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EPISIOTOMY AT A UNIVERSITY HOSPITAL IN LEBANON: PRACTICE AND PHYSICIANS' PERCEPTIONS

by

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AN ABSTRACT OF THE THESIS OF

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Episiotomy is a surgical procedure performed during labor and delivery that is thought to facilitate childbirth. Several international organizations around the world have issued recommendations to regulate this practice. In Lebanon, there has never been a study which analyzed medical health records in order to understand this practice in the country.

This thesis is based on a retrospective analysis of hospital records in a university hospital over 5 years in addition to interviews with Obstetrician-Gynecologists in order to understand their perceptions of the practice. Through our analysis and our interviews, I was able to identify several risk factors for episiotomy. These were: parity, maternal age, and fetal weight. I was also able to conclude that women who had an episiotomy had a higher percentage of high degree perineal tears when compared to women without an episiotomy. In addition, through our interviews, I was able to note discrepancies between senior physicians' approach and junior physicians' approach. The latter seemed to be more in favor of a restrictive approach towards episiotomy rather than a routine one. In addition, junior physicians seemed to be more appreciative of implementing guidelines and policies to guide the practice.

In conclusion, this study is the first of its kind in the country. It was able to show that the university hospital is still behind in terms of approaching the WHO recommended rates of episiotomy and that episiotomy is not preventing 3rd and 4th degree lacerations. Thus this finding should be used to discourage performing prophylactic episiotomies. I hope that by adopting policies that guide the practice in the university hospital this could set the example for other hospitals in Lebanon and thus encourage a new approach on the issue at the level of the Ministry of Public Health. More studies on episiotomy in Lebanon are needed that could potentially look at rates in different hospitals and medical care centers and also examine other complications that could arise from having an episiotomy such as pain, sexual function, and women's ability to perform daily activities. Finally, one should also keep in mind that episiotomy is part of the overall over-medicalization of delivery. Other practices during delivery (such as lithotomy position, bed rest, enemas and others) should also be considered when addressing practices in labor and delivery.

ABBREVIATIONS

AUBMC	American University of Beirut Medical Center
EHR	Electronic Health Records
IRB	Institutional Review Board
RCTs	Randomized Controlled Trials
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

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CHAPTER I

INTRODUCTION

"In a branch of medicine rife with paradoxes, contradictions, inconsistencies, and illogic, episiotomy crowns them all. The major argument for episiotomy is that it protects the perineum from injury, a protection accomplished by slicing through perineal skin, connective, tissue, and muscle." Henci Goer.

Episiotomy is a widening of the perineum to facilitate childbirth. The first known record of episiotomy dates back to 1741, but its protective effects for mothers have never been proven. After numerous studies emerged on the issue, the World Health Organization (WHO) guidelines on episiotomy were first published in 1996, and were republished in 2007. WHO recommends considering episiotomy in the presence of the following indications only:

-A vaginal delivery that is complicated by breech presentation or shoulder dystocia;

-A vaginal delivery during which forceps or vacuum extraction is used;

-Fetal distress;

-Scarring from female genital cutting; and/or 3rd or 4th degree lacerations that have not properly healed.

(WHO, 2007)

There is by now an accumulation of evidence demonstrating that episiotomy can have harmful effects. These range from perineal lacerations and tears, to infections, postpartum hemorrhage, and financial implications (Viswanathan et al., 2005). With the emergence of evidence-based medicine and the appearance of studies looking at episiotomy practice, multiple risk factors have been found to be associated with this operative procedure. These include: Maternal age, parity, and fetal weight among others. In addition to the WHO guidelines, several international organizations have published recommendations over the years to encourage adopting a restrictive episiotomy approach. In their practice bulletin, the American College of

Obstetricians and Gynecologists state that the practice of prophylactic episiotomy does not appear to result in either maternal or fetal benefit (ACOG, 2006). In addition, the Royal College of Obstetricians and Gynecologists in the United Kingdom also recommends adopting a policy of restrictive episiotomy (Graham et al., 2005).

Despite the evidence not recommending the practice, episiotomy is still quite common, and the trend of episiotomy over the world varies greatly from country to country, with rates ranging from 9.7% in Sweden (Graham et al., 2005) to 100% in Taiwan (Carroli & Mignini, 2009). In the region, there have been only a few studies about childbirth practices in hospitals and very few which examine the prevalence of episiotomy practice. In Lebanon, only one study looks at the episiotomy rate (Khayat & Campbell, 2000) and there are no qualitative studies on the views of physicians about the practice.

Here I was interested to examine the practice of episiotomy at a university hospital from both a quantitative data analysis aspect and conducting interviews with physicians with the aim of establishing its rate as well as to look into physicians' perspectives about this practice, as similar studies on episiotomy have never been conducted in Lebanon.

My main objectives for this study were to:

1. Determine the overall rate of episiotomy at a university hospital in Beirut and examine the trend over the past 5 years.
2. Test whether mother's age, parity, fetal weight, patient's hospital admission class, and physician's gender are associated with episiotomy.
3. Test whether episiotomy is associated with postpartum hemorrhage and/or third or fourth degree perineal tears.
4. Explore the views and perspectives of Obstetrician-Gynecologists at that hospital about the decision making process leading to performing episiotomies and their views as to

whether the women's consent is needed and the extent to which international guidelines are and/or should be implemented.

To achieve the above objectives, a mixed-methods approach was taken to the methodology. First, I reviewed and gathered quantitative data from electronic medical health records at the university hospital from January 2009 until January 2014. In addition, I conducted qualitative interviews with physicians at the university hospitals to explore their views on the topic.

This thesis is divided into six chapters. The second chapter provides a detailed literature review of the topic and each variable included in this study. The third chapter describes the methodological approach of each type of data collection (both quantitative and qualitative approaches). The fourth chapter presents the main findings of the analysis of data collected through the electronic health records review. The fifth chapter presents the main findings of the qualitative analysis of data from the interviews conducted with ObGyns at AUBMC. And finally, the sixth chapter discusses the results of this study, its strengths, limitations and ends with a conclusion and recommendations.

CHAPTER II

LITERATURE REVIEW

A. Background

Episiotomy is a widening of the perineum to facilitate childbirth. It is derived from: "the Greek *episton*—pubic region—plus *–tomy*—to cut and is an incision of the pudendum—the external genital organs" (Cunningham, Leveno, Bloom, Spong & Dashe, 2014). An episiotomy is performed during the last part of the second stage of labor (Carroli & Mignini, 2009) and the incision is usually done either using a scalpel or scissors. Many view it as a medically induced laceration done in order to avoid a spontaneous laceration (Pietras & Taiwo, 2012). How did this medical procedure then originate?

The first known record of episiotomy dates back to 1741 (Carroli & Mignini, 2009), it was first described by Sir Fielding Ouldin (Harrison et al., 1984). Since that report, episiotomy was advertised as the "holy grail" of surgical incisions to ease the delivery, prevent trauma to the baby's head, improve post-delivery sexual function, and prevent trauma to the pelvic floor which in turn will prevent uterovaginal prolapse (Carvalho, Souza, & Filho, 2010; Harrison et al.1984). The theory was that increasing the diameter of the vaginal opening surgically would prevent a spontaneous tear of the tissues when there is no proper dilatation. However, here lies the problem - recommendations for episiotomy were based on a "theory". It became one of the most commonly performed surgical procedures worldwide based on theoretical grounds and its use was not backed by strong scientific evidence (Carroli & Mignini, 2009). However, its protective effects for mothers have never been proven.

