area. For example, if a mother was from the Kampung Melayu Sungai Buloh, then the Sungai Buloh Maternal Child Health Clinic was contacted, and the help of the community nurse was obtained after explaining to her about the study and expected observations to be done by the mother. The community nurse from the maternal and child health clinic does a regular postnatal home visits to all the mothers under her care in her area. Observing the episiotomy wound condition during the postnatal visit is a nurse midwife's routine responsibility.

On Day 5 of the postnatal period, the researcher contacted the nurse midwife to get her report on the primipara mother's condition to ensure the mother's perineal care practice, pain score and wound healing outcome aligned with the primipara mother's self-reporting information. If abnormalities were detected in the wound healing outcome, the mother was referred to the same maternal child health clinic for further treatment. Otherwise, the mother would continue her observation and scoring of pain and wound healing outcomes till day 7 post-delivery. The flow of data collection is shown in Figure 3.4.

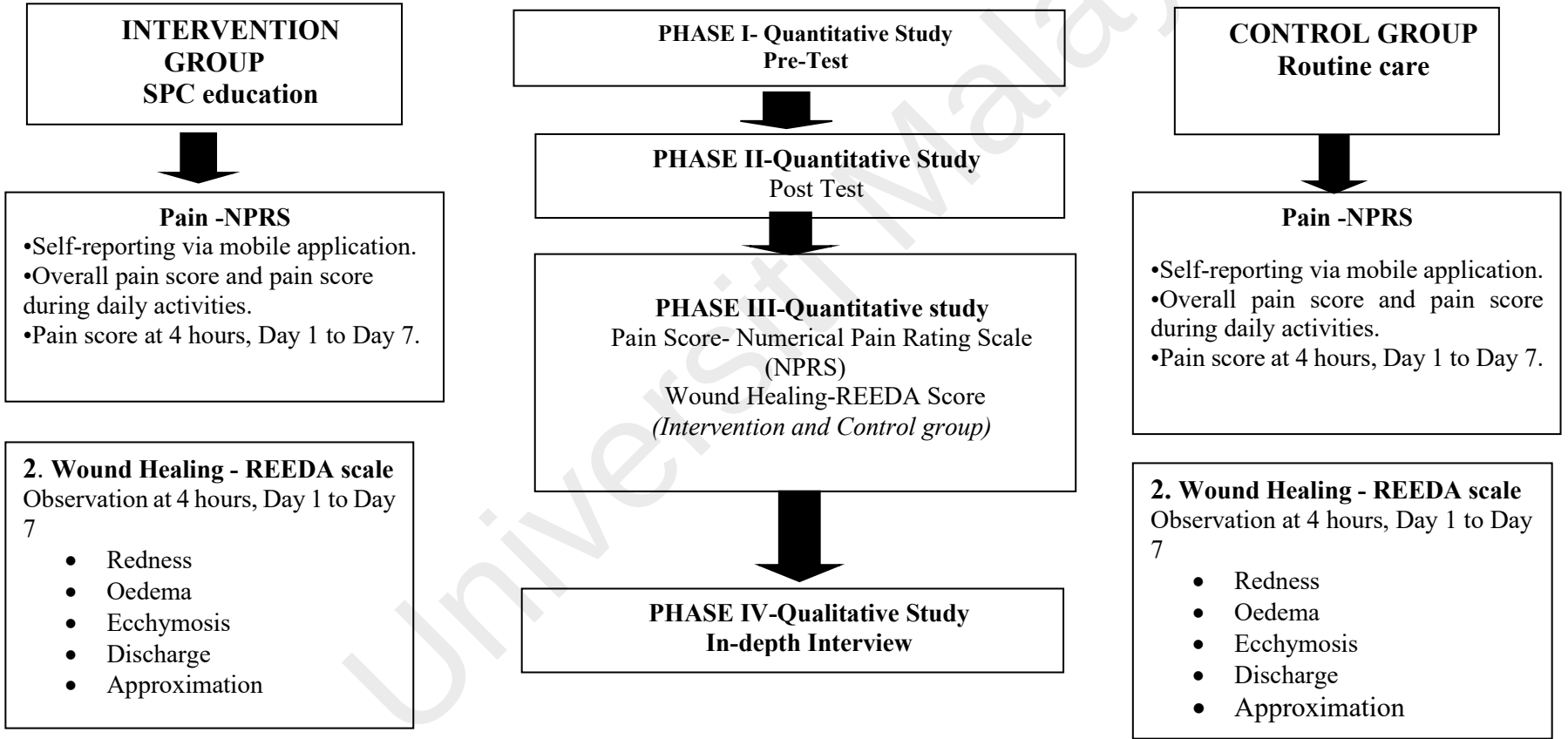

Figure 3.4: Flow chart of the study

3.10.2 Qualitative Method

Face-to-face, in-depth interviews were used to collect qualitative data to obtain the primipara mothers' opinions regarding self-perineal care education. The interview was scheduled at each primipara mother's postnatal follow-up. The protocol for the in-depth interview was developed to guide the researcher while conducting the interview session, as shown in Table 3.6

Table 3.6: The protocol for in-depth Interview

Interviewer	Interviewee
Greet the interviewee and introduce oneself.	Reply to the Interviewer's greeting and also introduce oneself.
Explain the purpose of the interview and why the participants were selected.	Listen to the interviewer and understand why they were chosen to be interviewed.
Obtain consent.	Give consent.
Explain the discussion is to be audiotaped and ask for their agreement.	Agree to the interview being audiotaped.
Address the issue of confidentiality.	Recognise the issues of confidentiality.
Inform the participant that their name will not be used or revealed in the analysis.	Recognise their rights.
Invite the participants to answer the following questions	
(1) What is your opinion of self-perineal care education?	
(2) How well did you perform the practise of self-perineal care at home?	
(3) What were your challenges in performing self-perineal care at home?	
Closing remarks	

Three structured questions were asked to the primipara mothers from the intervention group who practised self-perineal care at home. This interview explored their opinions regarding SPC education, experiences and challenges faced at home in practising self-perineal care at home. The time and date of the interview were arranged with the mothers.

Each session was 45 minutes to 1 hour and was done at the Maternal Child Health Clinic. A room was reserved for this interview session to create an environment conducive to discussion and to ensure the mother's privacy.

Actions taken to ensure enriched data received from the mother, such as further information outside the main questions, were explored fully. The interviewer first established a good rapport with the interviewee to gain trust and respect. The interviewer also asked open-ended questions based on the main question to enrich the data obtained from the primipara mothers. During the in-depth interview, the mother was closely observed for exhaustion, pain, restlessness, and lack of eye contact to ensure the mother was comfortable during the entire session. If any of these signs were observed, the researcher would stop the interview session and ask the mother to take a short break, helping the mother accommodate the problem. The interview session continued at a convenient time later.

The number of participants was determined by achieving “data saturation”, sampling to the point at which no new information was obtained and redundancy was achieved on the topic of perineal care teaching and its practices. In this study, data-saturated from the 10^{th} participant. However, two more primipara mothers were interviewed to make it 12 participants involved in the in-depth interview. This session was done at four to six weeks of a postnatal check-up at the postnatal clinic when the mothers in the intervention group came for the follow-up to the maternal child health clinic.

3.11 Ethical Consideration

Ethical approval for this study was granted by the National Medical Research Registry (NMRR -18-3852-44776 (IIR) as it involved data collection at three government premises, namely Hospital A, Hospital B and Maternal Child Health Clinic C (Appendix

J and Appendix K). Ethical approval was also obtained from the Medical Research Ethics Committee, the University of Malaya Medical Centre (MRECID. NO: 201952-7388) Appendix L.

The researcher is a doctoral student at the Department of Nursing Science, Faculty of Medicine, University of Malaya. This study was conducted by following standard ethical guidelines and protecting the human rights of participants, including the right to self-determination, the right to privacy, the right to anonymity and confidentiality, the right to fair treatment or justice, and the right to protection from discomfort and harm (Grove & Gray, 2018).

The researcher fully informed primipara mothers about the study and they voluntarily decided to participate and understood they could withdraw any time before data analysis without penalty. The participants were assured that they would be free from coercion and harm and that participation would have no impact on their treatment. The researcher assured the participants that the data collected was confidential and anonymous. A cover letter was given to the participant to underpin this information about the study.

Before data collection, the researcher informed the potential participants about the study's purpose and benefits and allowed them to read the cover letter. The researcher gives time for the participants to ask questions.

3.11.1 Informed Consent

Informed consent was obtained from participants who volunteered to participate in the study. They received a letter explaining the purpose of the study, which ensure their anonymity and confidentiality. The signed consent form of the participants was obtained after the initial explanation and teaching session with the participants. The participants

were informed of their rights to reject participation and told clearly that they could withdraw anytime up to data collation. The researcher obtained informed consent without hesitation as the participants understood the study's aim and felt that they could benefit from the experience.

3.11.2 Anonymity and Confidentiality

Data from the quantitative and qualitative methods were managed with numerical methods to keep participants' identities confidential and anonymous, which was maintained throughout the study. The participants were given numbers rather than their names to make the information provided anonymous. Even now, only the researcher can access all the information and findings reported by the participants to maintain confidentiality. Foremost, their records are secured through password-protected files and encryption when sending information over the internet.

After the study was completed, all records, such as consent forms, and audio recordings stored on a labelled compact disc, and hard copies of verbatim transcriptions, were kept in a locked cabinet in the researcher's office. All the softcopies, including mobile application information, are retained in password-protected data files for five years.

3.12 Pilot Study

A pilot study is a small-scale version of the main study that can identify various steps cabinet in the research process and refine the main study methodology (Grove et al., 2012). A pilot study is also conducted to examine the validity and reliability of the research instruments (Grove et al., 2012; LoBiondo-Wood & Haber, 2014). Validity ensures that the instrument is supposed to be measured (Polit & Beck, 2021). An

instrument's reliability is defined as the consistency of the measures obtained from the study (Grove et al., 2012).

The pilot study was conducted to test the validity and reliability of the research tools. Phase one was done to test the questionnaire's clarity and reliability, and the second phase was to establish the study's feasibility in an actual setting. The Bahasa Malaysia version of instruments tested for validity proved equivalent and acceptable for the five primigravida mothers.

In July 2019, the pilot study evaluated the relevance and clarity of the questionnaire, where the research instruments were tested with 30 primigravida mothers at the antenatal clinic. These mothers were excluded from the actual study, and the data obtained from this pilot study was not included in the final analysis. An information sheet regarding the study and the questionnaire in the mobile application was accessed by the primigravida mothers to obtain their knowledge regarding self-perineal care. The participants attempted the same questionnaires 4 to 6 weeks after the delivery. Thirty participants attempted the questionnaire using the mobile application. Based on the comments and feedback of the participants in the pilot study, a minor adjustment was made to the sentence structure of a particular item in the knowledge section which would avoid ambiguity. Also, the real time needed to complete the questionnaire was observed.

A month later, in August 2019, the second phase of the pilot study was undertaken to evaluate the teaching material and mobile application utilisation for the primipara mothers on knowledge, pain score and wound healing outcomes. The teaching material reliability was assessed in a pilot study with the same 30 primipara mothers. The questionnaire was administered at two different time points with intervals of 5 weeks. The participants were asked to include their feedback and recommendations on the

duration, vocabulary and any challenges that could cause them to misinterpret the questionnaire. Based on the pilot study outcomes and the mother's comments /feedback, no significant changes were made to the questionnaire.

3.13. Data Analysis

The data were analysed using the IBM SPSS version 25 software.

3.13.1 Quantitative Data Analysis

Quantitative variables such as knowledge scores were described as means ± standard or median and inter-quartile ranges. Qualitative variables such as demographic characteristics were expressed as frequencies and percentages. The Pearson Chi-Square test was performed on categorical data and Mann-Whitney U test was performed on continuous data to test the homogeneity in demographic variables between the intervention and control groups.

All the assumptions for all the tests employed were checked and met. For each of the 16 questions used to assess knowledge on perineal care, the number of correct responses by individual items was tested using McNemar's test since the data were categorical independent variables (dichotomous) with two related groups being mutual.

The differences in overall mean knowledge scores between the two groups at baseline and post-delivery were tested using the Mann-Whitney U test. The changes in knowledge score, from baseline to post-delivery, were tested using the Wilcoxon Sign Rank test as data were not normally distributed and were continuous data.

The Kolmogorov-Smirnov test (p= .010) revealed that the intervention group's mean difference in total knowledge score was not normally distributed as a *p-value* < *.05*. The

Generalized Linear Model was used to assess the association between the mean difference in the total knowledge score and the demographic variables among primipara mothers in the intervention group.

The Generalized Estimating Equation (GEE) was used to compare the pain score and wound healing outcome over time between the two groups. GEE was used to analyse data as the two selected tertiary care hospitals were homogenous and the same in the patient management system. The pain score and wound healing outcomes were recorded over seven days on a continuous scale, and at each time point, the values were not distributed normally. Hence the Generalised Estimating Equation (GEE) was used to test for the differences in the pain score and wound healing outcome over seven days. The differences in changes and interaction effects were tested in the same analysis, and the corrected mean and standard error were reported. In the analysis, analgesic and traditional methods used were controlled. For all tests, the level of significance was set as .05. The summary of statistical tests used is shown in Table 3.7.

Table 3.7: Summary of statistical tests used

No	Specific Objectives	Measurement variables	Statistical Analysis
1.	To measure the mean total score of knowledge among primipara mothers in both intervention and control groups.	Mean total knowledge score Continuous Data SPCE	Mann Whitney U test Wilcoxon Sign Rank Test McNemar's Test
2.	To determine the association between primipara mothers' demographic data and mean differences in the total knowledge score in the intervention group.	Demographic Variable (Qualitative data) Mean total knowledge score (Continuous score)	Generalized Linear Model
3.	To determine the difference in wound healing outcomes among primipara mothers in both groups.	Mean total REEDA score (Continuous data) SPC education	Generalized Estimating Equations (GEE)
4.	To determine the difference in the overall mean total pain score and pain interference during selected daily activities among primipara mothers in both groups.	Mean total pain scores (Continuous data) SPC education	Generalized Estimating Equations (GEE)
5.	To explore primipara mother's opinion of SPC education, experiences, and challenges in performing self-perineal care at home.	Qualitative Data	Thematic Analysis

3.13.2 Qualitative Data Analysis

This research used thematic analysis to analyse qualitative data, following the measures. As for qualitative analysis, the first step was to coordinate and prepare data for analysis. The qualitative raw data was obtained through an in-depth interview, in which each session was recorded using an MP4 player fitted with a sensitive microphone. They were later transcribed into a verbatim transcription. The transcriptions were typed in a word document while the researcher repeatedly listened to the audio file. It was transcribed into the common language of the participants (Bahasa Malaysia). Later the transcribed text was checked with primipara mothers by phone calls for data accuracy. The researcher forward translations by translating them back into English and back-translated into Bahasa Malaysia and these were checked by a qualified translator for translation accuracy and quality of data.

According to Creswell and Poth (2017), the second step was reading through all the data. The transcriptions were read several times to obtain a general idea of the information and to be immersed in the data to fully understand what the participants were saying. The researcher reflected on the comments made by the mothers on the self-perineal care training and their experiences and challenges of self-perineal care they faced at home.

Coding the data was the third step of qualitative data analysis. It involved reviewing transcripts and giving labels to each part. Coding was performed on data from the participants based on previous literature reviews and grouped to form categories.

The fourth step was to generate a definition, and the theme and sub-themes were created. After completing the coding cycle for all transcripts, data analyses were conducted manually to classify the emerging trends represented by recurring themes.

The fifth step included the interrelation and the interpretation of themes to identify and explain each theme. The researcher discussed details about each theme and addressed the subtheme. The themes and sub-themes were cross-checked with the supervisors. Figure 3.5 summarises qualitative data analysis using the thematic analysis proposed by Creswell and Poth (2017).