In maternal health care, a disparity is evident between what the evidence suggests is the best practice and actual clinical practice (Langer, 2002). And routine episiotomy is an example of this disparity. Nonetheless, in the 1980s, with the rise of evidence-based medicine, the practice of episiotomy was being questioned. Thacker and Banta reviewed 350 books and articles on episiotomy and concluded in that research which was published up until 1980 was inadequate to support the benefits of episiotomy (Helewa, 1997). This was followed by a report on "Appropriate delivery techniques" by the World Health Organization (WHO) in 1985 which stated that routine episiotomy was not justified and that a restrictive approach is advised (Pietras & Taiwo, 2002). An important aspect of this report was that the WHO equated an episiotomy with a second degree perineal tear stating that "You cannot talk of perineal protection while at the same time causing its damage" (Pietras & Taiwo, 2002). Finally, the Cochrane collaboration performed a review of available data that was published until 2008 to assess the effects of restrictive episiotomy versus routine episiotomy (Carroli & Mignini, 2009). They concluded that restrictive episiotomy led to fewer severe perineal traumas, in addition to less need for suturing and fewer complications in the healing phase of episiotomy: "The benefit of a restrictive practice outweighs the potential harm" (Carroli & Mignini, 2009). From a practice that was based on theory in the 1800s, two centuries later there are now guidelines by the WHO recommending considering episiotomy in the presence of the following indications only:

> -A vaginal delivery that is complicated by breech presentation or shoulder dystocia;
>
> -A vaginal delivery during which forceps or vacuum extraction is used;
>
> -Fetal distress;
>
> -Scarring from female genital cutting; and/or 3rd or 4th degree lacerations that have not properly healed.
>
> (WHO, 2007)

B. Episiotomy consequences

There is an accumulation of evidence demonstrating that episiotomy can have harmful effects. These range from perineal lacerations and tears, to infections, postpartum hemorrhage, and financial implications (Viswanathan et al., 2005). A report by the WHO found that episiotomy is associated with a higher infection rate and longer healing time in comparison with spontaneous perineal lacerations; it was also found to be associated with a four-fold increase in the incidence of lacerations of the third degree (WHO, 1997).

1. Perineal tears and lacerations

Randomized controlled trials (RCTs) are considered as the "gold standard" in research to demonstrate causality. Two of the largest randomized controlled trials on episiotomy suggest that women who have a routine episiotomy are at increased risk of 3rd and 4th degree lacerations compared to women who are part of a restrictive episiotomy use practice (Helewa, 1997). Several other RCTs have been conducted over the years in multiple countries that look at the association between episiotomy and perineal lacerations, particularly 3rd and 4th degree lacerations.

In a randomized allocation trial in 1994, primigravida patients were allocated to either a routine episiotomy group or a restrictive episiotomy group (Eltorkey et al., 1994). Those who were in the restrictive group had a more intact perineum than their counterparts with an odds ratio of 5.17 ($P < 0.001$) (Eltorkey et al., 1994). Moreover, a randomized controlled trial in the United Kingdom revealed that a liberal practice of episiotomy was not associated with a decrease in urinary incontinence, nor in fetal head damage, nor in severe perineal trauma (Thompson, 1997). Another randomized controlled trial also looked at the risk of 3rd and 4th degree

lacerations in women undergoing routine episiotomy versus those undergoing selective episiotomy. The percentage of lacerations was respectively 14.3% versus 6.8% with a relative risk of 2.12 (Rodriguez et al., 2008).

Retrospective reviews of records of vaginal deliveries are another method through which investigators looked at the association between episiotomy and perineal lacerations.

In a hospital based retrospective study in Nigeria, the authors found that episiotomy was associated with both increased hospital stay and 3rd and 4th degree perineal lacerations (Chigbu et al., 2008). In a review of 8647 deliveries in 1991 and 1992, Hueston found that 17% of those who had an episiotomy had a 3rd or 4th degree laceration, while only 2% of those who did not have an episiotomy had the same outcome ($p<0.001$) (Hueston, 1996).

In a retrospective cohort study in a university-affiliated hospital in Quebec city, the frequency of severed perineal lacerations (3rd and 4th degree) was assessed in women on whom a median episiotomy was performed and those who did not have an episiotomy. Results were significant with 20.6% of women with an episiotomy having a severe perineal laceration and only 4.5% of women who did not undergo an episiotomy having the same outcome (Labrecque et al., 1997).

In another retrospective study which looked at comparing the frequency of 3rd and 4th degree perineal tears in patients with and without episiotomy, it was found that deliveries with an episiotomy had a higher rate of severe perineal tears than those without (Odds Ratio of 2.3, with $p<0.001$) (Steiner et al., 2012). In addition, when adjusting for critical conditions such as shoulder dystocia, instrumental delivery, and macrosomia the adjusted Odds Ratio remained

similar to the crude OR thus suggesting that a routine episiotomy in these conditions may not be beneficial (Steiner et al., 2012).

Finally, in a large scale medical records review by the Consortium of safe labor that covered 19 hospitals in the United States from 2002 to 2008, the investigators looked at risk factors for 3rd and 4th degree lacerations. Episiotomy was found to be a risk factor with 2.4 fold in nulliparous women and 4.4 fold in multiparous women (Landy et al., 2011).

2. Postpartum hemorrhage

Postpartum hemorrhage is another potential complication of episiotomy. Blood loss is expected in vaginal deliveries; however, when the average amount of blood loss is more than 500 ml postpartum hemorrhage is identified (WHO, 2012).

One of the few studies that were done in the Arab region on this issue is one in Qatar that looked at the indications for the use of episiotomy. When comparing the mean blood loss post-delivery between two groups of women, those who underwent an episiotomy lost on average 61 ml more than those who did not undergo an episiotomy ($p<0.001$) (Husic & Hammoud, 2009).

Another study in Argentina and Uruguay looked at risk factors for postpartum hemorrhage. One of the risk factors identified in this prospective cohort study was episiotomy with an adjusted odds ratio of 1.7 (CI 1.15-2.5) (Sosa et al., 2009).

In a study on Vietnamese born women in Australia, the rate of postpartum hemorrhage in women who underwent an episiotomy was 10.6%, as compared to 7.4% for those who did not have an episiotomy (Trinh et al., 2013); and when compared to a natural tear, episiotomy was found to be associated with increased bleeding (Wagner, 1999).

3. Financial implications

Another outcome of episiotomy that is not often addressed is the financial implications. Although it does not directly affect the women undergoing delivery, it does constitute an important factor to consider when considering policies which advocate a restrictive episiotomy approach.

In their study published in 2002, Borghi et al. constructed a decision-tree model to look at the cost-effectiveness of restrictive episiotomy vs routine episiotomy in low risk vaginal deliveries in Argentina. Their conclusion was that a restrictive episiotomy policy was less costly than a policy of routine episiotomy, with a potential reduction of 11.63$ to 20.21$ in provider cost (Borghi et al., 2002).

4. Pain, incontinence, and episiotomy effect on daily activities

Pain, urinary incontinence, and fecal incontinence are other potential consequences of episiotomy. These nonetheless are not immediately apparent after delivery and should be followed up on during the days, weeks and even months following delivery.

A prospective follow-up study in Taiwan assessed pain scores for women at weeks 1, 2, and 6 postpartum. Those who did not have an episiotomy had a lower perineal pain score which was statistically significant at all three intervals (Chang et al., 2011). In addition, at 3 months post-delivery, those who had an episiotomy had a significantly higher urinary incontinence score with p=0.0293 (Chang et al., 2011).

In Turkey, mothers were evaluated at one week post-partum to assess their ability at completing routine daily activities. Statistically significant findings were apparent with more

than one activity. In comparison to women who did not have an episiotomy, women who did have an episiotomy were less able to do chores (32% of women from the episiotomy group faced that problem vs. 13.51% of women from the non-episiotomy group) and were less able to stand up and sit comfortably (72% of women from the episiotomy group faced that problem vs. 45.95% of women from the non-episiotomy group) (Karacam & Eroglu, 2003).

In a secondary cohort analysis performed on participants of a randomized trial, Klein et.al indicated that none of the women with an intact perineum described their pain as "deterring, excruciating, or horrible" (Klein et.al, 1994). On the other hand, 20% to 22% of those who had an episiotomy used those terms to describe their pain (Klein et.al, 1994).

Signorello (2000) conducted a retrospective cohort study in 1996 and 1997 which looked at the effect of episiotomy on fetal incontinence. When compared with women who did not undergo episiotomy but who had a spontaneous laceration, with women who underwent an episiotomy had a threefold higher risk of fetal incontinence at both three months and six months postpartum (CI respectively 1.3-7.9 and 0.7-11.2) (Signorello, 2000). This effect was independent of other potential confounding variables such as maternal age, baby's weight, use of instruments in delivery, and other labor complications.

C. Episiotomy risk factors

With the emergence of evidence-based medicine and the appearance of studies looking at episiotomy practice, multiple risk factors have been found to be associated with this operative procedure. These include: Maternal age, parity, and fetal weight among others.

1. Maternal age

Some studies have found an association between episiotomy rate and both young maternal age and older maternal age. In a retrospective cross-sectional study in 2006, Carvalho, Souza, & Filho found that episiotomy was significantly associated with both adolescence (CI=1.33-2.28) and age > 35 (CI=0.14-0.90).

In another retrospective study in Nigeria over a period of 5 years, out of all the women who delivered vaginally, 45% underwent an episiotomy with a mean age of 24.7 years (Chigbu et al., 2008). While those who did not have an episiotomy had a higher mean age of 28.5 years (Chigbu et al., 2008).

Finally, Hornemann et al. conducted a retrospective case-control analysis on 2,967 deliveries. They found that high grade lacerations were noted in patients who had median and mediolateral episiotomies and that the mothers' age was significantly associated with high grade lacerations (Mean age of 29.29 years, $p<0.05$) (Hornemann et al., 2009).

2. Parity

Parity is another risk factor for episiotomy which has been addressed in multiple studies over the years and in several countries.

In a retrospective cross-sectional study in 2006, Carvalho, Souza, & Filho found that episiotomy was significantly associated with primiparity (CI=3.33-6.71).

In a review of vaginal deliveries in Qatar in 2008, it was noted that as parity increased, episiotomy rates decreased. Rates of episiotomy ranged from 96.8% for para=0 to 25% for

para=3 which is still higher than the justifiable 20% rate recommended by WHO (Husic & Hammoud, 2009).

In a review of vaginal birth in a district hospital, by Jackson & Dunster looked at the parity of women who had an episiotomy and those who did not, and found that 54% of women from the episiotomy group were nulliparous in comparison with 24% in the non-episiotomy group ($p<0.001$) (Jackson & Dunster, 1984).

Another notable study is one done by Lurie et al., in which primiparous women who had a normal delivery were followed in their second delivery and rates of episiotomy in both instances were calculated. It was found that having an episiotomy during the first delivery increased the risk of an episiotomy during the subsequent delivery (OR of 2.84, with $p<0.05$) (Lurie et al, 2012). Essentially, episiotomy was a risk factor for another episiotomy.

In a review of 66,224 vaginal deliveries over a period of 20 years in the United States, primiparity was found to be an independent predictor of episiotomy (8 fold) (Ogunyemi, 2006).

In another review of vaginal deliveries in Nigeria, as parity increased, the episiotomy rate decreased. Rates of episiotomy decreased from 87.4% in para 0 to 15.2% in para 3-4 (Otoide et al., 2000). At the same time, the incidence of spontaneous perineal tears increased with parity: from 5.2% in para 0 to 25.4% in para 3-4 (Otoide et al., 2000). Nonetheless, when compared with perineal tears, episiotomy was found to be associated with an increased risk of wound breakdown which was statistically significant (Otoide et al., 2000).

Finally, a study in Finland questioned midwives and student midwives about the practice of episiotomy at their respective hospitals. Their findings showed that 55% of primiparous women underwent an episiotomy versus 12% of multiparous women ($p<0.001$) (Raisanen et al., 2010).

3. Fetal weight

Fetal weight, particularly a weight which is more than average is also associated with episiotomy. In a review of 66,224 vaginal deliveries over a period of 20 years in the United States, macrosomia (i.e. birth weight of more than 4000 g) was found to be an independent predictor of episiotomy (1.8 fold) (Ogunyemi, 2006).

4. Episiotomy angle

Different types of episiotomy are associated with different outcomes. The two most common angles adopted when performing an episiotomy are the median episiotomy and the lateral episiotomy. While a lateral episiotomy causes an increased risk of blood loss and more pain than a median episiotomy, it does on the other hand protect the anal sphincter muscle and thus does not cause a risk of anal rupture (Pietras & Taiwo, 2012)

In terms of laceration, a midline episiotomy is associated with a greater risk of sphincter (muscular opening) laceration which may raise the risk of fecal incontinence more than mediolateral episiotomy (DeLancey, 2008). In addition, it is essential to note that the incision angle is not the same as the angle after repair. There is a difference of about 15 degrees between the two and it is crucial to note the difference in order to avoid the anal sphincter muscle and thus avoid fecal incontinence (De Lancey, 2008).

In addition, in their study published in 2007, Sooklim et al. compared the outcomes of a midline episiotomy versus those of a medio-lateral episiotomy. Severe perineal tears occurred in 14.8% of women with a midline episiotomy whereas they occurred in 7% of women with a medio-lateral episiotomy (Sooklim et al., 2007).

D. Episiotomy, healthcare providers and the effects of training

In addition to looking at the procedure itself, it is imperative to look at those who are performing this procedure. This becomes even more imperative when no guidelines which guide this practice are being followed.

Gerrits et al. looked at the association between use of episiotomy and the professional status of the delivery attendant. They performed a multiple logistic regression that gynecologists were 3.4 times more likely to perform an episiotomy than midwives (Gerrits et al., 1994).

In his study, Hueston not only looked at episiotomy rates by professional status of the delivery attendant but he also looked at whether episiotomy rates differed with level of training. He did find a moderate difference, as residents performed an episiotomy on 64% of their patients, while attending physicians performed an episiotomy on 61% of their patients ($p=0.02$) (Hueston, 1996).

Henrisken et al. (1994) observed episiotomy practice at a labor ward; and this was followed by feedback to the midwives about their practice and that of their colleagues. Then the authors compared the rates of episiotomy pre and post intervention. The episiotomy rate decreased by 6.6% after the intervention (CI 95% 3.6-9.6) (Henriksen et al., 1994).

Ho et al (2010) looked at episiotomy practice pre and post intervention. After performing a retrospective survey on delivery practice in 4 Southeast Asian countries, they trained the staff through evidence-based practice workshops. Following the training, the rate of episiotomy decreased from 64.1% to 60.1% for all women and from 92.2% to 80.7% for nulliparous women (Ho et al., 2010).