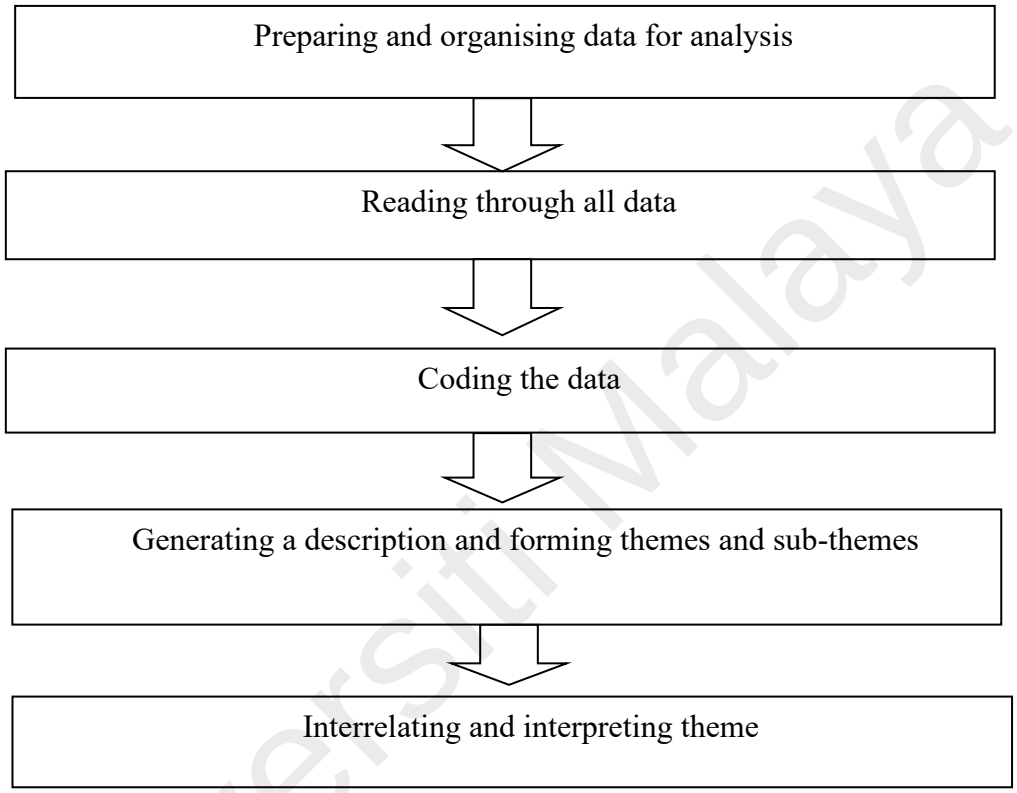

Figure 3.5: Qualitative data analysis using thematic analysis (Tobi, 2016)

3.13.3 Demonstrating Trustworthiness

To ensure the trustworthiness of the qualitative study, some activities were performed to achieve the accuracy of primipara mothers' experiences of self-perineal care, including credibility, dependability, confirmability, and transferability. Member checking was performed to maintain the credibility of this study (Speziale et al., 2011). Credibility is to ensur that the data collected was true and accurate. The transcript of each in-depth

interview was confirmed by the participants to ensure the findings were true to their experiences. Member checking was performed when there was no objection from them, and they agreed that the findings were accurate with what was discussed in the in-depth interview session. An extensive discussion and peer checking by the researcher and supervisor was also performed to identify correct coding, so themes and sub-themes could be generated. Dependability was met once the researcher had demonstrated the credibility of the findings, so when credibility was established, it meant that dependability also existed (Speziale et al., 2011).

Confirmability is the degree of neutrality in the research study's findings. It means that the findings were based on the participant's responses, and there were no potential biases or personal motivations of the researcher. An audit trail highlighting every step of data analysis was made to provide a rationale for the decision, which was performed to maintain this confirmability. Only the researcher who had collected the data and who was immersed in the analysis can confirm the findings (Speziale et al., 2011).

Transferability is the probability that the study's findings have meaning to others in similar situations. This study used a description to show that these research findings can apply to other contexts, circumstances, and situations (Speziale et al., 2011).

The researcher realised that her personal experiences might have interfered with the phenomenon under investigation. The researcher's thoughts and feelings may well have been unintentionally influenced by interaction with the primigravida mothers during the in-depth interview; however, the researcher tried to remain neutral by putting aside her own beliefs, thoughts, and perceptions, refraining from making judgments and remaining open to the data as it emerged. The researcher tried to keep these separate from what was being shared by the participants (Speziale et al., 2011) .

3.14 Summary

A mixed method design with a quasi-experimental study with a non-equivalent control group pre-test and post-test design was conducted and embedded within the qualitative study. Population, sample size, and sampling method have all been addressed in this chapter. One hundred and twenty-five primipara mothers participated in the quantitative research by answering a questionnaire on self-perineal care knowledge using pre-test and post-test measurements. The self-perineal care education teaching material and mobile application were developed. Self-perineal care education was given to the sixty-two primipara mothers in the intervention group at 32 to 36 weeks of gestation. Later at 4 hours post-delivery, self-perineal care education was reinforced to the primipara mothers with a hands-on, practical teaching session. Sixty-three primipara mothers followed routine self-perineal care instruction. The pain score and wound healing outcome were measured 4 hours post-delivery and used as the baseline observation. SPC education was continued by the primipara mothers from day one to day seven post-delivery and used as the baseline observation. The data collection procedure was described for both the intervention and control groups. Twelve primiparas from the intervention group were involved in an in-depth interview to share their self-perineal care practice experiences at home. The Ethical Board of the University of Malaya and the National Medical Registry granted the ethical approvals for conducting this study. Descriptive and inferential statistics were employed to summarise and interpret the quantitative data. Thematic analysis was applied to analyse the qualitative data. The quantitative results of this study are discussed in Chapter four to relate the data into sentences that show their significance to the research questions.

CHAPTER 4: QUANTITATIVE RESULTS

4.1 Introduction

This study aims to evaluate the effect of SPC education on knowledge, episiotomy pain scores and wound healing outcomes among primipara mothers. Specifically, this chapter discusses the results of the quantitative study related to effectiveness of SPC educational on knowledge, pain scores, and wound healing outcomes.

4.2 Data Screening and Management

A normality test was performed on the continuous dependent variables, knowledge of self- perineal care, pain scores, and wound healing outcomes. The results are shown in Table 4.1.

4.2.1 Knowledge Scores

Pre-test and post-test knowledge scores of self-perineal care were assessed for normality. A Kolmogorov-Smirnov (K-S) ($p < .05$) and visual inspection of the histograms as shown in Figure 4.1 and Figure 4.2. Normal Q-Q plots as shown in Figure 4.3 and Figure 4.4 showed that pre-test and post-test scores of self-perineal care were not normally distributed. The skewness value of the data was < less than $\pm$ 2.0 and kurtosis value was above $\pm$ 3.0. Therefore, the assumption of normality distribution among groups was not satisfactory therefore the data distribution was not normal.

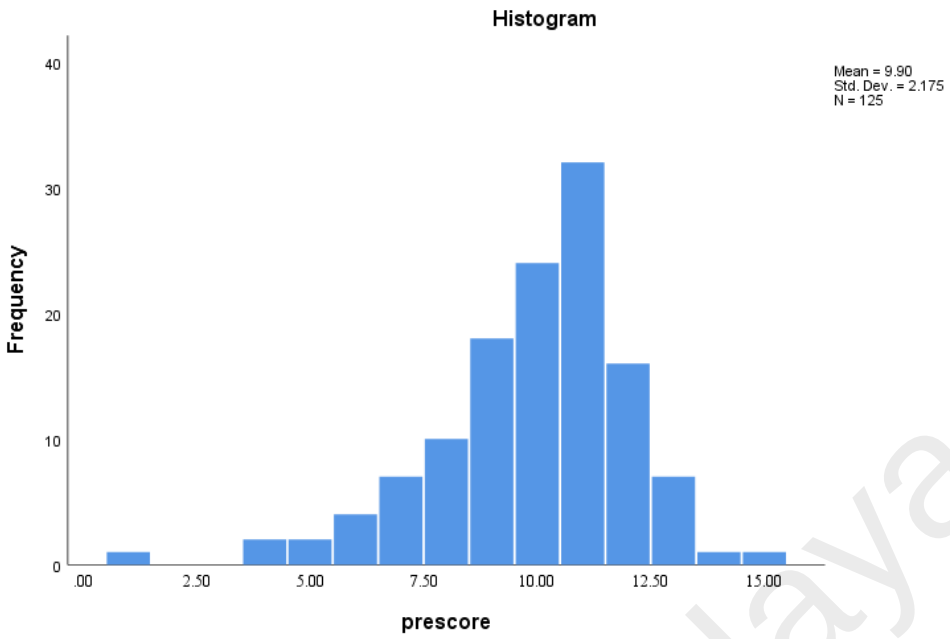

Figure 4.1: Histogram of pre-test score

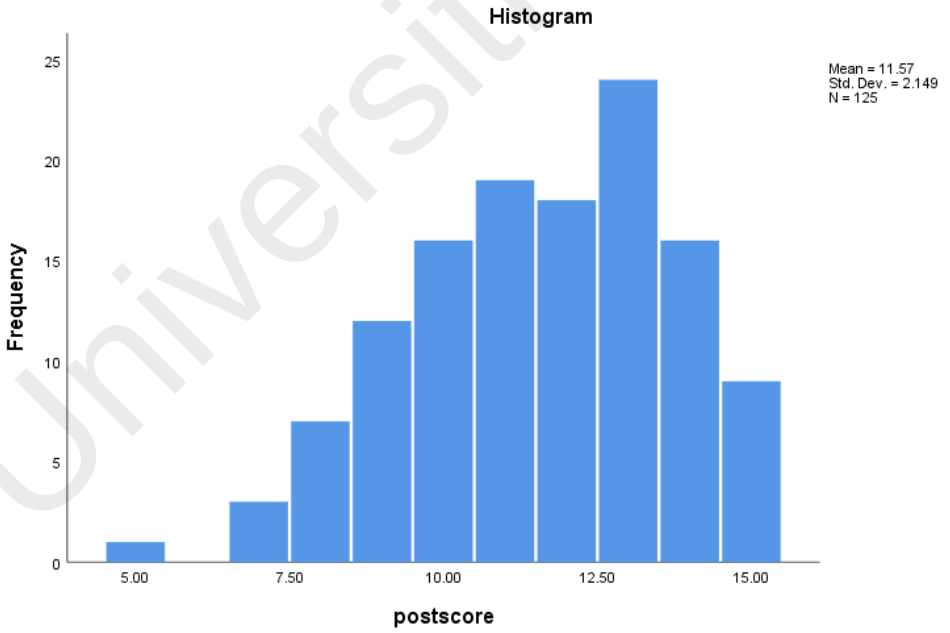

Figure 4.2: Histogram of post-test score

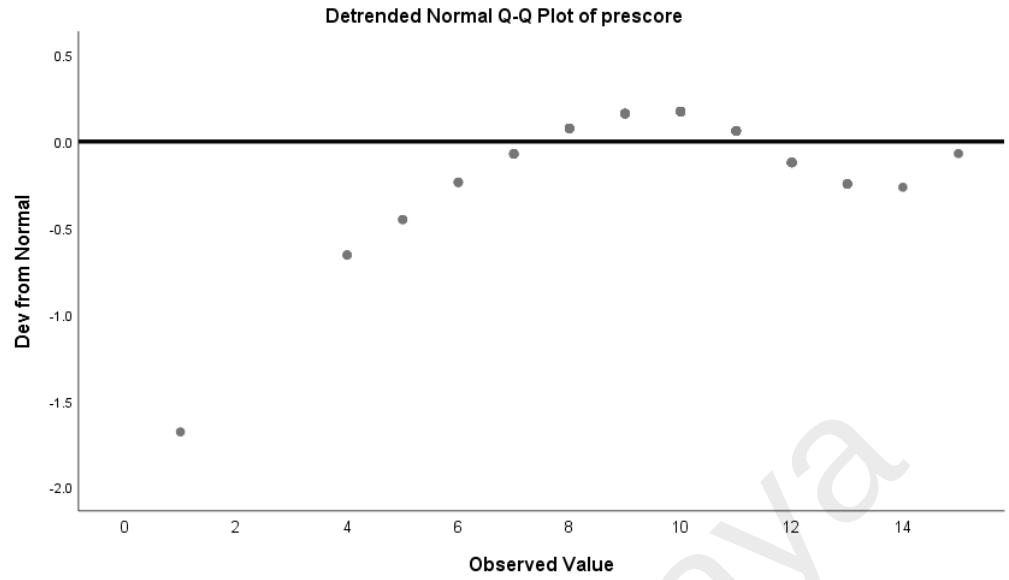

Figure 4.3: QQ plots of pre-test score

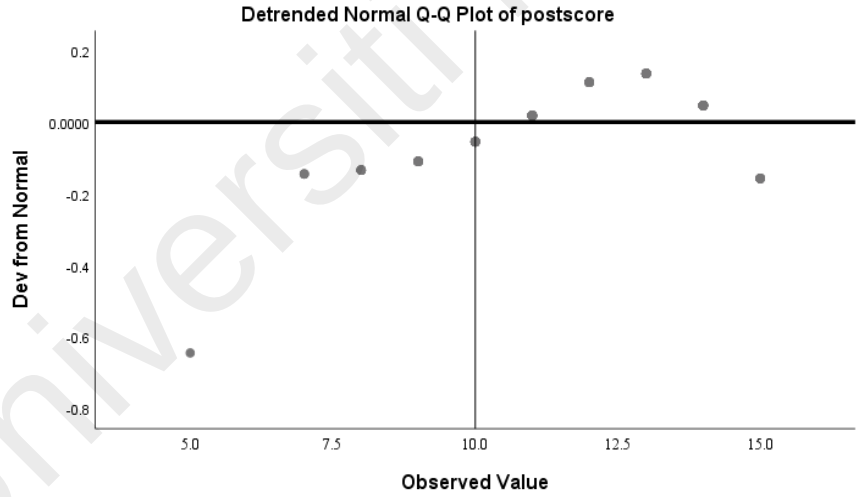

Figure 4.4: QQ plots of post-test score

Table 4.1: Test of normality of mean total knowledge score (N=125)

Variables	Mean	Median	Skewness	SE	Kurtosis	SE	Kolmogorov
Pre-test (n=62)	11.55	10.50	-.742	.304	1.20	.60	.002
Post-test (n=62)	14.66	13.00	-1.322	.304	4.04	.60	.001

Normality Test

4.2.2 REEDA Score

The descriptive statistics for the REEDA scores over the seven days are shown in Table 4.2. In the tests of normality, all p -values were <.05. Hence, the REEDA scores were not distributed normally. The data on wound healing outcomes based on the mean total REEDA score obtained for 4 hours, day 1 to day 7 post-delivery, were also assessed for normality. A Kolmogorov-Smirnov (K-S) (p < .05) and visual inspection of the histograms, normal Q-Q plots, and box plots were not a normal distribution. Skewness showed that at certain time points, the value was negative, indicating skewed left data, and as for the kurtosis, the value was greater than +3. A Kolmogorov-Smirnov (K-S) (p < .05) showed that at each time point, the data were not distributed normally since all p-values were less than .001, as shown in Table 4.2 therefore, the data distributions were not normal.