Reynolds et al (1995) conducted an intervention study based on continuous quality improvement program through educational strategies implemented in a tertiary care center in Ontario. These strategies included: "better understanding of appropriate episiotomy rates, ways to reduce maternal exhaustion and fetal distress, and manoeuvers to protect the perineum" (Reynolds, 1995). After the program was implemented, episiotomy rates decreased from 44.5% to 33.3% ($p<0.001$) (Reynolds, 1995). The decrease in the rate was statistically significant in both primiparous women and multiparous women (Reynolds, 1995).

A study published in 2013 looked at midwife-reported reasons for doing an episiotomy in a delivery unit in Singapore. The most common reason was primiparity which was reported by 55.1% of midwives interviewed (Wu et al., 2013) which is not in accordance with international guidelines and recommendations.

Finally, in a study looking at the association between physicians' beliefs and episiotomy practice, women whose physicians had an unfavorable view of episiotomy were more likely to have an intact perineum than other women (23% versus 13%, $p<0.05$), experienced less pain ($p<0.01$) and were more satisfied with the birth experience ($p<0.01$) than women who were attended by physicians who viewed episiotomy favorably (Klein et al., 1995).

E. Episiotomy and consent

Despite the above mentioned evidence describing complications of episiotomy, it has become one of the most commonly performed surgical procedures worldwide (Carroli & Mignini, 2009) and is often performed without the patient's specific consent (Frass & Al-Harazi, 2010). Although episiotomy qualifies as a surgical procedure and thus requires the patient's consent, if information has not been given to the woman prior to delivery it becomes difficult to obtain

consent during the labor itself when the woman is unable to properly process information and a decision to perform an episiotomy should be taken (Frass & Al-Harazi, 2010). Some believe (Enkin et al., 2001) that if women were properly informed of the evidence about the risks associated with episiotomy they would not readily consent to it. Often, patients presenting for delivery are approached for consent to delivery, which includes related procedures, including episiotomy or repair of perineal lacerations.

F. Recommendations

Several international organizations have published recommendations over the years to encourage adopting a restrictive episiotomy approach. Previously mentioned recommendations by WHO identify specific indications that should guide the practice while other organizations mostly advise on desired episiotomy rates that should be reached and a restrictive policy which should be followed.

In their practice bulletin, the American College of Obstetricians and Gynecologists state that the practice of prophylactic episiotomy does not appear to result in either maternal or fetal benefit (ACOG, 2006). It also states that routine episiotomy is not necessary (Graham et al., 2005).

The Royal College of Obstetricians and Gynecologists in the United Kingdom also recommends adopting a policy of restrictive episiotomy (Graham et al., 2005).

In their guide to effective care in pregnancy and childbirth, Enkin et al. (2001) categorize practices in pregnancy and childbirth based on the evidence supporting their effectiveness. They found the following in relation to episiotomy: when episiotomy is necessary, midline versus mediolateral episiotomy is considered as a form of care with a tradeoff between beneficial and

adverse effects; in preterm birth, routine use of episiotomy is a form of care of unknown effectiveness; and finally, liberal or routine use of episiotomy for birth is considered as a form of care that is likely to be ineffective or harmful.

In addition, a systematic review of the outcomes of clinical episiotomy published in 2005 by the American Medical Association stated that no benefits from episiotomy have been found (Hartmann, et al, 2005).

Finally, at the population level, WHO recommends a maximum 10% rate of episiotomy among all normal vaginal births (WHO, 1996) and indicates that a rate greater than 20% among all normal vaginal births is not justifiable by evidence (WHO, 1996).

G. Global and regional episiotomy rates

Episiotomy rates around the world vary greatly. Among primiparous women, they range from 9.7% in Sweden (Graham et al., 2005) to 12% to 15% in the United Kingdom (Macleod & Murphy, 2008) to 100% in Taiwan (Carroli & Mignini, 2009). In developing countries such as Burkina Faso, the rate is 43% for primigravidas, and in Botswana 1 out of 3 women who are having normal delivery have an episiotomy (Butshe, Dyall & Garner, 1998).

Interestingly, in a study done in Australia which looked at obstetric interventions during birth, only 3.8% of Lebanese born women had an episiotomy, second lowest after New Zealand with a 3.6% rate (Dahlen et al., 2013). Another study also done in Australia also found a difference in the rates of episiotomy between Australian-born women with 15.1% and Vietnamese born women with 29.9% (Trinh et al., 2013).

There have been only a few studies about childbirth practices in hospitals in the region. Countries in the Middle East are often importers of new technologies and medical practices. To what extent have these countries adopted the practice of episiotomy despite the recommendations against making it a routine procedure?

One study was found in Lebanon where researchers interviewed healthcare professionals in hospitals in 1997 about obstetric practices and the reported episiotomy rates were found to vary greatly between hospitals from 5 to 100% (Khayat & Campbell, 2000). Among the 39 hospitals included in this study, interviewees in the maternity wards at 16 of these hospitals reported that the rate of episiotomy was generally more than 80% among all women undergoing vaginal delivery. And 46% of the hospitals included in the study reported performing episiotomy on all para 0 women, while 44% of hospitals reported that it is the doctor who takes the decision to perform an episiotomy (Khayat & Campbell, 2000). There were two other studies in the region that replicated this study following 1997. A study in Jordan, for example, found that among the hospitals included in the study, 67% reported practicing routine episiotomy for primiparous women, and 20% reported often undertaking episiotomy for all women (Sweidan, Mahfoud & DeJong, 2008). Another study using the same methods addressed childbirth practices in Jeddah in Saudi Arabia, and found that 45% of governmental hospitals included in the study reported that they practice routine episiotomy in primiparous women (Altaweli, McCourt & Baron, 2014). Another study in Yemen in 2008 found that episiotomy was performed in 75.1% of nulliparous women (Frass & Harazi, 2010).

The Choices and Challenges in Changing Childbirth research network published a paper (2005) summarizing findings from studies based on observed delivery practices in a hospital in Egypt, and on interviews with healthcare professionals in selected hospitals in Lebanon, Syria,

and the West Bank. Findings from Lebanon have been already shared above as part of the original study by Khayat & Campbell. Among the observed deliveries in Egypt, episiotomy was observed among 93% of primiparas, while in the West Bank, on the average, interviewees reported that episiotomy was performed in 78% of primiparas; and in Syria the reported rate of episiotomy was 95% (Choices and Challenges in Changing Childbirth research network, 2005).

Finally, an operational research project in a governmental hospital in the occupied Palestinian territory (Hassan, Sundby, Husseini & Bjertness, 2013) revealed the extent to which this practice is amenable to change. In this study researchers implemented over a period of five years an on-the-job training, as well as audit, feedback, and meetings with staff in a governmental hospital related to delivery practices. They observed a significant ($p< 0.05$) decrease in the rate of episiotomy for first pregnancy from 80% pre-intervention to 39.1% post intervention.

CHAPTER III

METHODS

The study is a mixed-methods study which used both quantitative and qualitative approaches to address the research objectives. The methodological approach of each type of data collection is described consecutively below.

A. Quantitative component

To address the objectives of: determining the overall rate of episiotomy at the hospital and examining the trend over the past 5 years, testing whether maternal age, parity, fetal weight, patient's hospital admission class, and physician's gender are associated with episiotomy, and finally testing whether episiotomy is associated with postpartum hemorrhage and/or third or fourth degree perineal tears; quantitative data analysis was conducted on data collected from the American University of Beirut-Medical Center (AUBMC) as described below.