Table 4.2: Test of normality of mean total REEDA score

Pain Score	Mean± SD	Median	Skewness	SE	Kurtosis	SE	Kolmogorov
4-hour	8.23±1.40	9.00	-.387	.217	-1.126	.430	.001
Day 1	5.80±1.49	6.00	-.368	.217	0.294	.430	.001
Day 2	5.12±1.38	6.00	-.615	.217	-.621	.430	.001
Day 3	4.36±1.52	5.00	-.039	.217	-1.371	.430	.001
Day 4	3.88±1.38	3.00	.442	.217	-.856	.430	.001
Day 5	3.22±1.26	3.00	.881	.217	.391	.430	.001
Day 6	2.74±1.28	3.00	1.043	.217	1.015	.430	.001
Day 7	2.22±1.49	2.00	.853	.217	.681	.430	.001

Normality Test

4.2.3 Pain Scores

A normality test was also done on pain scores obtained for 4 hours, day 1 to day 7 post-delivery. A Kolmogorov-Smirnov (K-S) ($p < .05$) and visual inspection of the histograms, normal Q-Q plots, and box plots showed that pain scores were not a normal distribution. Skewness showed that at certain time points, the value was negative, indicating skewed left data, and as for the kurtosis, the value was greater than +3. A Kolmogorov-Smirnov (K-S) ($p < .05$) showed that at each time point, the data were not distributed normally since all *p*-values were < .001. The descriptive statistics for the pain scores over the seven days are shown in Table 4.3. In the tests of normality, all p-values were <.05. Hence, the pain scores were not distributed normally.

Table 4.3: Test of normality of mean total pain score

Variables	Mean± SD	Median	Skewness	SE	Kurtosis	SE	Kolmogorov
4 Hours	8.23±1.40	9.00	-.387	.217	-1.126	.430	.001
Day 1	5.80±1.49	6.00	-.368	.217	.294	.430	.001
Day 2	5.12±1.38	6.00	-.615	.217	-.621	.430	.001
Day 3	4.36±1.52	5.00	-.039	.217	-1.371	.430	.001
Day 4	3.88±1.38	3.00	.442	.217	-.856	.430	.001
Day 5	3.22±1.26	3.00	.881	.217	.391	.430	.001
Day 6	2.74±1.28	3.00	1.043	.217	1.015	.430	.001
Day 7	2.22±1.49	2.00	.853	.217	.681	.430	.001

Normality Test

4.3 Demographic Characteristics

The total sample size of the intervention group was 65 primigravida mothers. Meanwhile, 65 primigravida mothers were assigned to the control group. Three participants from the intervention group dropped out of the study as these mothers had a caesarean section for foetal distress. Two participants from the control group also dropped out due to instrumental delivery and caesarean section. This meant that 125 primigravida mothers participated in this study with 62 participants in the intervention group and 63 participants in the control group.

Table 4.4 shows the demographic data of the samples. The majority (n=93, 74.4%) of the participants were Malays. About one-half had a secondary level of education (n=68, 54.4%). Most primipara mothers were housewives (n=51, 40.8%), and it was noted that more than half of the primipara mothers were from nuclear families (n=69, 55.2%). At baseline, the awareness of self-perineal care among the primipara mothers was only (n=48, 38.4%). Social media was claimed as the primary source of information on self-perineal care during the antenatal phase of primipara mothers (n=19, 39.6%). The

characteristics of the participants are shown in Table 4.4. There were no significant differences in demographic variables between the intervention group and control group as all p values >.05.

Table 4.4: Characteristics of the participants (N=125)

Characteristics	All subjects (n=125)	Intervention (n=62)	Control (n=63)	p-value
	n (%)	n (%)	n (%)	
Age	25.52±4.21[a]	25.48±3.51[a]	25.56±4.83[a]	0.722[b]
Ethnicity				
Malay	93 (74.4)	46 (74.2)	47 (74.6)	0.911[c]
Chinese	18 (14.4)	10 (16.1)	8 (12.7)	
Indian	9 (7.2)	4 (6.5)	5 (7.9)	
Others	5 (4.0)	2 (3.2)	3 (4.8)	
Education				
Primary	19 (15.2)	7 (11.3)	12 (19.1)	0.060[c]
Secondary	68 (54.4)	37 (59.7)	31(49.2)	
Tertiary	38 (30.4)	18 (29.0)	20 (31.7)	
Occupation				
Government	10 (8.0)	6 (9.7)	4 (6.3)	0.266[c]
Private	47 (37.6)	27 (43.5)	20 (31.7)	
Self Employed	14 (11.2)	6 (9.7)	8 (12.7)	
Housewife	51(40.8)	23 (37.1)	28 (44.4)	
Student	3 (2.4)	0	3 (4.8)	
Family Type				
Nuclear	69 (55.2)	30 (48.4%)	36 (57.1)	0.424[c]
Extended	56 (44.8)	32 (51.6%)	27 (42.9)	
Income (RM)				0.072[c]
1000 to 2000	23 (18.4)	12 (19.4)	11(17.5)	
2000 to 3000	27 (21.6)	8 (12.9)	19 (30.2)	
3000 to 4000	49 (39.2)	25 (40.3)	24 (38.1)	
>4000	26 (20.8)	17 (27.4	9 (14.3)	
¶ SPC Awareness				
Yes	48 (38.4)	28 (45.1%)	20(31.7)	0.123[c]
No	77 (61.6)	34 (54.8%)	43(68.3)	
Source of Information				
Family members	6 (12.5)	3 (4.8%)	3 (15.0)	0.465[c]
Friends	15 (31.3)	8 (12.9%)	7 (35.0)	
Health care providers	8 (16.7)	6 (9.7%)	2 (10.0)	
Social media	19 (39.6)	11 (17.7%)	8 (40.0)	

[a] Mean (SD)
[b] Mann -Whitney U Test
** Significant at .05 level (2 tailed)
[c] Pearson Chi-Square Test
¶ SPC-Self-Perineal

4.4 Knowledge of Self-Perineal Care

Baseline perineal care was assessed using 16 questions. All 125 participants were tested on their baseline knowledge of these 16 areas.

4.4.1 Baseline Pre-Test Assessment on Knowledge of Perineal Care

The number of correct responses for each question is provided in Table 4.5. In summary, 60 (48%) participants believed they knew of a solution that was not suitable for perineal care, and only 69 (55.2%) were aware of the importance of drying the perineal care after washing the perineum. 53 (42.4%) of the participants knew about the type of work that can be safely done during confinement. Most of the participants (113, or 90.4%) knew about the food to be taken to prevent constipation, and 103(82.4%) were aware of the methods to wash the perineal area. However, only 81(64.8%) participants knew the meaning of perineal care. In this study, the individual knowledge scores ranged from 1 to 16, the mean being 9.90 ± 2.18. The distribution scores were not distributed normally (.001). The median score was 10.

Table 4.5: Baseline assessment of knowledge of perineal care (N=125)

Item	Baseline	
	n	%
1. Meaning of perineal care	81	64.8
2. Time to do care	83	66.4
3. Importance of perineal care	97	77.6
4. Method to wash the perineal area	103	82.4
5. Solution that is unsuitable for perineal care	60	48.0
6. Hand washing before and after cleaning	94	75.2
7. Drying the perineal area after washing	69	55.2
8. Frequency of sanitary pads to be changed	60	48.0
9. Type of work done during the confinement	53	42.4
10. Preferred position for mother with episiotomy.	77	61.6
11. Signs and symptoms of perineal infection	103	88.8
12. Precaution to prevent perineal infection.	104	88.8
13. Food taken to prevent constipation.	113	90.4
14. Area to be cleaned last in perineal care	73	58.4
15. Time to visit the doctor.	85	68.0
16. Type of undergarments to wear after delivery.	84	67.2

4.4.2 The Difference in Mean Total Knowledge Score Pre and Post Intervention

The mean total knowledge score pre and post- intervention for both the intervention and control groups was examined.

4.4.2.1 Intervention Group

The women in the intervention group were given SPC education and routine care. Their knowledge level was assessed before and after the intervention. The McNemar test was used to determine the number of women who gave the correct answers in the pre-and post-assessments, shown in Table 4.6. First, most women in the intervention group were aware of the importance of perineal care, signs and symptoms of perineal infection, aspects of washing, precautionary and preventive measures of perineal infections, and type of food to avoid constipation. Many women in this group did not know the frequency

of pad change, the type of work to avoid during confinement, and solutions suitable for perineal care. Post-assessment showed improvements in almost all areas. Almost all the participants answered post-intervention correctly for these four items "time to do perineal care," "signs and symptoms of perineal infection", "precaution to prevent perineal infection" and food to take to prevent constipation" which contributed 98.38% of knowledge in these particular areas after SPC education.

Table 4.6: Number of correct responses by individual items in the intervention group (N=62)

Item	Correct responses		*p*
	Pre-test	Post-test	
1. Meaning of perineal care	41	57	.001**
2. Time to do perineal care	42	61	.001**
3. Importance of perineal care	51	59	.039**
4. Method to wash the perineal area	52	56	.454
5. Solution that is not suitable for perineal care	32	56	.001**
6. Hand washing before and after cleaning	51	59	.039**
7. Drying the perineal area after washing	36	59	.001**
8. Frequency of sanitary pads to be changed	35	45	.046**
9. Type of work done during the confinement	28	45	.005**
10. Preferred position for mother with episiotomy	39	55	.002**
11. Signs and symptoms of perineal infection	52	61	.001**
12. Precaution to prevent perineal infection.	50	61	.001**
13. Food taken to prevent constipation.	57	61	.219
14. Area to be cleaned last in perineal care	42	54	.029**
15. Time to visit the doctor.	45	58	.002**
16. Type of undergarments to wear after delivery.	45	59	.001**

Based on McNemar's test
**Significant at .05 level (2 tailed)

4.4.2.2 Control Group

The women in the control group were given routine care only. Their knowledge level was re-assessed post-delivery. The number of women who gave the correct answers in the pre-and post-assessments is shown in Table 4.7. Most women in the control group were aware of the meaning of perineal care, aspects of washing, the type of food to

prevent constipation, signs and symptoms of perineal infection, precaution to prevent perineal infection and food to be taken to prevent constipation. Thirty-two participants were unaware of a solution unsuitable for perineal care, and 25 participants were unaware of the frequency of sanitary pads being changed. The types of work performed during the confinement were unknown to 25 participants. In the post-assessment, there were some improvements only in the meaning of perineal care, knowledge of solutions that are not suitable, drying the perineal area after washing, and the preferred position for the mother with episiotomy.

Table 4.7: Number of correct responses by individual items in the control group (N=63)

Item	Correct responses		*p**
	Pre-test	Post-test	
1. Meaning of perineal care	40	49	.022*
2. Time to do perineal care	41	41	1.000
3. Importance of perineal care	44	44	1.000
4. Method to wash the perineal area	51	44	.118
5. Solution that is not suitable for perineal care	28	37	.001*
6. Hand washing before and after cleaning	43	49	.057
7. Drying the perineal area after washing	33	43	.001*
8. Frequency of sanitary pads be changed	25	21	.303
9. Type of work one during the confinement	25	27	.897
10. Preferred position for mother with episiotomy.	38	41	.001*
11. Signs and symptoms of perineal infection	51	53	.774
12. Precaution to prevent perineal infection.	54	56	.687
13. Food taken to prevent constipation.	56	54	.774
14. Area to be cleaned last in perineal care	31	31	1.000
15. Time to visit the doctor.	40	42	.904
16. Type of undergarments to wear after delivery.	39	48	.064

Based on McNemar's test
**Significant at .05 level (2 tailed)

4.4.3 The Effect of SPC Education on the Mean Total Score of Knowledge

The knowledge scores at baseline, and post-delivery and the differences were obtained for each group. The results are shown in Table 4.8. The between-group differences were tested using the Mann-Whitney U test, while the within-group differences were tested using the Wilcoxon Sign Rank Test. There was no significant difference in the scores between the two groups at baseline (p=.155). However, the mean total knowledge score in the intervention group was significantly higher than the control group post-intervention.

There was a significant increase in the knowledge score in the intervention (p= .001) but not in the control group (p=.133). It shows that primipara mothers in the intervention group had an increased mean total score of knowledge following the self-perineal care and also had a better mean total score of knowledge compared to the primipara mothers in the control group.

Table 4.8: Mean Differences in Total Knowledge Score Within and Between Groups (N=125)

Group	Baseline Median (IQR)	Post Delivery Median (IQR)	Differences Median (IQR)	*p*
Intervention (n=62)	10.5 (3)	13 (3)	3 (2)	.001**
Control (n=63)	10 (3)	10 (2)	0 (3)	.133
p^*	0.155	.001		

Based on Wilcoxon sign rank test
Based on Mann-Whitney U test
**Significant at .05 level (2 tailed)

4.5 Association Between Demographic Variables and Change in Knowledge Score in the Intervention Group

This section examines the association between demographic variables and changes in knowledge scores in the intervention group. The Generalized Linear Model with a linear

log method was used to examine the associations between demographic variables and changes in knowledge. Results in Table 4.9 demonstrated that after controlling for the selected primipara mothers' demographic, there was no significant association between the mean difference in total knowledge score in the intervention group and selected demographic variables as all *p*-value > .05. Hence, the mean difference in the total knowledge score in the intervention group was solely from the SPC education intervention.

Table 4.9: Association between the mean difference in total score and characteristics in the intervention group (N=62)

Source	Wald Chi Square	df	*P*
Age	3.221	1	.073
Race	.292	3	.961
Education	4.730	2	.094
Occupation	.916	3	.821
Monthly income (RM)	2.507	1	.113
Family type	1.551	1	.231
¶Source of SPC information	.701	1	.438

Generalized Linear Models
** Significant at .05 level (2-tailed)
¶ SPC-Self-Perineal Care

4.6 Effect of SPC Education on Wound Healing Outcomes Among the Primipara Mothers

Primigravida mothers in the intervention group had SPC education in addition to routine care, while the mothers in the control group only received routine care. In section 4.3.3, it was shown that the mothers in the intervention groups had significantly higher knowledge scores compared to the mothers in the control group. Further analysis was done to compare the changes in the REEDA scores over time between the two groups. Since the REEDA scores were not distributed normally, the Generalized Estimating

Equation (GEE) procedure was used to test the difference by group, changes over time, and changes over time by group (interaction effect). As some of the participants had used traditional remedies, the analysis was controlled for the usage of traditional methods.

The main effects of group and time and the time* group interaction were less than 0.05. The results are shown in Table 4.10. The changes in REEDA scores over time and the difference in the changes over time in the two groups are shown in Table 4.11 and Figure 4.5. Overall, the mean total REEDA score decreased over time in both groups. Within groups, there was a significant reduction at each subsequent time point. In between-group comparisons, the mean total REEDA score was significantly lower in the intervention group than in the control group from day 2 to day 7 post-delivery (p=.001). This indicated that primipara mothers in the intervention group had faster wound healing than mothers in the control group. Other than at 4 hours postpartum, the REEDA scores at every point in time were significantly lower in the intervention group compared to the control group. At 4 hours, the REEDA scale for redness, oedema, and ecchymosis criteria was higher than at any other time as episiotomy had just been repaired.

Table 4.10: The effect of SPC education on total REEDA score (N=125)

Effect	Wald Chi-Square	df	*P*
Group	16.292	1	.001**
Time (duration)	113.294	7	.001**
Time*group	21.225	7	.003**

Generalized Estimating Equation (GEE)
***Significant at .05 level (2 tailed)*

Table 4.11: Comparison of mean total REEDA score between groups (N=125)

Time	Intervention(n=62) Mean ±SE	Control(n=63) Mean ±SE	*p*
4-hours	5.36±.21	5.73±.29	.251
Day 1	4.12±.26	5.02±.43	.033
Day 2	2.80±.24	4.20±.44	.001**
Day 3	1.62±.40	3.71±.49	.001**
Day 4	1.34±.40	3.06±.47	.001**
Day 5	1.22±.39	3.01±.42	.001**
Day 6	1.15±.35	2.69±.51	.001**
Day 7	1.01±.39	2.50±.43	.001**

Generalized Estimating Equation (GEE)
**Significant at .05 level (2 tailed)

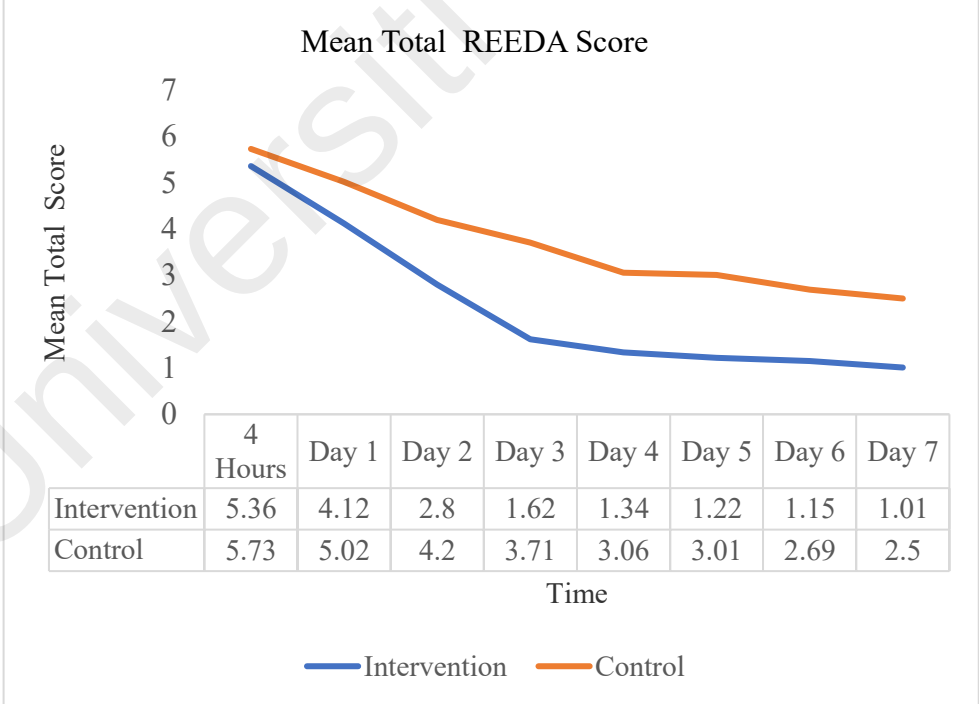

Figure 4.5: Mean total REEDA score within and between groups

4.7 Effect of SPC Education on Overall Mean Total Pain Score

This section examines the effect of SPC education on overall mean total pain scores among primipara mothers. The Numerating Pain Rating Score (NPRS) with 11 points was used to measure the pain score among the primipara mothers. The NPRS allows mothers to rate their episiotomy pain in the last 24 hours or average pain intensity. 0 indicated the absence of pain, and 10 represented the most intense pain.

Further analysis was done to compare the changes in the overall pain score over time between the two groups. The Generalized Estimating Equations (GEE) procedure was used to test the differences by group, changes over time, and the difference in changes over time by group (interaction effect). The analysis was controlled for the usage of analgesics. As shown in Table 4.12, the *p*-values of the group, time, and time*group interaction were all less than .05. The changes in overall pain scores over time and the difference in the changes over time in the two groups are shown in 4.13 and Figure 4.6. Other than at 4 hours postpartum, the overall pain scores at every point of time were significantly lower in the intervention group compared to the control group.

Table 4.12: Effect of SPC education on overall episiotomy pain score

Effect	Wald Chi-Square	df	*p*
Group	16.292	1	.001**
Time (duration)	113.294	7	.001**
Time*Group	21.225	7	.003**

Generalized Estimating Equation (GEE)
**Significant at .05 level (2 tailed)

In GEE, analysis was performed to test the changes in the mean pain score for both groups. Overall, the mean total pain score decreased over time in both groups. Within groups, there was a significant reduction at each subsequent time point. In between-group comparisons, the mean total pain score was statistically significantly lower in the intervention group than in the control group from day 1 to day 7 post-delivery (p=.001). The mean total pain score was lower in the intervention group than in the control group. The results are shown in Table 4.13 and Figure 4.6.

Table 4.13: The overall mean pain score within and between groups

Time	Intervention(n=62) Mean ±SE	Control(n=63) Mean ±SE	*P*
4 hours	8.35± .19	8.11± .16	.329
Day 1	5.18± .21	6.41± .13	.001**
Day 2	4.65± .71	5.59± .15	.001**
Day 3	3.92± .20	4.79± .17	.001**
Day 4	3.77± .19	3.98± .16	.001**
Day 5	2.87± .16	3.57± .14	.001**
Day 6	2.13± .13	3.33± .15	.001**
Day 7	1.52± .16	2.92± .17	.001**

Generalized Estimating Equation (GEE)
**Significant at .05 level (2 tailed)

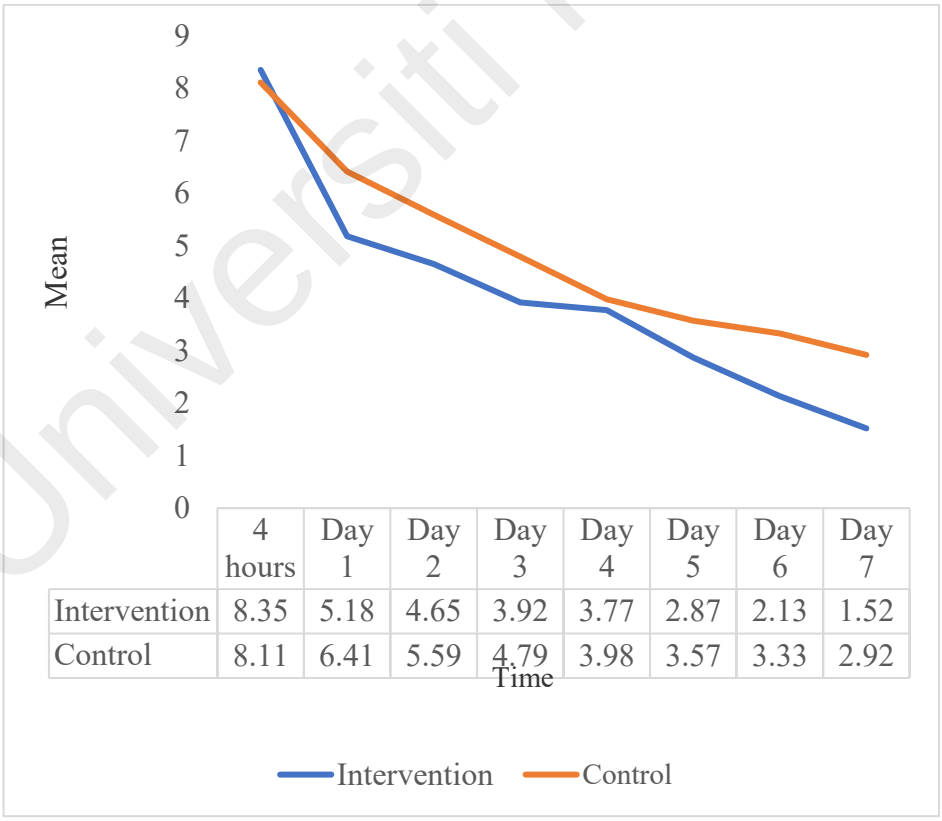

Figure 4.6: Overall mean pain score between groups

4.7.1 Effect of SPC Education on Pain Score During Selected Daily Activities (N=125)

GEE procedure was used to compare the changes in pain scores during activities over time between the two groups. The analysis was controlled for the usage of analgesics. As shown in Table 4.14, the p-values for the group, time, and time*group interaction for all five activities were less than .05. The differences in pain scores between the groups over time are shown in Table 4.15. Overall, the intervention group's pain scores for all five activities declined over time compared to those of the control group.

Table 4.14: Effect of SPC education on pain score during daily activities

Effect	Walking	Sitting	Urination	Defecation	Lying
Group	.001**	.001**	.001**	.001**	.001**
Time	.001**	.001**	.001**	.001**	.001**
Time/*Group	.001**	.001**	.001**	.001**	.009

Generalized Estimating Equation (GEE)
**Significant at <.05

Table 4.15: The overall mean pain score differences during daily activities within and between groups

Daily activities	Intervention Group (n=62)	Control group (n=63)	*p*-value
	Mean ±SE	Mean ±SE	
	Walking		
4 hours	7.13± .21	6.79± .28	.239
Day 1	5.39± .21	5.84± .23	.064
Day 2	2.71± .16	4.98± .23	.001**
Day 3	2.51± .15	4.39± .23	.001**
Day 4	2.39± .15	4.06± .23	.001**
Day 5	2.18± .16	3.78± .20	.001**
Day 6	1.85± .18	3.54± .19	.001**
Day 7	1.55± .20	3.39± .22	.001**
	Sitting		
4 hours	7.74± .32	8.41± .24	.110
Day 1	6.69± .65	6.70± .25	.599
Day 2	5.82± .24	5.88± .26	.070
Day 3	4.82± .26	4.90± .26	.766
Day 4	3.95± .23	4.22± .24	.218
Day 5	3.43± .23	4.05± .24	.004**
Day 6	2.47± .21	3.68± .23	.001**
Day 7	1.59±.21	3.16±.24	.001**
	Urination		
4 hours	6.91± .20	7.05± .25	.101
Day 1	5.37± .29	6.90± .26	.001**
Day 2	4.15± .18	6.09± .15	.001**
Day 3	3.86± .18	5.36± .19	.001**
Day 4	3.18±.15	4.59±.16	.001**
Day 5	2.71± .13	3.96± .15	.001**
Day 6	2.00± .13	3.45± .15	.001**
Day 7	1.28± .14	3.01± .17	.001**
	Defecation		
Day 1	7.71± .32	7.87±.30	.801
Day 2	5.39± .31	5.34±.26	.887
Day 3	4.74± .29	6.54±.26	.001**
Day 4	4.03± .28	6.13±.26	.001**
Day 5	3.53± .20	5.13±.27	.001**
Day 6	2.75± .24	4.23±.26	.001**
Day 7	2.10± .19	2.99±.22	.001**

'Table 4.15, continued'

Daily activities	Intervention Group (n=62)	Control group (n=63)	*p*-value
	Mean ±SE	Mean ±SE	
	Lying		
4 hours	6.99± .20	7.60± .20	.061
Day 1	5.59± .22	6.29± .18	.001**
Day 2	4.59± .21	6.64± .88	.001**
Day 3	3.95± .18	5.01± .18	.001**
Day 4	3.14± .16	4.34± .17	.001**
Day 5	2.59± .16	3.33± .18	.001**
Day 6	1.82± .15	2.98± .19	.001**
Day 7	1.30± .16	2.47± .21	.001**

Generalised Estimating Equations (GEE) used
**Significant at the $p < .05$ (2 tailed)

4.8 Summary

In this study, knowledge of perineal care was assessed using 16 questions. At baseline, more than 50% of the women had no idea about the types of garments to wear after delivery, the area to be cleaned last in perineal care or hand washing. Post-delivery, there were improvements in all areas in the intervention group, whereas not much improvement was observed in the control group. The overall knowledge score for the two groups was similar at baseline, but in post-analysis, the scores were higher in the intervention group compared to the control group.

The REEDA scores were similar between the two groups four hours after delivery. The intervention group's scores were significantly lower than the control group. Similarly, the two groups' overall pain scores were similar four hours after delivery but significantly lower in the intervention group from day 1 to day 7. The qualitative results of this study are discussed in Chapter Five to understand primipara mothers' opinions, experiences and challenges in performing self-perineal care at home.

CHAPTER 5: THE QUALITATIVE RESULTS

5.1 Introduction

This chapter presents the qualitative data findings from in-depth interviews of primipara mothers who participated in self-perineal care education. Thematic analysis was used to analyse data collected from in-depth interview transcripts and organised into themes and sub-themes. Two themes emerged from the study namely "the perceived benefits of self-perineal care" and "the challenges of self-perineal care". Four sub-themes were identified from the theme "perceived benefits of self-perineal care" such as "self-awareness", "boosted confidence level", "self-empowerment" and "enhancement of wound healing". The other main theme "the challenges of self-perineal care" identified three sub-themes "lack of family support", "lack of knowledge and resources in using a mobile application" and "traditional beliefs".

This chapter will begin with the demographic characteristics of the participants, followed by a description of the themes and sub-themes identified during the in-depth interview sessions. Selected quotes from the participant's in-depth interview are presented to enrich the illustration of the qualitative findings.

5.2 Demographic Characteristics

In-depth interviews were conducted to collect qualitative data from the primipara mothers who had done self-perineal care at home. All the primipara mothers were interviewed at 4 to 6 weeks after childbirth. This interview was done during their postnatal visit to the Maternal and Child Health Clinic C, Selangor.

Twelve primipara mothers voluntarily participated in the in-depth interviews. Data saturation was achieved at the 12th interview session. Therefore, the total number of

primipara participants in these sessions was 12. A total of 8 (66.7 %) of primipara mothers who attended the in-depth interviews were Malay. Most primipara mothers, 6 (50%), were from 26 to 30 years old. Overall, 5 (41.7%) mothers had secondary, and 7(58.3%) had tertiary-level education. Out of the 12 mothers, 6 (50%) were working, and 7(58.3%) were from extended families. Table 5.1 presents the demographic characteristics of the mothers.

Table 5.1: Demographic characteristics of in-depth interviews participants (n=12)

Variables	n	Percentages (%)
Ethnicity		
Malay	8	66.7
Chinese	2	16.7
Indian	2	16.7
Education		
Secondary	5	41.7
Tertiary	7	58.3
Age		
21 to 25 years old	5	41.7
26 to 30 years old	6	50.0
Above 30 years old	1	8.3
Working Status		
Yes	6	50.0
No	6	50.0
Family Types		
Nuclear family	5	41.7
Extended family	7	58.3

5.3 Themes and Sub-Themes

The recorded in-depth interviews were transcribed into document formats. The researcher read each mother's written transcript over a phone call to confirm the accuracy

of the transcript. A linguistic professional forwarded translated the transcript verbatim from Bahasa Malaysia into English and translated it back into Bahasa Malaysia to ensure the validity of the translations (p140-p152). The transcript was content validated by an expert panel comprising two TESL (Teaching English as a Second Language) teachers from secondary schools.

Thematic analysis was used to analyse data collected from the in-depth interview transcripts. After repeated readings, these transcripts were reviewed, and segments were developed for each interview transcript. Coding and thematic analysis of the transcripts were conducted to identify emerging themes. The analysis revealed that similarities emerged in the responses provided by the primipara mothers which were later organised into themes and sub-themes. Two themes emerged from the study: the perceived benefit of self-perineal care and the challenges in performing self-perineal care at home. Later, seven sub-themes were identified from the two main themes: acquired self-awareness, boosted confidence level, self-empowerment, wound healing enhancement, lack of family support, lack of knowledge and resources in using a mobile application, and traditional beliefs, as shown in Table 5.2. Selected quotes from the in-depth interviews with participants are presented to enrich the illustration of the qualitative findings.

Table 5.2: Themes and sub-themes

Themes	Sub-themes
1. Perceived benefits	1. Self-Awareness
	2. Boosted Confidence Level
	3. Self-Empowerment
	4. Enhancement of wound healing
2. Challenges of self-perineal care	1. Lack of family support
	2. Lack of knowledge and resources in using mobile application
	3. Traditional Beliefs

5.4 Themes 1: Perceived Benefits

Each primipara mother expressed positive feedback for the interview question," What is your opinion regarding self-perineal care education? Most primipara mothers agreed that the self-perineal care education benefited them.

The opinion of the primipara mothers regarding their experience of self-perineal care elicited the theme of "Perceived benefits." Many primipara mothers claimed that self-perineal care education had given them new knowledge. The mothers' opinion of self-perineal care suggested four sub-themes: (1) self-awareness, (2) boosted confidence level, (3) self-empowerment, and (4) enhancement of wound healing. The following explanations provide more detail about each sub-theme.

5.4.1 Self-Awareness

Self-awareness is one of the sub-themes within the theme of perceived benefit. Most primipara mothers stated that self-perineal care education had created self-awareness during the in-depth interview sessions. All the primipara mothers revealed that they had learned new information in a very personalised manner. Self-perineal care education created awareness of the importance of taking care of the episiotomy wound in the perineal region. Initially, many were not aware that such knowledge on perineal care was available at the study hospital. However, the newly-acquired knowledge created the self-awareness to pay more attention to the perineal region to prevent infection post-childbirth.