1. Data collection

A proposal was submitted to the Institutional Review Board (IRB) and approval to access the medical records was granted on January 30, 2015. After getting the IRB approval, we contacted the medical records department at the American University of Beirut Medical Center (AUBMC) and were provided with the list of medical records numbers of all patients who had a normal vaginal delivery from January 2009 until January 2014. Data was collected from the electronic health records (EHR) from a computer connected to the hospital's server. The electronic health records were accessed through the Hospital Information System.

The data collection consisted of a retrospective review of delivery medical records in AUBMC, a university hospital in Beirut, with a rate of 1500 deliveries per year. The review included records from January 2009 until January 2014. Scanning of inpatient charts started in January 2009, thus, it was decided to conduct the review for the past 5 years to guarantee the availability of electronic health records and thus make the search more feasible.

Data was collected on an excel sheet and then imported on the Statistical Package for the Social Sciences (SPSS) for analysis.

2. Sampling

The estimated rate of deliveries in the hospital is around 1500 deliveries/year. The list of medical records numbers that was collected from the medical records department consisted of a total of 2727 normal vaginal deliveries. Out of these 2727 deliveries, 352 cases were either not scanned or had missing documents in their charts which hindered the data collection. Thus, a total of 2375 cases were scanned. Out of the 2375 cases, 619 were excluded.

3. Measures

With episiotomy as an outcome, measures that were collected included the below variables. Patient's hospital admission class was included as a variable which reflects the socio-economic class of the women.

-Episiotomy (Yes=1, No=0)

-Type of episiotomy (Median=1, Mediolateral=2)

-Date of delivery

-Maternal age

-Patient's hospital admission class (Those with private insurance=1, those without private insurance=2)

-Fetal weight

-Physician gender (Male=1, Female=2)

-Parity

-Perineal Tears (No=0, Yes=1)

-Degree of perineal tears (First=1, second=2, third=3, fourth or more=4)

-Postpartum hemorrhage (No=0, Yes=1)

Any patient identifiers (name and case number) or physician identifiers (name or pager number) were omitted from the data collection.

After reviewing the characteristics of the participants in the studies included in the Cochrane review (Carroli & Mignini, 2009), the following inclusion and exclusion criteria were used.

Exclusion criteria:

Only women for whom an episiotomy was not recommended as per WHO guidelines were included in the study. Thus, exclusion criteria included:

-Women who are delivering prior to 37 weeks gestation

-Women who underwent an operational delivery (use of vacuum, forceps, or both)

-Evidence of shoulder dystocia

-Fetal breech presentations

-Evidence of fetal distress, as indicated by: bradycardia, tachycardia, or late decelerations.

In addition, women who were delivering more than one baby were also excluded from the review.

4. Analysis plan

Data was collected on excel and then imported into SPSS. A simple linear regression was performed to assess trends in the rate of episiotomy over time. In this study, episiotomy rate is defined as the percentage of episiotomies among normal vaginal deliveries. Then a univariate logistic regression was performed to test the association between episiotomy and the following variables: Maternal age, patient's hospital admission class, fetal weight, parity, and physician gender. A multivariate logistic regression was then undertaken to identify the final model which shows whether or not there is an association between the above mentioned factors and episiotomy. In addition, a univariate logistic regression was also performed to test whether there is an association between use of episiotomy and post-partum hemorrhage. And finally, crosstabulation (chi-square test) was performed to test the association between: episiotomy and type of tears, type of episiotomy and type of tears, and type of episiotomy and degree of tears. The statistical analysis was performed using SPSS and statistical significance was evaluated at $p<0.05$ level.

5. Ethical considerations

An IRB approval was sought since the study included reviewing medical charts of patients. An expedited review was granted. Patient identifiers such as name and case number were not recorded to ensure patient confidentiality; the same was applied to physician identifiers. Each case was given a number for the sake of the study. Thus, the first case reviewed was coded 1; the second case was coded 2…etc.

B. Qualitative component

To address the objective of exploring the views and perspectives of Obstetrician-Gynecologists at the hospital about the episiotomy practice, interviews were conducted with physicians and the scripts from these interviews were analyzed.

1. Data collection

The application to the IRB was integrated with the one sent for the quantitative component. In addition a topic guide was developed (See Appendix). Two topic guides were developed, one directed towards attendings and the other towards residents. After getting IRB approval, the chairman of the Obstetrics and Gynecology (ObGyn) Department was contacted and informed of the study. Contact information of practicing ObGyn physicians at AUBMC were collected from the ObGyn department webpage. Emails were sent to the physicians as a first line of communication explaining the study and requesting their willingness to be contacted for interview. As per the IRB documents, we were allowed to send emails to the physicians up to four times only. If they agreed to participate they were contacted and a mutually agreed upon time and place was set to conduct qualitative in-depth interviews. Interviews occurred in locations chosen by the physicians. The attending physicians chose their office to have the interview, and the resident chose a conference room in the Obstetrics and Gynecology department. After introducing myself, the aim of the study was explained and oral consent was sought for tape recording the interview. They all agreed to have it recorded. Interviews were conducted in English and transcribed verbatim into a word document immediately after each interview ended. They took around 10 min – 20 min each depending on each physician as some were more expressive while others only gave direct answers to the questions being asked.

2. Sampling

Out of the 25 practicing physicians (attendings and PGY IVs) at the OBGYN department at AUBMC, 4 replied to the email and agreed to participate. I aimed towards a purposive sampling by level of experience (senior vs. junior) and gender. Despite having both senior and junior physicians participating in the study, they were all males as no female physician agreed to participate.

3. Measures

To get a viewpoint on physicians' views and perspectives on performing episiotomy, I had two topic guides to aid in structuring the interviews. The first topic guide was addressed for attendings and the second for residents. They were both similar except for one question addressed to residents which inquired about the amount of influence they believe they have on the decision to perform an episiotomy.

The interviews first began with questions that aimed towards gaining knowledge on each physician's background, i.e. their professional status and medical training. They were then asked about their own practice of episiotomy, this included questions about their views of routine episiotomy, warning signs for impending perineal tears, the decision-making process they follow and their views on the relationship between episiotomies and perineal lacerations. After which, they were asked about their thoughts concerning regulating the practice of episiotomy through informed consents and implementing policies. Finally, they were asked about their outlook on the current practice of episiotomy at the university hospital and in Lebanon.

4. Analysis plan

I undertook a thematic analysis to identify common themes and perceptions that emerged from the in-depth interviews concerning the perspectives of physicians towards episiotomy, the need for consent from women, their views concerning the need for hospital guidelines, and about the current practice. A matrix was constructed to develop themes and sub-themes that emerged from the interviews which were then analyzed for common findings and differences.

5. Ethical considerations

A waiver for a written informed consent was requested and granted by the IRB. An oral consent for the interview and for tape recording during the interview was requested because, given the sensitivity surrounding the practice of episiotomy, it was expected that physicians would be unwilling to share their names in writing for the purpose of the study (even though the names would remain undisclosed).

CHAPTER IV

RESULTS-QUANTITATIVE COMPONENT

In this chapter, the main findings of the analysis of data collected through the electronic health records review are presented. The aim of this analysis is to determine the overall rate of episiotomy at the hospital and examine the trend over the past 5 years, to test whether mother's age, parity, fetal weight, patient's class, patient's level of education, and physician's gender are associated with episiotomy, and finally to test whether episiotomy is associated with postpartum hemorrhage and/or third or fourth degree perineal tears.