Illustrated below are some of the comments from the primipara mothers' in-depth interviews. Similar comments were made repeatedly by the primipara mothers that this teaching exposed them to new knowledge, which made them aware of self-perineal care.

"It covers everything…. cleaning, checking the pain and seeing the wound. Good, actually, after hearing the talk, I know how important it is to take care of the wound…… down there…., or it will get infected …I am scared……. The talk was easy to understand and self-care was not as easy as I thought. I was careful with the wound by doing the cleaning properly. I follow the instructions in the mobile application you gave me. After I met you that day….. I started to do the self-care as you told me. I did it many times. Your tips were useful to practise. If not for the tips… maybe I wouldn't know about it" (IDI 4).

"As a first-time mother…it was a good knowledge for me …I didn't know many things at the beginning, but now I know better. Previously, the nurse got to talk to me in the ward but only for a short while only. After your talk, I know better and motivated to do the care myself. I realised how important it is to take care of the cleanliness after delivery…. it avoids wound infection…. I did not really know about it, no joke…. It was like an eye-opener for me …. that a lot of attention should be given to care for myself……. I didn't want any problem, and I decided not to have stitches again……. Thank God, my wound is healing fast". Good knowledge… as it created awareness to be more careful with the wound. Lucky I was in your teaching sessions! All the while, I actually didn't know, I had to wash from front to back to prevent infection, I simply wash. I didn't know all that, but now it makes sense" (IDI 9).

"I also learned a lot …The knowledge beneficial for me when I go home...Lucky I met you…. If not, oh, I don't know! later part can cause infection if not cared for. Maybe…I will be doing the cleaning as usual, and I wouldn't spend as much time as you told me. During the second teaching session …erm…. I understood better, and I was more ready to take care of myself. I knew at that point; it is very important to take care of the wound

there. A lot of information like exercise and soaking with salt water. It was all good actually" (IDI 11).

5.4.2 Boosted Confidence Level

A boosted confidence level is the second sub-theme under the theme of "perceived benefits". The primipara mothers claimed that self-perineal care education raised their confidence to practise self-perineal care at home and empowered them to take care of their own health. During the in-depth interview, the mothers repeatedly claimed that the knowledge had given them the confidence to perform self-perineal care at home as they were able to do it themselves and didn't have to depend on caretakers to help them. Below are the statements from the primipara mothers during the in-depth interview, which refer to this sub-theme.

"Now, after your teaching that day, I learned more about taking care of the wound down there..... I was not scared when I went home because I knew how to do it. When I came back home, at least I knew how to care of myself.... I didn't always depend on others for their opinions on the wound. It saved time. Naturally, I was scared to see any wound from childhood, but after trying it ... this time, I managed it. When I came back home, I started to do self-perineal care regularly, and I knew how to do a proper cleaning. I didn't ask anyone much about the wound.....When I had doubts about the wound healing. I called you because I had your number. It was a bit of a relief!" (IDI 3).

"After listening to your talk, I was able to take care of my wound. It gave me more confidence when I knew there was someone that I can refer to I feel that I was really lucky. I had the confidence too after your teaching. I strictly follow whatever you told me such as cleaning from front to back. I also often change any pad which is not

comfortable I was happy that I could call you when I had a problem with my wound last time. After talking to you, I felt good and confident to take care of myself" (IDI 6).

"I feel very motivated to take care of myself …. You are always there for me to discuss the problem and doubts. It is a real relief for me…the first time you talked to me at the clinic then later after my delivery. I understood actually that this would give me more confidence to me to take care of myself……" (IDI 9).

The mothers also stated that their partner and other family members were satisfied with the confidence level shown by them in taking care of themselves.

5.4.3 Empowerment

Empowerment is another sub-theme that emerged from the perceived benefit of self perineal care. "Empowerment" means that mothers have power and control over their own lives. The mothers in the intervention group stated they became more vital to manage themselves post-childbirth and felt able to do the self-perineal care competently, as taught to them. The mothers claimed they could do the perineal care at home, observe and self-report using the mobile application and seek medical attention when necessary.

"My mother was happy to see me taking care of the wound without asking her many questions that I could manage myself…. She compared me with my elder sister, who delivered last year. My mother said my sister always asked her questions. She used to ask for advice often from my mother about wound care. I was happy about that, and I felt I actually wanted to try even more……This knowledge has helped me care for myself without depending on others. I have learned how to take care of myself during confinement …I can also can teach my other sister who is going to deliver in three months ……" (IDI10).

"I mentioned to my hubby earlier regarding what I learned in the hospital …… he was happy because not many problems arose during confinement … and the wound healed very fast without any complications…He said that I could do it…."(IDI 11).

"I have learned from your teaching, and when I came back home, I tried to follow what was taught to me.... In the beginning, I was not sure during the first two days, but later it became a habit. After that, I had no more problems, and I have done it" (IDI 12).

5.4.4 Enhancement of Wound Healing

Enhancement of wound healing is another sub-theme from the theme of the perceived benefit of self-perineal care. There were many positive opinions regarding enhancing wound healing after self-perineal care as it helped in healing and was able to involve in maternal-child care. Some of the comments were:

"I soaked myself in salt water (sitz bath). At the beginning, it was not comfortable, but later it helped…. The wound healed, and I felt less pain after I started to do regular cleaning and exercise. I can see the differences now. I have begun to do it more often. The itchiness has stopped. "The wound was already less painful within a week …. I just followed al the steps as you told me…... I cleaned the wound, and sometimes I used the fan to air the wound…… The wound dried without any problem" (IDI 2).

"The wound was less painful within a week and certainly less painful compared to the first few days. I keep on doing the cleaning and air the wound often. I also eat a lot of fish and drink plenty of water to avoid constipation. My wound dried faster. I followed the instructions carefully, and the wound healed without any complications. I did it consistently and also whenever I was free. It was easy to do. I started to eat more meat

and chicken intake and drink milk, and the wound healed. I was careful with the wound, especially during washing and drying. I also was very careful when sitting. I didn't sit for very long at the beginning but I lie down most of the time" (IDI5).

"After your teaching that day, I realised that I needed to take care of the wound so it would heal faster. Alhamdulillah, after following your teaching and doing it as you said, I saw the wound drying out, no problem. Yes, I did the exercise you showed me that day…. It was very easy. I do it now, but I started it quite late. I began to do it only after one week because I still had the pain. I feel better after doing it. There is less pain. The wound dried after day 4. I continue to do the cleaning as usual, but this time there was less pain. I think the wound healed already. By day 7, the wound had healed outside but inside there was still some pain. Seeing the wound using the mirror was difficult at first, but it was helpful overall to see the healing. In the beginning I wasn't very good, but later I got the idea a little bit better. I had to adjust my position to see the wound using the mirror" (IDI 12).

Four sub-themes that covered the benefits of self-perineal care education were discussed. Through in-depth interviews with the primipara mothers, self-perineal care education created self-awareness, boosted confidence, empowered them, and enhanced wound healing.

5.5 Theme 2: Challenges of Self-Perineal Care

The primipara mothers responded to the in-depth interview question, "What were the challenges you faced while performing self-perineal care at home?". Their answers to the above question revealed that they had faced several challenges during self-perineal care at home. The comments were categorised into the following sub-themes: lack of family

support, lack of knowledge and resources using the mobile application, and traditional beliefs.

5.5.1 Lack of Family Support

The sub-themes "lack of family support" is under the theme of challenges of self-perineal care". Many of the primipara mothers pointed out that they could only do self-perineal care if a family member was present to help take care of their new-born; however, they claimed that was not a given. Family support was required because of the pain the mother sometimes had to endure, the inability to prioritise tasks, and the time needed to care for the new-born. However, the mothers claimed they did not always have the support they needed as family members were often busy with their own schedules. The comments by the primipara mothers were as below

"I needed time at the beginning. I try to follow the plan..... Sometimes my baby would cry, so I had to settle him first...Now, if any of my family members are around, I will try to get their help to take care of my baby, and I can spend more time taking care of myself....". "At the beginning, I was struggling to take care of myself. I needed more time for myself. I couldn't really spend much time cleaning myself... if my baby is awake or crying, and I can't leave him just like that. I need to wait for someone to replace me if I want to go to the washroom. I often delayed cleaning at the beginning, but I still do it whenever I can" (IDI 2).

"I need time. Sometimes the baby will cry, and I need to bathe myself and attend to the baby, I can't focus.... It is very tiring also. If my sister is around, then no problem. I can take my time, but she is not staying with me...I didn't know how to handle it initially as my husband had to go to work. I was stressed at that time ...my baby also got

jaundice…I was back and forth to the clinic, I couldn't focus on myself really, but even so, I still managed to do important things" (IDI 4).

"At the beginning, I did the cleaning but, as usual, I had to focus on the baby's needs first. I had no one with me at that time I just rested, I slowly started to do proper cleaning, which has become my routine. For the first few days, I had so much pain from the wound…. most of the time I just rested, and I tried to take care of the baby when the baby is awake. I cleaned myself as much I could…My movement was restricted as I was in a lot of pain. Sometimes I feel shy to call my mother-in-law to help when my husband is not around. She is old, I don't want to disturb her" (IDI 9).

Some of the comments from the primipara mothers made it clear that they couldn't solely depend on the family members alone, so instead later learned how to manage their time better.

"When I went home from hospital, I was busy settling my baby. It was very painful at that time. The best time to bathe and take care of the wound was when my baby falls asleep. I follow my baby's routine…. Now, when the baby sleeps, I try to take care of myself" (IDI 3).

"In the beginning It was like, hectic. I didn't know how to manage the time between my baby and me. I didn't know how to plan …I didn't know what to do at first, but later, I learned how to organise my baby and myself. I also started to care for myself when the baby slept. It is better this way actually. I don't need to depend on others. But at this time, there is less pain" (IDI 9).

Initially, the primipara mothers admitted they had difficulties using the mobile application. They mentioned that they were not good at using mobile apps to report pain

scores and wound healing outcomes. Some mothers even delayed reporting the observation because they were unsure how to use the mobile app accurately. However, they figured it out after a few attempts and completed the required tasks.

5.5.2 Lack of Knowledge and Resources in Using the Mobile Application

"Lack of knowledge and resources in using the mobile application" is another sub-theme under the main theme of "challenges of self-perineal care." Primipara mothers mentioned that they had difficulty reporting the observation immediately because they were unfamiliar with the mobile application. Sometimes they also have difficulties getting internet access or lack the resources or the credit on their phones to report on time,

"I was in the ward for three days as my baby got jaundice. It was very uncomfortable. Still, I tried to do the cleaning as much as I could, since I had to report the result. I found it was challenging to use the application. It was my first experience……. When I was in the ward, I asked the nurses to help me…. It was difficult in the beginning, but later I realised that it was actually quite easy" (IDI 3).

"Sometimes I delayed reporting as I had no data on my phone…. later when I had data, I tended to forget because I was busy with baby, but you called me right to remind me…. Later, I made a point of doing the report early in the morning before I forget" (IDI 4).

"I am also not so good at using my handphone. I asked for help from my husband…. It also took time because I had to wait for him to come back. If he was around, there was no problem……. Later, I learned how to do it myself. I always check and report my pain and wound condition after taking a morning bath. Sometimes I forget to report as I always

put it off, especially when I'm busy with other things. Also, if I have no data, I tend to forget (but) you also call and remind me……" (IDI8).

5.5.3 Traditional Beliefs

Another sub-theme for challenges faced during self-perineal care is the traditional beliefs of the immediate caretakers, which may have been held existed in their family from one generation to another. Some caretakers recommended traditional remedies and practices to mothers in an attempt to maintain good health for the mother and baby (Fadzil et al., 2016). Most of these treatments are generally considered reasonable and safe during the postnatal or confinement period and can help the new mother regain her health to the pre-pregnancy status, others are less helpful.

The primipara mothers in the interviews explained that once they returned home from the hospital, they were cared for by immediate family members such as their mother, sister, and/or mother-in-law. According to the participants, some practices can interfere with wound healing so they must be able to convince the caretakers to accept their opinion. Here are some of the comments by the primipara mothers regarding traditional beliefs during the postpartum period.

"My mum was not keen for me to do the saltwater soaking (sitz bath). She said, it would make the wound sorer and it wouldn't be not good for the wound so she suggested 'bertangas' (steam bath) later as she had done during her confinement…. She said it was very effective. I was scared because the wound was still painful and raw…My mother told me to take warm herbal baths daily. Pity me! She put a lot of leaves and herbs inside the warm water and asked me to take a bath at noon for fast recovery. I followed her advice, but was always scared that this practice would affect the wound healing. I had no choice because my sister also used to take this bath…. I have done a 'bertungku' (hot

compression) and massage. You know, these two methods are common among Malays during confinement, but I only started doing it after one week. Sometimes, these take a lot of time and this can disrupt proper perineal care… like airing the wound ….” (IDI7).

“Oh yes my mother-in-law also suggested ‘tangas’ (vagina steam bath). She said it was good to the private parts, and the wound heals faster. But I told her that I got stitches and scared to do it…. She also suggested that I take ‘jamu’(herbs) as they can help me to recover faster and helps in breastfeeding…….I was not sure whether to take them or not…” (IDI9).

“My sister didn’t allow me to wash my hair often. She said my body would be cold and it would be easy to get flu. She asked me to take a bath only after sunrise or mid-morning, which sometimes interferes with the schedule for perineal care. I was not comfortable with this as it disturbed my routine washing” (IDI 11).

Primipara mothers of almost every Malaysian ethnicity also stated that they sometimes had to follow food taboos during the postnatal period. Food restriction was observed by all races, though the slight differences observed in the concept and practice between them was due to the different cultural beliefs held by the older people in their family. Here are some of the comments:

“My mother added a lot of pepper, ginger, ulam leaf, and “Kaduk leaf” to my food. She was the one who prepared food for me. These are not my favourites, but I ate them because she said all this could make the wound dry and heal the stitches at the private parts. I had no choice…. I just follow…even though I prefered to eat fruits” (IDI 6).

"My mother-in-law has many food taboos. Sometimes, I cannot stand her…. She wouldn't let me take many foods such as fruit, vegetables, and eggs as she claimed that all these foods could cause stomach upset……Many more such crazy things…. If I didn't follow her advice, she'd put on a sour face. Because I was staying in her house, I didn't have much choice but had to take whatever I was given just to please her" (IDI 7).

"My mother-in-law is a fussy person. She is particular about food…. She t allow me to eat any eggs at all……as well as many other foods such as papaya, orange, pineapple, and vegetables as spinach, 'luffa'. She said eggs could cause pus. Fruit and vegetable are cold for the body according to her, and will cause body ache. I followed whatever she said as she was the one preparing my food in the beginning……Sometimes it's difficult to say anything to old people……. My mother didn't even allow me to drink plain wate. Instead, she encouraged me to drink red date juice and dried longan water. In the beginning, I had constipation. I was scared to bear down during pass motion. But later, there was no more constipation and it was okay. My mother gives me fish cooked in sesame oil and ginger but only selected vegetables as some can cause joint paint…I like to eat vegetables" (IDI 12).

5.6 Summary

Although the primipara mothers mentioned that they had benefited from self-perineal care education, such as self-awareness, a boosted confidence level, and self-empowerment, they also faced many challenges during self-perineal care at home, such as lack of family support, lack of knowledge and resources in using the mobile application and the fact that some traditional beliefs among the mother's caretakers sometimes contradict accepted scientific practice. The qualitative results will be interpreted in

chapter six and discuss the integration of quantitative results and relates to the research questions.

CHAPTER 6: DISCUSSION

6.1 Introduction

This chapter discusses the main findings of this study and compares them with previous studies. It discusses the quantitative conclusions, including the description of knowledge, pain scores, and wound healing outcomes among primipara mothers before and after SPC education. Then, the study's qualitative findings reflect the primipara mother's opinion of self-perineal care education and their experiences and challenges when performing self-perineal care at home. This chapter also explains the results and integrates the quantitative and qualitative findings to provide new knowledge.

6.2 Profile of the Sample

The participants of this study were 125 primigravida mothers from two tertiary care hospitals. Their mean age was 25.52±4.21, which is in line with another study by Mankar et al. (2021) reported that 46% of the primipara mothers involved in their study were from 20 to 25 years old. This finding is also almost similar to a study by Missiriya (2016) which stated that 63.3% of their participants were from the age group 21 to 25 years old.

In the current study, most primipara mothers were of Malay ethnicity. This is similar to many other studies done in Malaysia as Malay is the predominant ethnic group in Peninsular Malaysia, constituting 69.6 % of the population. Aziz and Lee (2014) reported that most respondents (76.5%) in their study were of Malay ethnicity, 8.8 % were Chinese and 9.9% were Indian.

In Malaysia, the minimum level of education for all citizens is secondary school. In the present study, more than half of the primipara mothers had secondary-level education. This finding is much the same as a study by Salgaonkar (2020), who reported that 48% of their mothers had finished secondary school. Another study by Mathews (2018) also reported one-third of the respondents in the study were educated at the secondary school level. In the current study, half of the mother's worked either in a government department, in the private sector or were self-employed. This is in line with another study by Oluwasola and Folasade (2017) which reported that two-thirds of the participants were working mothers compared to 11.8 % of the participants who were homemakers. In this current study, more than half of primipara mothers were from nuclear families. This finding is consistent with the studies by Mankar et al. (2021) and Missiriya (2016), where about half of the respondents were from nuclear families, too.

Awareness of self-perineal care was found among only one-third of the primipara mothers at the outset of this study. This finding is similar to a study by Praveen et al. (2018), which reported that more than two-thirds of the participants involved in their research were not exposed to any health information. Out of these mothers, more than one-third of them claimed that the source of their information on health issues was social media. Another study by Missiriya. et al. (2017) estimated that about 26.7% of the mother's information on perineal care was sourced from mass media and about 28.3% was obtained from health personnel.

6.3 Effect of SPC Education on Knowledge of Primipara Mothers

The present study demonstrates the effectiveness of the SPC education that is designed to impart knowledge to new mothers who have had a vagina delivery with an episiotomy.

The current study revealed that the level of knowledge among primipara mothers in the intervention and control groups was moderate at the baseline.

In this study, face-to-face SPC education supplemented with a mobile application was intended to teach the mothers and keep them well-informed about perineal care. The mobile application was to replace the pamphlet that would usually be given to mothers, which the mothers don't always carry with them. The mobile app was used to access information on SPC education. This digital tool enhanced fast, reliable access to accurate information on perineal care for the primipara mothers in the intervention group, compared to the control group who continued to rely on regular modes of communication provided by their hospital. This new approach can be said to be more suitable, especially during the pandemic, as mothers did not need to spend a long time in the hospitals. The mobile application was also described in an earlier study as a useful tool for information sharing, interaction, and tracking the results of educational intervention (Şat & Sözbir, 2018). The information in the mobile application may encourage primigravida women to be more interested in caring for themselves (Ledford et al., 2016).

To the best knowledge of the researcher, this is the first study that has utilised a mobile application to educate mothers specifically on perineal care. Mobile apps can play a very important role in imparting knowledge on perineal care compared to the traditional method using posters and pamphlets. Using mobile apps to access information regarding self-perineal care enables the mother to refer to relevant information anytime and anywhere (De Souza et al., 2011).

In the present study, only one-third of the primigravida mothers stated that they were already aware of the importance of self-perineal care during the antenatal period. Out of these mothers, one-third of them claimed that the source of their information was mainly

social media. Only one-fifth of the mothers stated that the source of their information was their healthcare provider. This study provides insight for hospitals as to how to introduce structured SPC education to all antenatal mothers. Hence, there is a need to conduct health education programmes to enhance the knowledge of postpartum mothers on self-perineal care.

The knowledge level of the primipara mothers at baseline in this current study was in line with many other studies in various parts of the world that have reported a moderate level of self-perineal knowledge among mothers. According to Joseph et al. (2020), most postnatal mothers have inadequate knowledge regarding self-perineal care. Postnatal mothers in Pune City, India, also had an average level of knowledge of perineal care (Gadade et al., 2018). Another study in Indonesia reported the correlation between maternal knowledge and perineum wound healing. The study concluded that knowledge and postpartum attitude contributed to perineum wound healing (Rahayu et al., 2017). A study in Nepal concluded that mothers had moderate knowledge about postpartum care. The highest level of knowledge was in recognising the danger signs and the lowest was in the family planning area (Timilsina & Dhakal, 2015). A possible explanation for the latter's finding being in line with the current study was that there was no structured teaching of self-perineal care in their setting.

In contrast to our finding, Lalitha (2016), in a study done in Bangalore, India, revealed that most primipara mothers had inadequate self-care knowledge, one-third of the mothers had moderate knowledge, and none had adequate knowledge during the postnatal period. The differences in the outcome of this study might be due to the participants' different backgrounds, such as education level, race, family type and exposure to their society. The different type of tools used to assess the knowledge may also have contributed to the divergent findings.

In this current study, the knowledge level improved to an adequate level for the mothers in the intervention group, following the SPC education supplemented with information in a mobile application. This can be compared to the control group whose scores remained at a moderate level. Previous researchers, who conducted perineal care lessons with mothers discovered an improvement in knowledge following their education programme which led to good self-perineal practice (Ari et al., 2019; Gadiya et al., 2014; Noronha, 2004; Oleiwi, 2010; Praveen et al., 2018; Raman, 2015; Salgaonkar, 2020)

According to Gadiya et al. (2014), a planned teaching programme improved primipara mothers' knowledge regarding episiotomy care in Gujarat, India. Another study by Oleiwi (2010) in Baghdad studied the effectiveness of an instruction-oriented intervention for primipara mothers on episiotomy and self-perineal care. The study concluded that most mothers had adequately met their needs for perineal care by using all the recommended interventions in their educational package. The results revealed that the study group participants benefited from the intervention and demonstrated significant improvement in their episiotomy and self-perineal care knowledge which is similar to the current study's results.

Interestingly, another study in Pune City, India, also concluded that planned health teaching effectively increased mothers' knowledge of perineal care (Salgaonkar, 2020). The questionnaire used in that study was similar to our own. "Meaning of the perineal care," hand washing before and after cleaning," and" method of washing genitalia." were three areas that showed significant improvement in both studies after their sessions on perineal care.

In this study, there was no significant difference in the scores between the two groups at baseline (p= .155). However, the mean total knowledge score in the intervention group

was significantly higher than that of the control group post-intervention. Therefore, it was concluded that SPC education effectively enhanced the knowledge of primipara mothers in the intervention group. The current study concluded that SPC education effectively reduced perineal pain and improved the wound healing of postpartum women as knowledge is essential in consistently practising self-perineal care. The results of the present study are valuable to the midwives who should provide more structured self-perineal care education to all the mothers who attend the antenatal clinic, especially the primigravida mothers. This is supported by a previous study by Praveen et al. (2018) who revealed a significant difference between the mean knowledge post-test scores of the intervention and control groups.

The current study was conducted in both the antenatal and postnatal phases. This study could determine the importance of educating mothers on self-perineal care from antenatal to allow enough time to convert theoretical knowledge into practice. However, many studies on perineal care are done postnatal rather than antenatal (Mohamed & El-Nagger, 2012; Raman, 2015).

6.3.1 Association Between Knowledge and the Demographic Variables

The current study found no significant association between demographic variables and the mean difference in the total knowledge score in the intervention group. The demographic variables included age, race, education, occupation, monthly income, and family type. This finding was similar to the previous study by Salgaonkar (2020) which found that demographical variables, including age, monthly income, ethnicity, education, occupation, family type, and source of perineal care information, had no significant association with the mean difference in the total knowledge score in the intervention

group. Therefore, it can be concluded that the improvement in the mothers' knowledge in this study was solely due to the SPC education intervention.

However, a study by Lalitha (2016) suggested that the knowledge of perineal care among primipara mothers was, indeed associated with primipara mothers' demographic variables. This study discovered a statistically significant association between the mothers' self-care knowledge of primipara mothers during the postnatal period and selected demographic variables such as age, educational status, area of residence, and occupation. In another study by Mousumi Pradhan (2019), there also appeared to be a significant association between the level of a mother's knowledge and demographic variables such as age, marital status, and religion. Furthermore, Missiriya (2016) concluded that there was a statistically significant association between the mother's knowledge and her age, education, and family type. Other findings have shown an association between knowledge and just the two demographic variables, namely, the country of origin and the environmental background of mothers that is urban or rural.

Nonetheless, many empirical studies have stated that knowledge of self-perineal care should be taught through health education. Thus, maternal child health clinics and related bodies should seriously consider this issue and provide self-perineal care education to primigravida mothers to reduce maternal morbidity and maternal mortality.

6.4 Effect of SPC Education on Wound Healing

The present study revealed that primipara mothers in the intervention group had faster wound healing than mothers in the control group. Other than 4 hours post-delivery, the REEDA score at every point was significantly lower in the intervention group compared to the control group on day 7 of the postnatal period. The results of this study concluded

that women who received and practised self-perineal care during the postpartum period had an increased level of knowledge regarding self-perineal care.

Episiotomy wound healing occurs naturally. Oxygenation, sex, hormones, infection, stress, diabetes, obesity, medications, alcoholism, smoking, and diet are a few of the many variables that might impede one or more stages of the healing process for a wound. (Guo & DiPietro, 2010). The finding of this study is coherent with another study by Raman (2015) in Bangalore, India which revealed a significant difference in episiotomy wound scores between aseptic perineal care instruction and self-perineal care on the second and third postnatal days with a p-value less than .05. This study found that the REEDA scores at every point of time were significantly lower in the intervention group compared to the control group following SPC education given to the mothers.

A quasi-experimental study by Mohamed and El-Nagger (2012) in Egypt revealed a statistically significant reduction in the REEDA wound healing scores in the experimental group compared to the control group. Their study also concluded that women who received and practised self-perineal care instruction enhanced wound healing outcomes during postpartum, which is in line with the result of the current study. In another quasi-experimental study by Ari et al. (2019) in Jos, Nigeria, findings indicated that mothers in the intervention group practised perineal wound care and implemented hygiene, nutrition, and pain relief measures better than mothers in the control group. Women were taught postpartum perineal wound care and they practised it, resulting in better wound healing. The study concluded that knowledge is crucial to enhance good practice, leading to better wound healing outcomes. This is also supported by Manjula et al. (2012) the length of the episiotomy wound, self-perineal care frequency, parity, and the absence of episiotomy sutures all impacted how fast the wound healed.

In the current study, SPC education interventions consisted of the Kegel exercise for the primipara mothers. This study concluded that practising postnatal Kegel exercises had a significant effect on decreasing perineal pain after episiotomy and accelerating the healing of the incision and recommended that integrating the Kegel exercises as the main part of the routine hospital postnatal instructions for mothers to improve the quality of their lives in the postnatal period. This may be due to the effect of Kegel exercises on increasing the circulation in the perineum, improving the tone and elasticity of the perineum, so the perineal muscle becomes healthier and strong, which helps in the quicker healing of the episiotomy wound. Also, the postpartum mother had less perineal pain so she could contract the muscles efficiently according to the predetermined time and frequency. This is also supported by another previous study by Shayan et al. (2020) which found that the women's practice of Kegel exercises contributed to faster wound healing, increased blood and oxygen flow to the tissue, and enhances wound healing (Shayan et al., 2020).

The current study's finding is also in line with another study that examined the effect of postpartum Kegel exercises on episiotomy pain and wound healing among primiparous women using the REEDA scale. On the other hand, the current result contradicted McGuinness and Norr (1991), who reported that there was no statistically significant difference between one group that adopted the Kegel exercises and one that did not.

The mother is vulnerable to getting an infection in the postnatal period. A sitz bath relieves the mother's pain and discomfort, promotes healing, and prevents episiotomy complications. Practising a sitz bath is one of the interventions of SPC education. According to McGuinness and Norr (1991), the application of water externally to the body for therapeutic effect is a practice called hydrotherapy or water therapy." One of the most popular hydrotherapy methods is the sitz bath from Germany. A sitz bath is a natural

method of soaking in warm water which can stimulate the lymphatic system, increase circulation and remove toxins (McGuinness & Norr, 1991).

A study done by Gustirini et al. (2020) on the effect of a sitz bath on episiotomy pain and episiotomy wound healing among postnatal mothers concluded that the experimental group had a more significant change in the mean score of both. The findings of this study are supported by another study by Kaur et al. (2015), which stated that the application of sitz bath therapy significantly improved episiotomy wound healing. This study concluded that sitz baths contributed to the wound-healing process of the mothers. Another study that aligns with the current study was done in Indonesia. It found that proper vulva hygiene can be ten times greater in preventing infection in a perineal wound. The results showed that vulva hygiene treatment prevented infection in the perineal wound (Sangkala & Sriwardana, 2020).

Mothers worldwide practice various traditional methods to ensure a speedy and safe recovery. In the current study, the traditional method practised among the primipara mothers was recorded and controlled during the statistical analysis. This was done because many mothers practising traditional postpartum methods can affect the study's outcome. The postpartum period is important when the mother returns to her pre pregnancy status. The rest of the postpartum care was hot compression, corset showering with herbs, or abdominal binder (Fadzil et al., 2016). In conclusion, traditional massage, herbal baths, and consuming herbal medicines are popular methods among Malaysian women irrespective of the residence area.

Interestingly many other studies have been conducted focusing on traditional practice, such as the study by Moudi et al. (2018) which reported that traditional Baluch healers used Mastic oleoresin (MO) (*Pistacia lentiscus*) to accelerate wound healing and relieve

episiotomy pain. This resulted in the healing rates in the intervention group being higher than those in the control group. A study by Eghdampour et al. (2014) was done to determine the impact of *Aloe vera* and *Calendula* on episiotomy healing in primiparous women. Based on the results, *Aloe vera* and *Calendula* ointment considerably increase the speed of episiotomy wound healing. Another study in Iran evaluated the effect of *Verbascum Thapsus*, the great mullein, in healing episiotomy wounds (Taleb & Saeedi, 2021).

6.5 Effect of SPC Education on Mean Pain Score

This study found that after implementing SPC education, the primipara mothers in the intervention and control group had a reduction in mean pain scores over time. The mean total pain score in the intervention group was lower than the control group.

However, several pharmacological and non-pharmacological treatments have been proposed to reduce episiotomy pain and enhance wound healing (Steen & Diaz, 2018). This current study finding was similar to a previous study by Zaki et al. (2019), where a quasi-experimental research design was conducted in Egypt. Results revealed a statistically significant difference in redness and perineal oedema between both groups after 48 hours regarding the intensity of episiotomy pain. It can be concluded that puerperal women who had received perineal self-care instruction experienced lower episiotomy pain and faster episiotomy healing than those who had not received instructions. Praveen et al. (2018) reported that primigravida mothers in the experimental group reported that they could carry out daily activities such as walking, sitting, urinating, and defecating comfortably compared to the control group.

In the current study, SPC education promoted the use of an ice pack to reduce pain. The mothers preferred a local, cold compress local for the first 24 to 48 hours in post-

operative management for an episiotomy. This is in line with another quasi-experimental study done by Dube (2013) which concluded that the application of ice plays an important and beneficial role in post- episiotomy pain and in improving the episiotomy wound . The study showed a significant difference in the pain scores of the experimental and control groups. Another study by Amorim. et al. (2014) also concluded that applying an ice pack for 10 minutes to the perineum achieves effective pain relief. A previous study also reported that crushed ice gel pads are safe and effective in reducing episiotomy pain and improving wound healing for postpartum primiparous women. It can also increase their independence in daily living activities (El-Saidy et al., 2018).