A. Sample Description

Tables 1a and 1b summarize the main features of the sample. Table 1a is a general description of the sample, and Table 1b is a description in relation to whether or not episiotomy was performed. After excluding cases which do not fit our inclusion criteria, the sample consisted of records of a total of 1,756 normal vaginal deliveries that took place at the University hospital between January 2009 and January 2014. Of these records, 228 deliveries (13%) occurred in 2009, 380 deliveries (21.6%) occurred in 2010, 407 deliveries (23.2%) occurred in 2011, 374 deliveries (21.3%) occurred in 2012, 337 deliveries (19.2%) occurred in 2013, and only 30 deliveries (1.7%) occurred in 2014 since data collection was for the month of January alone.

Maternal age ranged between 17 and 50 with a mean age of 29.7 years. Of all of the 1.756 cases, 295 women (16.8%) were of advanced maternal age (age≥35 years) at the time of delivery. In terms of hospital admission class, 856 cases (48.7%) were first class patients, 396

(22.6%) were second class patients, and 504 (28.7%) were third class patients. Out of all the records reviewed, 1001 women (57%) were delivered by male physicians, and 755 women (43%) were delivered by female physicians. At the time of delivery, 757 women (43.1%) had a parity of 0, 713 had a parity of 1 (40.6%), 228 (13%) had a parity of 2, 48 (2.7%) had a parity of 3, and 10 women (0.6%) had a parity of 4 or more. Please refer to table 1a for the above sample description.

Table 1a: Description of the sample

Variables	Categories	N	%	Mean	SD
Maternal age	**Age<35 years**	1461	83.2	29.7	4.9
	Age≥35 years	295	16.8		
Fetal weight*	**Weight<4000 g**	1695	96.5	3267.18	386.841
	Weight≥4000 g	57	3.2		
Patient's hospital admission class	**1st class**	856	48.7		
	2nd class	396	22.6		
	3rd class	504	28.7		
Physician gender	**Male**	1001	57		
	Female	755	43		
Parity	**0**	757	43.1		
	1	713	40.6		
	2	228	13		
	3	48	2.7		
	≥4	10	0.6		
Episiotomy	**Episiotomy performed**	1484	84.5		
	Episiotomy not performed	272	15.5		
Type of episiotomy	**Median**	404	27		
	Mediolateral	1080	73		
Perineal tears	**Yes**	332	18.9		
	No	1424	81.1		
Degree of perineal tears**	**Lower degree (1st or 2nd)**	267	80.4		
	Higher degree (3rd, 4th or higher)	58	17.5		
Postpartum hemorrhage	**Yes**	4	0.2		
	No	1752	99.8		
Total Sample	-	1756			

**4 delivery records did not include fetal weight*

***7 delivery records did not include the degree of perineal tears*

In relation to whether or not episiotomy was performed, Table 1b summarizes the sample description. Most of the women on whom data was collected had had an episiotomy. Indeed, out of all the deliveries, 1484 (84.5%) had an episiotomy performed on them, and the remaining 272 women (15.5%) did not have an episiotomy. Mediolateral episiotomy was more frequently performed than median episiotomy. Out of those who had an episiotomy, 404 (27%) had a median episiotomy and 1080 (73%) had a mediolateral episiotomy. Only 3 of the mediolateral episiotomies were left mediolateral, and the remaining cases were right mediolateral. Out of all the delivery cases, 1424 women (81.1%) did not have a perineal tear, while 332 women (18.9%) had a perineal tear. Out of those who had a perineal tear, 267 women (80.4%) had a lower degree tear, i.e. 1st or 2nd degree tear. And 58 women (17.5%) had a higher degree perineal tear, i.e. 3rd degree, 4th degree or more. 7 women (2.1%) did not have the degree of their perineal tear recorded. Finally, only 4 women (0.2%) had post-partum hemorrhage. It is also worth noting that out of the cases which were excluded from the analysis (i.e. those for whom episiotomy was indicated) 89% of them did have an episiotomy.

Table 1b: Description of sample characteristics divided by whether or not episiotomy was performed

		Episiotomy					
		No			Yes		
		Count	Mean	Column %	Count	Mean	Column %
Maternal age			30.1			29.7	
Fetal weight			3235			3273	
Physician gender	**Male**	164		60.3		837	56.4
	Female	108		39.7		647	43.6
Parity	**0**	7		2.6	750		50.5
	1	183		67.3	530		35.7
	2	66		24.3	162		10.9
	3	13		4.8	35		2.4
	4 or more	3		1.1	7		0.5
Patient's hospital admission class	**1**	130		47.8	726		48.9
	2	52		19.1	344		23.2
	3	90		33.1	414		27.9
Perineal tears	**Yes**	212		77.9	120		8.1
	No	60		22.1	1364		91.9
Degree of perineal tears	**0**	61		22.4	1370		92.3
	Lower degrees (1st and 2nd)	205		75.4	62		4.2
	Higher degrees (3rd, 4th or more)	6		2.2	52		3.5
Post-partum Hemorrhage	**Yes**	0		0	4		0.3
	No	272		100	1480		99.7

B. First research objective: Determining the overall rate of episiotomy at the hospital and examining the trend over the past 5 years

I did a crosstabulation of episiotomy by year to look at the trend of Episiotomy practice over the 5 years that included in the data collection (2009 to 2013) in addition to the month of January in the year 2014. The analysis included all 1756 delivery cases. Please refer to Graph 1 and Table 2 for data on the overall rate of episiotomy at the hospital and the trend over the past 5 years.

- In the year 2009, 97.4% of patients had an episiotomy,
- In the year 2010, 93.2% of women had an episiotomy,
- In the year 2011, 86.7% of women had an episiotomy,
- In the year 2012, 76.7% of women had an episiotomy,
- In the year 2013, 73.0% of women had an episiotomy,
- And finally, in January 2014, 73.3% of women had an episiotomy.

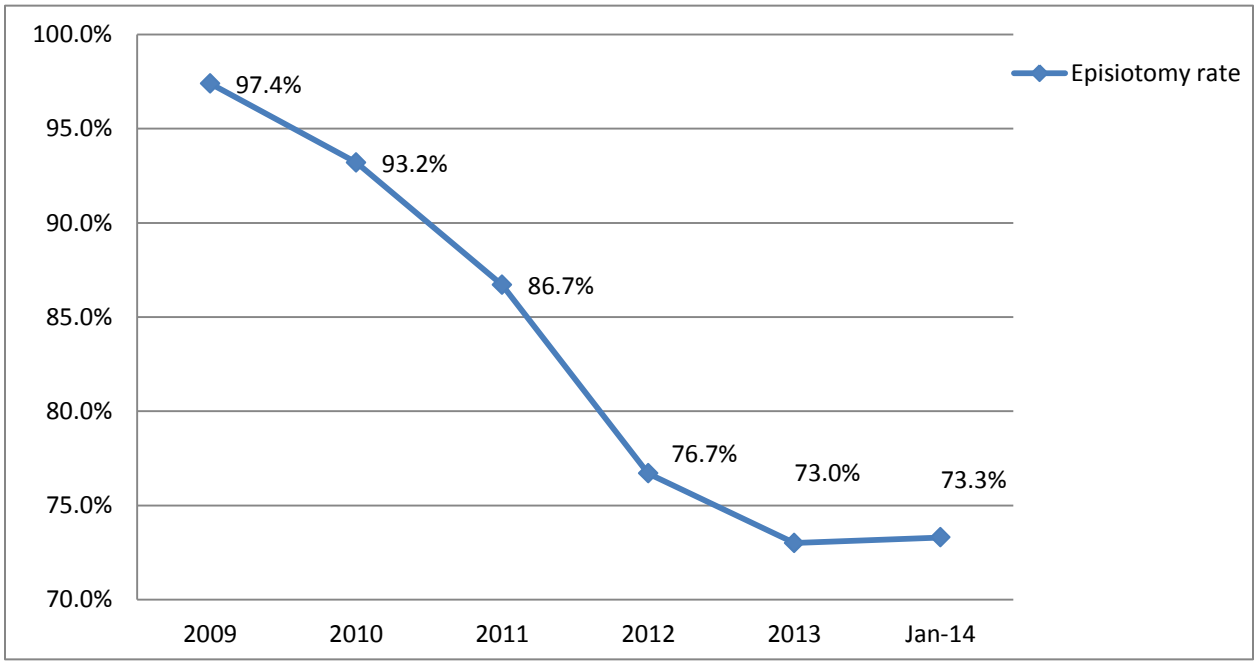
These results show a steady decrease in the rate of episiotomy by around 24% in the space of 5 years. Indeed, the proportions for year 2011 were significantly different from those of years 2009 and 2010 and from those of years 2012, 2013, and 2014 at $\alpha=0.05$. In addition, rates for years 2012, 2013, and 2014 were statistically different from those of years 2009 and 2010 at $\alpha=0.05$.