Cold gel pads are a non-invasive and effective way to relieve discomfort. Alternatively Sheikhan et al. (2011) from Iran used a cold gel pad to reduce oedema and discomfort, an efficient non-pharmaceutical technique. The study found that using gel pads following an episiotomy can be an effective pain reliever. In line with the current study, Steen et al. (2000), in another randomised control trial, evaluated the effectiveness of icepacks and epifoams with cooling gel pads on reducing postpartum perineal pain and found no statistically significant difference between groups. Maternity gel pads, specially designed to cool the perineal region, were more effective in alleviating perineal trauma when compared with hospital standard regimens and were more highly rated by women.

The current study concluded that women who received and practised self-perineal care had a lower level of postpartum episiotomy pain score and decreased pain during daily activities such as walking, sitting, urinating, defecating and lying down. Similar to this study, a previous quasi-experimental study done in Egypt by Mohamed and El-Nagger (2012) revealed a statistically significant reduction in the level of perineal pain at different time points in postpartum between the two groups. There was a statistically significant difference between groups concerning pain interference with walking, sitting, and

urinating. In addition, in many other studies, perineal care teaching positively affects the reduction of episiotomy pain (Ari et al., 2019; Oleiwi, 2010; Raman, 2015) and good wound healing outcomes (Zaki et al., 2019).

Aradmehr et al. (2015) investigated factors associated with post-operative pain following episiotomy in primiparous women in Iran. The study concluded that longer cuts and poor wound healing might increase perineal pain. SPC education in the current study advised the primipara mother to avoid prolonged sitting, which can put pressure on the perineum. Other factors contributing to the extended episiotomy were excluded in the current study by recruiting mothers at 32 to 36 weeks with normal pregnancy only. Mothers with instrumental delivery were excluded from the studies because of the possibility that mothers would have a liberal episiotomy cut and prolong wound healing compared to a standard episiotomy cut.

An observational, hospital-based prospective cross-sectional study was conducted in Mumbai, India. The study revisited the need to correct antenatal factors such as obesity, anaemia, and hypothyroidism in postnatal follow-up patients at high risk. Factors such as constipation and daily activities in the study may contribute to increasing perineal pain following episiotomy (Deshpande et al., 2019). In the current study, all these factors were excluded, such as mothers with medical problems such as Gestational Diabetes, Pregnancy Induced Hypertension, and Hyperthyroidism. Obese mothers over 35kg/m^2 were also excluded from the study. Constipation prevention was included as well in the SPC education.

6.6 Primipara Mothers' SPC Education, Experiences, and Challenges in Performing Self-Perineal Care at Home.

In-depth interviews were conducted, and the qualitative data were analysed using thematic analysis. Two main themes emerged from the study that explored the primipara mothers' opinion of SPC education, experiences, and challenges in performing self-perineal care at home. The first theme was perceived benefit, and the second was self-perineal care challenges.

SPC education was a good choice as the primipara mothers revealed that they had gained new knowledge and better-understood episiotomy and perineal care. SPC education created self-awareness among them to prevent puerperal infection following delivery. The primipara mothers also claimed that the SPC education had boosted their confidence level and made them more confident in performing self-perineal care at home. Using mobile applications to self- report the observation of pain scores and wound healing outcomes was a new experience. The primipara mothers described SPC education as very useful. The participants described the facts that were taught to them about self-perineal care was new knowledge for them as no structured teaching of self-perineal care at the study hospitals. The current study confirmed that a well-informed mother would be physically and psychologically prepared for childbirth and the perineal trauma that they go through which is in line with a study done by Way (2012).

Many qualitative studies have been conducted among mothers who have recently delivered. A qualitative interpretive approach using a feminist perspective by Priddis et al. (2014) reported that the psychological impact on women following severe perineal trauma is extensive and complex. The study concluded how women are cared for during their labour, birth, and postpartum period directly impacts how they process, understand, and rediscover a new sense of self following severe perineal trauma. The author Priddis

et al. (2014) evaluated the current services for women who experience ongoing physical morbidities. Recommendations for future practice include establishing specialised perineal care clinics that give consistent and collaborative care to women (Hickman et al., 2020).

The possible reason for these two different findings is that structured SPC education was given to the primigravida mothers before and after labour in our study, and the primipara mothers were supported throughout the pregnancy till the delivery date and for seven days post-delivery. The need for education of women before childbirth is very much needed. The teaching should start during the antenatal period for the mothers to have enough time to apply theory to practice and to establish a good rapport with the midwives.

In the current study, the primipara mothers had support from the antenatal phase till day 7 in the postnatal period. The support was created with the mobile application where the primipara mothers had continuous sources to refer to in case of any doubts. The SPC knowledge given to the primipara mothers and the ongoing support given were essential factors in creating awareness, boosting confidence levels, and creating self-empowerment among them.

The current study finding was not in line with another previous study done in Geneva, Switzerland, by Razurel et al. (2011). The study identified problems and events perceived as stressful by primiparous mothers during the postpartum period. The study concluded that medical staff dispensed educational information during the antenatal period was not put into practice during the postpartum phases. In the current study, the primipara mothers claimed that their confidence levels were boosted following SPC education. This could be because self-perineal education was given to mothers face-to-face, supplemented with

information via mobile applications twice during the antenatal and postnatal phases. In the current study, their husband's lack of involvement was not mentioned by the primipara mothers during the in-depth interviews as they are equipped with their new knowledge and felt they could manage themselves.

Other qualitative findings by McQueen and Mander (2003) suggested midwives should provide advice and legitimise the need for support and coping mechanisms to aid the transition to parenthood. Midwives could help women have more realistic expectations about life after childbirth. Mothers in the study also claimed that not much information regarding episiotomy was given to them. This is supported by a qualitative study conducted by Djanogly et al. (2022) in London to explore how women experience and perceive episiotomy. Minimal information on episiotomy was shared with participants, particularly concerning risks and alternatives. The study concluded consent to episiotomy is not consistently informed or voluntary and more often takes the form of compliance. The information must be provided to women more quickly to fulfil legal requirements and facilitate a sense of genuine choice (Djanogly et al., 2022).

Ghiasvand et al. (2022), in their qualitative study, investigated women's perception of episiotomy. The study suggested that healthcare systems support mothers' physical and mental health. It was recommended that health policymakers devise plans to boost factors that lead to positive views and eliminate those contributing to negative experiences and views. In a previous qualitative study, Shoorab et al. (2019) studied Iran's perceptions and experiences of women with perineal injuries in postpartum care. The study concluded that postpartum care in women with severe perineal trauma needed to be reviewed so that follow-up care and comprehensive provision of required services could be considered, focusing on effective communication skills, including honesty, active listening, and compassion. The possible reason for the above study finding was, at the time was no

teaching on episiotomy and/or perineal care in the study hospital. The decision to perform an episiotomy was taken during the second stage, and less time or no time was given to mothers to discuss the need for the episiotomy. In addition, there was no structured teaching on perineal care in the presence of episiotomy wounds.

In the current study, the primipara mothers also faced challenges performing self-perineal care at home, such as a lack of family support. Sometimes mothers are left alone at home, and they need family support to help manage the new-born as they also need to manage themselves. This was reported at the initial stage as mothers still had perineal pain, and primipara mothers are unfamiliar with the new-born care at the beginning. The current study aligns with a study by Larkin et al. (2012), who claimed that women often felt alone and unsupported postpartum.

In the present study, the teaching was done twice during the antenatal phase and reinforced postnatally for better communication and impact on knowledge related to self-perineal care. However, according to Way (2012), women may be unprepared for the impact of perineal pain and discomfort on their lives, particularly when completing daily activities in the early postnatal period. This study also suggested different approaches to communicating the impact on women, such as in the early postnatal period rather than during pregnancy, should be considered. Physical symptoms of perineal pain and discomfort experienced by women are not addressed in isolation from any psychosocial consequences. Way (2012) suggested communicating with women in early postpartum regarding perineal pain and discomfort rather than in early pregnancy. The study finding differed from the current study's suggestion as it was suggested to teach mothers during the antenatal phase followed by the postnatal phase.

In the present study, the primipara mothers, without any complication, stayed for 24 hours for observation in the postnatal ward. It was very important to empower mothers to identify their pain level and signs and symptoms of perineal infection and perform the non-pharmacology method taught during SPC education. This prevents the mother from being dependent on analgesics to reduce perineal pain following an episiotomy. A combination of systemic and localised treatments is required to produce the appropriate pain relief that meets the needs of individual women. Women may suffer in silence because they can feel they are a bother if they ask for pain medication in the hospital. Midwives must recognise this and constantly ask women if they are in pain or discomfort, providing pain medication when necessary. Midwives must also ensure that women are given guidance based on the most up-to-date research. Intervention may require effective pain management to fulfil individual needs. For example, Mohamed and El-Nagger (2012) stated that genital tract trauma has various detrimental implications for women, including the inability to sit comfortably.

This study discovered that some primipara mothers had difficulties self-reporting the observation of pain scores and wound healing outcomes using the mobile application due to inadequate internet resources and unfamiliarity with the technology. This study finding is in line with this another study done using the mobile app by Koçak et al. (2021) and Malli and Ergin (2021).

The primipara mothers also had challenges that sometimes they had to follow their caretaker's advice. SPC education and traditional beliefs often have different values and beliefs in particular about the aspects of the sitz bath, bathing time for women in confinement, amount of water to drink, and eating certain fruits and vegetables. However, our primipara mothers tried their best to follow the SPC education guidelines. Sometimes, they gave in to their caretakers as they realised that some traditional practices were

harmless and didn't interfere with wound healing. It is always good to involve their caretaker in health education sessions for the mothers to help them overcome these challenges at home. This is supported by a narrative review done in Malaysia by Fadzil et al. (2016) which concluded that Malaysian mothers have certain postpartum practices that can prevent future ill-health. Despite perceived differences in intra-ethnic postpartum practices, most Malaysian mothers, regardless of ethnicity, have similar postpartum regimens and practices in terms of food taboos, traditional postpartum massage and traditional herbs, and recognition of the role of older female family members in postpartum care. Another study by Withers et al. (2018) concluded that many Asian women continue to perform a variety of traditional beliefs and customs during pregnancy, childbirth, and the postpartum period.

6.7 Integrating Quantitative and Qualitative Results

The embedded sequential design of mixed-method research was conducted in this study, where a qualitative data set acts as a supportive, secondary role in the quantitative data (Hennink et al., 2020). Qualitative data was embedded within the quantitative results to explore the primipara mothers' opinions, experiences, and challenges of the whole SPC education programme. The qualitative study was not intended to explain the significant quantitative study results but to explore experiences and challenges that added another dimension to the quantitative study results but to explore experience and challenges that added another dimension to the quantitative study results as illustrated in Figure 6.1.

SPC education was introduced to the mothers in the third trimester and was later given again at 4 hours post-delivery. This educational intervention had a significant effect on the knowledge level of the mothers. All 125 participants were tested on their baseline knowledge of these 16 areas. There was no significant difference in the scores between the two groups. In contrast, there was a significant increase in knowledge scores over

time in the intervention but not in the control group. SPC education also significantly affected pain scores and wound healing outcomes within and between groups.

The qualitative study explored the experiences and challenges perceived by the twelve primipara mothers who had participated in the SPC education. These mothers believed that the SPC education had improved their knowledge, increased self-awareness and their self-confidence level. The knowledge also empowered them to perform perineal care themselves, enhanced wound healing and reduced pain. However, they also encountered challenges with perineal care after being discharged home, which perhaps should have been anticipated. Nevertheless, these barriers did not interfere with the mothers' recovery process during the postpartum period.

The self-awareness created during the two sessions of teaching SPC to the mothers emboldened them to perform it at home. The importance SPC education was highlighted as this could have a major impact on their lives as young mothers. Most were quick to realise the importance of self-perineal care during the postnatal period and the consequences of poor hygiene which could lead to episiotomy wound dehiscence. The qualitative approach was an opportunity to explore SPC education to the mothers from their point of view. Taking their comments into account, the researcher subsequently improved the SPC education programme, enriching the content and adjusting the approach in a new version for the future.

SPC education significantly affected the knowledge, pain scores, and wound healing outcomes. The mean total score for the post-test was significantly higher in the intervention group than in the control group. Overall, the mean total REEDA score for wound healing decreased over time in both groups, and within groups there was a significant reduction at each subsequent time point. However, in between-group

comparison, the mean total REEDA score was significantly lower in the intervention group than in the control group from day 1 to day 7 post-delivery. As for the pain scores, the mean total pain score also declined over time in both groups, and within groups there was also a significant drop at each subsequent time point. Just as with the REEDA score, the mean total pain score was also statistically significantly lower in the intervention group than in the control group from day 1 to day 7 post- delivery. Overall, the pain scores declined over time in the intervention group compared to the control group for all five daily activities: walking, sitting, defecating, urinating, and lying down and this is supported by the primipara mothers' statement during an in-depth interview that there was a wound healing enhancement following the practice of self-perineal care at home.

SPC education helped the primigravida mothers to understand the purpose and benefit of performing perineal care at home after post-delivery. They also realised the importance of self-reporting, which leads to good practice. This is in line with Orem's self-care deficit nursing theory Hartweg (1991) addressed the supportive educative system that empowers pregnant mothers with knowledge: this will positively influence their practice of postpartum self-perineal wound care when they sustain perineal trauma thereby resulting in better wound healing progress.

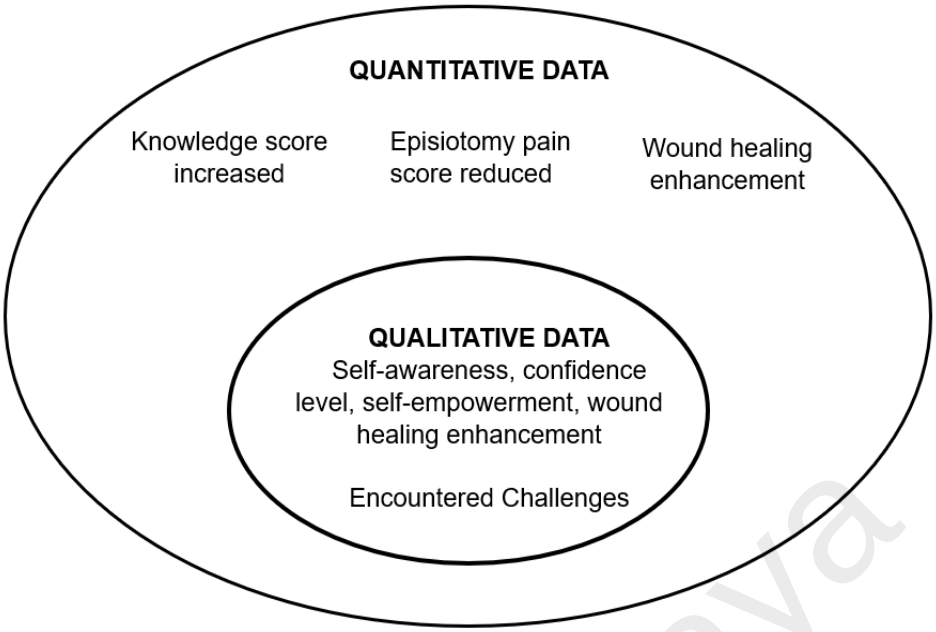

Figure 6.1: Integration between quantitative and qualitative results.

SPC education was given to the primipara mothers in antenatal and postnatal phases. The primigravida mothers were physically and mentally prepared from antenatal. The teaching was reinforced again with hands-on practice during postpartum, which was a good idea as the mother already had a close rapport with the researcher and could easily communicate their thoughts, despite being in pain and having to attend to the new-born.