Thus, our finding did show a significant decrease in the rate of episiotomy at the hospital over the past 5 years and a current rate of 73.3% as compared to the 97.4% rate in 2009.

Table 2: Cross-tabulation of Episiotomy by year of delivery

			Year						Total
			2009	2010	2011	2012	2013	January 2014	
Episiotomy	Yes	N	222	354	353	287	246	22	1484
		% within each year	97.4%	93.2%	86.7%	76.7%	73.0%	73.3%	84.5%
	No	N	6	26	54	87	91	8	272
		% within each year	2.6%	6.8%	13.3%	23.3%	27.0%	26.7%	15.5%
Total cases		Count	228	380	407	374	337	30	1756
		% within Year	100%	100%	100%	100%	100%	100%	100%

Graph 1: Episiotomy rate among normal vaginal deliveries, 2009-2014



C. Second research objective: Testing whether mother's age, patient's class, fetal weight, physician's gender, and parity are associated with episiotomy

1. Univariate logistic regression and unadjusted associations

In this section, the results of the unadjusted association between the outcome "Episiotomy" and several independent variables are presented. The univariate analysis was conducted to determine the eligible covariates from among maternal age, hospital admission class, fetal weight, physician's gender, and parity to be considered in the full model that would best predict the outcome of interest, episiotomy. Table 3 shows the Unadjusted Odds Ratio (OR) calculated at the binary level with a significance level of α=0.05.

a. Episiotomy and maternal age

With Episiotomy as the main outcome, a binary logistic regression was performed first with age as a continuous variable. For every one year increase in age, the odds of having an episiotomy were found to be 0.981 that of not having an episiotomy. However, this result was not statistically significant (p-value=0.142; 95%CI= 0.955, 1.007).

Another binary logistic regression was performed after categorizing age into two categories. Category 1 included women who were less than 35 years of age at the time of delivery, and category 2 included women who were of advanced maternal age at the time of delivery, i.e. ≥35 years. It was found that the odds of having an episiotomy for women who were of advanced maternal age, i.e. ≥35 years (category 2) was 1.337 times those who were less than 35 years of age (category 1). Nonetheless, this increase in odds was not statistically significant (p-value=0.126; 95%CI=0.988; 1.938).

b. Episiotomy and patient's hospital admission class

Patients' hospital admission class was also categorized into two categories. Category 1 included patients with a private insurance, i.e. of 1st and 2nd class; category 2 included 3rd class patients who did not have a private insurance. A binary logistic regression was performed with episiotomy as an outcome. It was found that the odds of having an episiotomy for 3rd class patients (category 2) were 0.782 that of 1st and 2nd class patients (category 1). This result, however, was not statistically significant (p-value=0.082; 95%CI=0.593, 1.032).

c. Episiotomy and fetal weight

With episiotomy as the main outcome, a binary logistic regression was first performed with fetal weight as a continuous variable. Fetal weight as a continuous variable was found not to have an effect on episiotomy (OR=1). The results were nonetheless not significant (p-value=0.132; 95%; CI=1, 1.001).

Fetal weight was then categorized into two categories. The first category included fetal weight <4000 g and the second category included fetal weight ≥4000 g (i.e. macrosomia babies). The odds of having an episiotomy for women delivering babies≥4000 g was found to be 0.958 that of women delivering babies<4000 g. However, the result was not significant with (p-value=0.909; 95%CI=0.464, 1.979).

Indeed, the mean fetal weight was 3273g for women who had an episiotomy and 3235g for women who did not have an episiotomy, thus proving that there was no statistically significant difference between the two groups.

d. Episiotomy and physician's gender

With Episiotomy as the main outcome, a binary logistic regression was performed with physician's gender as an independent variable. The odds of having an episiotomy for women being delivered by a female physician was 1.174 that of women being delivered by a male physician. The increase in odds however was not statistically significant (p-value=0.234; 95%CI=0.902, 1.528).

e. Episiotomy and parity

Parity was divided into 5 different categories: Para 0, Para 1, Para 2, Para 3, and Para≥4. A binary logistic regression was performed with episiotomy as the main outcome. It was found that the odds for all levels of parity were statistically significant: The odds of having an episiotomy for para 1 patients was 0.027 that of para 0 patients (p-value<0.0001; 95%CI=0.013, 0.058). The odds of having an episiotomy for para 2 patients was 0.023 that of para 0 patients (p-value<0.0001; 95%CI=0.010, 0.051). The odds of having an episiotomy for para 3 patients was 0.025 that of para 0 patients (p-value<0.0001; 95%CI=0.009, 0.067). And finally, the odds of having an episiotomy for para≥4 patients was 0.022 that of para 0 patients (p-value<0.0001; 95%CI=0.005, 0.102).

Thus, after performing the analysis at the univariate level, the covariates that presented with a p-value less than or equal to 0.2 were considered eligible to be included in the multivariate logistic regression. These covariates are all of the above variables (maternal age, patient's hospital admission class, fetal weight, and parity) except for the covariate physician gender. In addition, physician gender was not a variable that was had identified in the literature and thus it was not included in the multivariate logistic regression analysis. Parity was the only covariate

which showed statistical significance at the univariate level, with the odds of having an episiotomy decreasing as parity increased. The remaining covariates were not significant at the univariate level but were eligible to be included in the final model. For the covariate maternal age, it was found that the odds of having an episiotomy decreased with every one year increase in age. However, when maternal age was categorized into advanced age (≥35 years) and <35 years, going from the first category to the next, the odds of having an episiotomy increased. For the covariate patient's hospital admission class, the odds of having an episiotomy for 3rd class patients was less than that of 1st and 2nd class patients. And finally, for the covariate fetal weight, no effect was seen with fetal weight as a continuous variable. However, when fetal weight was categorized into ≥4000 g and <4000 g, the odds of having an episiotomy decreased going from the first category to the next.