The primipara mothers also encountered barriers in performing self-perineal care at home postpartum. Lack of family support, lack of knowledge and resources in using the mobile application, and contradicting traditional beliefs were reported as challenges for the primipara mothers at home. Midwives should anticipate these challenges to enable mothers to continue practising self-perineal care to reduce pain scores and improve wound healing outcomes. New mothers should be more involved in maternal-child bonding and should be urged to lead a healthy lifestyle after giving birth.

Mixed methods research combines quantitative and qualitative research to answer the research question. This method can help gain a more complete picture than a stand-alone quantitative or qualitative study as it integrates the benefits of both approaches. The strengths of one type of data often mitigate the weaknesses of the other.

6.8 Summary

This chapter has presented a discussion of the study findings. SPC education significantly increased the knowledge level of primigravida mothers, reduced their episiotomy pain, and enhanced wound healing outcomes. In addition, the mothers perceived that self-perineal care education contributed to their self-awareness and self-empowerment and boosted their confidence level. Even so, barriers still exist, although these should be anticipated to prevent negative experiences in the future. The experiences of self-perineal care that the primigravida mothers perceived have contributed to easing discomfort during the postnatal period, reducing pain and enhancing wound healing. Lastly, the findings could build a new body of knowledge in the field of midwifery. Intervention in self-perineal care improves primigravida mothers' knowledge, contributes to good perineal care practice, and enhances independent, healthy behaviour during postpartum. Finally, this study is concluded in Chapter Seven to summarise the main points of this study.

CHAPTER 7: CONCLUSION

7.1 Introduction

This chapter discusses the conclusion of the current study. Firstly, the strength and limitations of the study are highlighted. Then, the study is described in terms of the implications for nursing practice, further education and research. Recommendations for further research are also proposed in this chapter and a final summary of the study is presented.

7.2 Strengths and limitations of the study

The current study conducted among the primigravida mothers has strengths and limitations that should be highlighted.

7.2.1 Strengths of the Study

This study has several strengths. First, to the best of the researcher's knowledge, this is the first study that has attempted to assess the effect of self-perineal care education on knowledge, episiotomy pain, and wound healing among primigravida mothers. Previous studies have assessed the effect of perineal care education either on knowledge or pain scores and wound healing, but not together. This is the only study examined the effect of perineal care education holistically on knowledge, episiotomy pain, and wound healing outcomes. The finding of this study provides evidence that SPC education improves knowledge, reduces pain and enhances wound healing outcomes. An intervention performed solely during the postnatal period can reduce the mother's concentration as the mother could be in pain and attending to the needs of her new-born.

Second, this study was begun as early as the antenatal phase, compared to many other studies conducted during the postnatal phase. The time that postpartum mothers spent in

the ward was only for a brief period due to the high bed occupancy rate. Compared to the previous studies, the primigravida mother was physically and mentally prepared for self-perineal care from the antenatal period. An intervention performed solely during the postnatal period can reduce the mother's concentration as the mother could be in pain and attending to the needs of her new-born.

This study used a mixed-methods research design, including quantitative and qualitative data. This design enabled data to be collected from the primipara mothers and allowed the researcher to explore some mothers' opinion on SPC education, their personal experiences, and the challenges they faced while performing self-perineal care at home. Themes and sub-themes derived from qualitative data supported, reinforced and enriched the quantitative part of the study. This information can help nurse-midwives educate mothers on perineal care and guide them to help mothers cope with the challenges they face and thereby improve the care provided. To the best knowledge of the researcher, no mixed-method design has previously been performed in this field.

Another strength of this study that it was conducted in two tertiary care hospitals with similar inpatient care management and policies. This study had a control group as a counterpart. There was homogeneity of participants in both groups, which allows comparisons between the groups. As the study was conducted in two separate settings, information sharing between the mothers of the intervention group and the control group was prevented, and ensuring that the outcome of this study is reliable.

The final strength of this current study was the education primigravida mothers via a mobile application made possible, by the development of communication technology. Fast, reliable access to accurate information in a smartphone anywhere, any-time enhanced access to health care providers and ensured continuity of care. Self-reporting

using the primipara mothers' mobile application also empowered them to take responsibilities for their health and ensured they were involved in their self-care, in line with the current healthcare concept that encourages patient engagement. The mobile app made monitoring out-of-hospital context possible and easy, which is particularly important in remote areas.

7.2.2 Limitations of the Study

Despite its many strengths, this study also has a few limitations. Firstly, during the initial stage of this study, some mothers had difficulty handling the mobile application, even though two sessions were given to teach them how to use it correctly. However, after a few attempts by the mothers at home, and perhaps because the app was so user-friendly, they did soon become familiar with its operation.

The other limitation was that a few mothers faced difficulties in self-reporting using the mobile application due to poor internet access. Because of this, the researcher needed to call the mothers occasionally to collect the results herself, but then requested that the mother resume self-reporting once they had the access to the internet. However, the number of participants with this problem was minimal.

Potential recall bias is another possible limitation in this study, as self-reported data by mothers take some time to record due to the distraction of pain or a busy schedule (Koçak et al., 2021). Recalling a past event related to the subject it may vary from one individual to another. Therefore, if there was a delay in reporting by mothers, the researcher sent messages to all the mothers in both groups to remind them to self-report the findings as soon as possible, followed by a phone call by the researcher if necessary.

The researcher is well aware that self-reported observations on pain scores and wound healing outcomes can introduce bias to the study's results. There is a possibility, for a variety of reasons, that the primipara mothers score their pain scores for wound healing more or less than what was the case. Therefore, on day 5th of post-childbirth, the researcher collaborated with the community nurse from the nearest government maternal child health clinic, who regularly did her routine postnatal visit at the mother's residence. This was done to all the mothers in both groups in their respective areas to ensure all the information regarding the mother's pain score and wound healing outcome was in line with the community nurse's feedback to the researcher.

The other limitation was that selection of participants in this study was neither randomised nor blind. However, the two groups of primigravida mothers were well-matched with the most important demographic characteristics. Inclusion and exclusion criteria were defined to minimise selection bias. It is acknowledged that only randomisation can ensure a reliable comparison between two different groups (Suresh, 2018). Randomised controlled studies require greater time and a higher budget. Unfortunately, the researcher could not carry out randomised control trials because no grant was obtained for this project.

This study was conducted in two tertiary care hospitals in the Klang Valley, an urban setting, so the mothers' exposure to the self-education program and ability to follow instructions via mobile apps was easier than most. This perhaps limits generalisation to primipara mothers of other backgrounds, particularly those in the rural area and other types of health facilities in Malaysia.

The last limitation was the selection of participants based on the inclusion criteria. The exclusion criteria were put together carefully to exclude all the possible causes that would

change the mode of delivery from spontaneous vaginal delivery to lower caesarean section or instrumental delivery, which would increase the rate of dropouts. Therefore, the researcher recruited all the primigravida mothers without complications and risk factors, contributing to changing the mode of delivery except for foetal distress and poor progress of labour. Avoiding the dropout of participants could be one of the reasons why many previous studies were only done during postpartum.

7.3 Implication of the Study

This study has several implications for education, research, and nursing practice.

7.3.1 Education

Our study results indicate that SPC education effectively increases knowledge, reduces episiotomy pain, and enhances wound healing outcomes among primipara mothers**.** Knowledge deficits among primipara mothers are a significant barrier in self-perineal care practice as mothers are unaware of the benefits. Imparted knowledge of perineal care leads the mother to find time and resources to practise self-perineal care post-childbirth. This practice can reduce episiotomy pain scores and result in better wound-healing outcomes (Mohamed & El-Nagger, 2012). In this study, educating mothers through SPC training sessions supplemented with a mobile application has equal importance on each other compared to routine advice to the mothers, which is not structured and given upon discharge from the ward.

7.3.2 Research

The present study results could increase the awareness of nurse midwives on the positive impact of SPC education on mothers' knowledge, episiotomy pain, and wound healing outcomes. Thus, this would permit the midwives to give holistic care to the

mothers during postpartum despite their short stay in the hospital by empowering them to take charge of their health.

This study provides other insights that can be refined and investigated further to add a new body of knowledge to the nursing field through rigorous research. SPC education offers insights such as increased self-confidence, empowerment, and self-awareness among primipara mothers. These perceptions can be measured quantitatively so the cause-effect relationship can be established. The qualitative method is equally important in eliciting the mothers' opinions. The experiences and challenges faced by the mothers in performing self-perineal care at home were revealed in this study, so midwives could consider involving the caretakers in the health education session in the future to reduce the barrier faced by firs- time mothers at home.

7.3.3 Nursing Practice

The study results should prompt the development of structured self-perineal care supplemented with a mobile application. SPC education was introduced during the antenatal phase to prepare the mothers mentally and physically for their episiotomy and perineal care. Information via the mobile application was a good option as this saved time and resources for the nurse-midwife and the mothers themselves. At anytime and anywhere, the mothers were able to quickly access accurate, reliable information related to perineal care, compared to the customary way of depending on pamphlets, which are always at risk of being lost. Using the mobile application, they could repeatedly refer to the information throughout pregnancy and after delivery.

This study implies midwifery practice in Malaysia as the programme uses a mobile app to deliver SPC education and employs the mothers' smartphone to allow them to self-report pain scores and wound healing outcomes. This study empowered the primipara

mothers to take charge of their health by involving them in their nursing care. Self-reporting to the midwives encourages good rapport between primipara mothers and the nurse-midwives. In addition, there is a high probability that they will return for their subsequent pregnancy; therefore, the knowledge imparted to them will be beneficial in the long-term.

Implementing this package of SPC education at many maternal child health clinics and antenatal clinics in government settings will reduce midwives' challenges with limited resources and a high patient load compared to private hospitals. It is easier for nurse-midwives to consistently offer complete perineal care to mothers to prevent puerperal complications. Using a mobile application for perineal care can save time, and the mother also spends less time in the hospital, especially during difficult times like the Covid 19 pandemic. Self-perineal care is cost-effective as it can be done at home. Information on SPC education via a mobile application to replace a pamphlet is a viable option as it allows mothers to obtain information anytime and anywhere by simply using their smartphones.

This study has created a better collaboration between the hospital team and the maternal-child health clinic team during the follow-up done by the researcher. Collaboration and effective communication contributed to achieving the healthcare system's vision and mission to provide holistic care to post-natal mothers.

Implementing structured SPC education during antenatal care can reduce the number of perineal wound infections; by providing holistic care to the mothers, the hospital's image will improve. Managing episiotomy wound dehiscence with a short course of antibiotics, pain relief, anti-inflammatory and secondary suturing can be prevented, and

the cost of managing postnatal mothers with wound dehiscence complications can be reduced.

7.4 Recommendations and Further Research

A few recommendations are made in contributions to education, research, and practice.

7.4.1 Education

Developing and installing a mobile application to help midwives educate primigravida mothers should be encouraged in antenatal clinics. Structured health education would be a good strategy to improve knowledge among the primipara mothers, leading to widespread good practice. The mobile application can be downloaded onto a mother's smartphone in the first training session and can be easily referred to when she needs information related to self-perineal care. Since the smartphone is the readily available gadget that most mothers own in both urban and rural areas of Malaysia, a mobile app can be a valuable resource. Besides that, the SPC education programme should be started as early as the antenatal period to give mothers enough time to synthesise the knowledge into practice.

The components of SPC education can be part of the curriculum during midwifery training as perineal management is a vital element of midwifery care. Nurse educators can encourage midwifery students to practise non-pharmacology methods in SPC education, such as applying ice packs, doing Kegel exercises, and taking a sitz bath to reduce pain and enhance wound healing outcomes.

7.4.2 Research

This study's findings identify several areas that need further investigation concerning perineal care education. The researcher recommends that the study be replicated with a larger sample to validate the findings and thus generalisations can be made. This type of study should be replicated in obstetric units in all hospitals. The effectiveness of the intervention in each organisation should be evaluated to support the standardisation of practice in organisations across the Klang Valley. Managing perineal trauma can be standardised widely between health institutions in Malaysia. Thus, this will permit the midwives to give the best care to the mothers holistically during postnatal despite their short stay in the hospital. SPC education should be started as early as the antenatal phase since postnatal mothers spend a short time in the postnatal ward and so have little time to transfer theory to practice. For a quasi-experimental study, the observation period for the wound healing outcome should be extended up to 14 days post-delivery as complications such as wound dehiscence can go beyond seven days.

This mixed-method study also explores the mother's opinions of the SPC education they were given, their experiences throughout the study and the challenges of performing self-perineal care at home. By extension, a qualitative study to explore midwives' experiences in teaching mothers about SPC education in a clinical setting would be beneficial. Thus, the midwives could describe the challenges of using mobile applications to educate the mothers on self-perineal care.

Overall, this study presents evidence for the suitability and usefulness of SPC education intervention during pregnancy and uses a mobile application to upload all the information related to SPC education to replace the customary pamphlet. The mobile app was also used to self-report the pain score and wound healing outcome.

Further research should investigate the prevalence of wound dehiscence and factors contributing to perineal infection to improve the service given to mothers. Currently, the available evidence on wound dehiscence is only based on retrospective audits or case reviews, and the number of cases is relatively small. The evidence-based statistics in this study can be the spark to initiate research into the fundamental problem of episiotomy wound dehiscence.

This quantitative aspect of this study used a quasi-experimental design with a pre- and post-intervention approach; it incorporated a sample size calculation and specific inclusion criteria to achieve the primary objective of improving patient outcomes. A similar SPC education approach could be applied to other topics in health education, such as breastfeeding, neonatal jaundice monitoring and umbilical cord dressing outcome, and other necessary health education such as SPC education within the obstetric unit.

7.4.3 Nursing Practice

Collaboration between the hospital and the maternal child health clinic should be strengthened to provide holistic services to mothers throughout pregnancy and postpartum. The collaboration and networking between these two settings can ensure the continuity of care. Effective communication should be enhanced within and between the institutions of the healthcare system to gain the client's trust towards our hospitals and services.

Considering SPC education has effectively improved primigravida mothers' knowledge, episiotomy pain, and wound healing outcomes, the nurse-midwives should adopt this approach to improve antenatal and postnatal management for mothers. It also saves times and resources, especially valuable for hospitals dealing with a high number

of patients. This is also in line with empowering individuals to take charge of their own healthcare and practice preventive measures.

SPC education should be encouraged in a setting with limited staffing to provide health education consistently to mothers without the need to teach haphazardly and repeatedly. A perineal care support group should be established using the mobile application, which would be the first in Malaysia. This would build a good rapport between the mother and the midwives during pregnancy, intrapartum and postpartum.

7.5 Summary

In conclusion, this study found a significant difference in knowledge, reduced pain score, and enhanced wound healing outcomes between the participants in the intervention group and those of the control group. The primipara mothers perceived the benefit of self-perineal care education during the antenatal phase which included increased knowledge and improved practice. There is a great potential to educate mothers on perineal care using their smartphone as this gadget has become an essential possession; thus, SPC information uploaded in the mobile application was an excellent attempt to educate primipara mothers. However, some barriers should be anticipated and overcome to implement SPC education in the clinical setting to have the best outcome among primigravida mothers.

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LIST OF PUBLICATIONS AND PAPERS PRESENTED

a. "The Effect of Self-Perineal Care on Knowledge and Practice Among Primipara Mothers" was presented (oral) at Asia Pacific Conference on Nursing Sciences and Healthcare on 1-2 December 2021.

b. A manuscript entitled "The Effects of Self-Perineal Care Education on Episiotomy Pain Score and Wound Healing Outcome among Primigravida mothers in Malaysia Urban Area" published on 30.10.2022 in Iranian Red Crescent Medical Journal -https://doi.org/10.32592/ircmj.2022.24.10.2130

c. A manuscript entitled "The Effect of Self-Perineal Care on Knowledge and Practice Among Primigravida Mothers in Malaysia" was submitted to the Iranian Red Crescent Medical Journal.

d. A manuscript entitled "Primipara Mothers Experiences in Performing Self-Perineal Care Following SPC Education Program - A Qualitative Descriptive Study" was submitted to Journal Women and Birth.