Table 3: Univariate logistic regression analysis of the outcome (episiotomy) and other covariate with unadjusted ORs

Variables	Unadjusted OR	P-value	95%CI
Maternal age(continuous)	0.981	0.142	0.955-1.007
Maternal age (categorical)	1.337	0.126	0.922-1.938
Patient's hospital admission class	0.782	0.082	0.593-1.032
Fetal weight(continuous)	1	0.132	1-1.001
Fetal weight (categorical)	0.958	0.909	0.464-1.979
Physician gender	1.174	0.234	0.902-1.528
Parity		*<0.0001*	
Para 1	0.027	*<0.0001*	0.013-0.058
Para 2	0.023	*<0.0001*	0.010-0.051
Para 3	0.025	*<0.0001*	0.009-0.067
Para 4 and above	0.022	*<0.0001*	0.005-0.102

2. Multivariate logistic regression model

As previously mentioned, all of the above mentioned variables, except for physician gender, were eligible to be included in the final model since they had a p-value<0.2. For the variables age and weight, they both showed eligibility to be included in the model when evaluated as either continuous variables or as categorical variables. Thus, several models were tested and the final model included the below variables. Table 4 summarizes the results of the multiple logistic regression model included below.

-Patient's hospital class

-Fetal weight (continuous variable)

-Parity

-Maternal age (categorical variable)

a. Maternal age

Adjusting for the effect of the other variables in the model, mother's age was significantly associated with the main outcome episiotomy. It was found that the odds of having an episiotomy for mothers of greater than or equal to 35 years of age is 2.536 that of mothers of less than 35 years of age (p-value<0.001; 95%; CI=1.676, 3.836).

b. Fetal weight

Adjusting for the effect of other variables in the model, fetal weight was found to be significantly associated with the main outcome episiotomy. For every one gram increase in fetal weight, the odds of having an episiotomy were found to be 1.001 that of not having an episiotomy (p-value=0.002; 95%CI=1, 1.001).

c. Patient's hospital admission class

Adjusting for the effect of other variables in the model, patient's class was not significantly associated with the main outcome episiotomy. The odds of having an episiotomy for 3rd class patients was 0.775 that 1st and 2nd class patients (category 1) (p-value=0.1; 95%; CI=0.571, 1.051).

d. Parity

Adjusting for the effect of other variables in the model, parity was significantly associated with the main outcome episiotomy. The odds of having an episiotomy for para 1 patients was 0.024 that of para 0 patients (p-value<0.0001; 95%CI=0.011, 0.052). The odds of having an episiotomy for para 2 patients was 0.017 that of para 0 patients (p-value<0.0001; 95%CI=0.007, 0.038). The odds of having an episiotomy for para 3 patients was 0.014 that of para 0 patients (p-value<0.0001; 95%CI=0.005, 0.0038). And finally, the odds of having an episiotomy for para≥4 patients was 0.009 that of para 0 patients (p-value<0.0001; 95%CI=0.002, 0.044).

In summary, our final model maintained the statistically significant association between parity and episiotomy adjusting for the effect of maternal age, fetal weight, and patient's hospital admission class. In addition, it showed statistically significant association between maternal age and episiotomy adjusting for the effect of parity, fetal weight, and patient's hospital admission class. It also showed a statistically significant association between fetal weight and episiotomy adjusting for the effect of parity, maternal age, and patient's hospital admission class. The latter was the only covariate which didn't show significant association in our model. In the model, the odds of having an episiotomy increased by 1.001 with every 1 gram increase in fetal weight and

increased by 2.536 going from mothers who were less than 35 years of age to mothers≥35 years of age. On the other hand, the odds of having an episiotomy decreased when parity increased.

Table 4: Multivariate logistic regression analysis of the outcome (episiotomy) and other covariates with adjusted ORs

Variables	Adjusted OR	P-value	95% CI
Maternal age (categorical)	2.536	*<0.0001*	1.676 - 3.836
Patient's hospital admission class	0.775	0.1	0.571 - 1.051
Fetal weight (continuous)	1.001	*0.002*	1 - 1.001
Parity		*<0.0001*	
Para 1	0.024	*<0.0001*	0.011 - 0.052
Para 2	0.017	*<0.0001*	0.007 – 0038
Para 3	0.014	*<0.0001*	0.005 - 0.038
Para 4 and above	0.009	*<0.0001*	0.002 - 0.044

D. Third research objective: Testing whether episiotomy is associated with postpartum hemorrhage and/or third or fourth degree perineal tears.

In this section, the results of the unadjusted association between the outcomes post-partum hemorrhage, type of tears, and degree of perineal tears and the independent variables episiotomy and type of episiotomy are presented. Tables 5, 6, 7 and 8 summarize the results of this analysis calculated at the binary level at α=0.05.

1. Episiotomy and postpartum hemorrhage

With postpartum hemorrhage as the main outcome, a univariate logistic regression was performed with episiotomy as the independent variable. The odds of having postpartum hemorrhage for patients who had had an episiotomy were 4366148.077 that of patients who did not have an episiotomy. The results nonetheless were not significant (p-value=0.995; 95%;

CI=0.000, ∞) keeping in mind that only 0.2% of the sample had postpartum hemorrhage. The results of this analysis are presented in Table 5.

Table 5: Unadjusted Odds Ratio of post-partum hemorrhage

Variable	Unadjusted OR	P-value	95%CI
Post-partum Hemorrhage	4366148.077	0.995	0-∞

2. Episiotomy and perineal tears

Cross-tabulation analysis was first performed for the two variables episiotomy and type of tears. The following results are summarized in Table 6. Out of all the women who did not have an episiotomy, 77.9% had a perineal tear and 22.1% did not have a perineal tear. On the other hand, out of all the women who did have an episiotomy, 8.1% had a perineal tear and 91.9% did not have a perineal tear. The differences between the two groups were significant at α=0.05 level.

Table 6: Count and percentage of perineal tears in relation to whether or not episiotomy was performed

			Episiotomy		Total cases
			Yes	No	
Tears	Perineal tears	N	120	212	332
		% of tears within episiotomy cases	8.1%	77.9%	18.9%
	No perineal tears	N	1364	60	1424
		%of no tears within episiotomy cases	91.9%	22.1%	81.1%
Total cases		N	1484	272	1756
		Total %	100%	100%	100%

The results of a cross-tabulation analysis of the two variables type of episiotomy and type of tears are summarized in Table 7. Episiotomy was categorized into category 1 “median” and category 2” mediolateral” and women who did not have an episiotomy were excluded from the analysis. Out of all the women who had a median episiotomy, 3.1% had a perineal tear and 86.9% did not have a perineal tear. Out of all the women who had a mediolateral episiotomy, 6.2% had a perineal tear, and 93.8% did not have a perineal tear. The difference between the two categories was also significant at α=0.05.

Table 7: Perineal tears in relation to episiotomy type

			Type of Episiotomy		Total
			Median	Mediolateral	
Tears Type	Perineal tears	N	351	1013	1364
		% of perineal tears within episiotomy type	3.1%	6.2%	8.1%
	No perineal tears	N	53	67	120
		% of no tears within episiotomy type	86.9%	93.8%	91.9%
Total		N	404	1080	1484
		Total %	100%	100%	100%

Finally, cross-tabulation was performed to look at the relationship between degree of perineal tears as the outcome and type of episiotomy as the independent variable. The following results are summarized in Table 8. Out of all the women who did not have an episiotomy, 97.2% had a lower degree perineal tear (i.e. 1st or 2nd degree), and only 2.8% had a higher degree perineal tear (i.e. 3rd, 4th or higher). Out of all the women who had a median episiotomy, 45.1% had a lower degree perineal tear, and 54.9% had a higher degree perineal tear. And finally, out of all the women who had a mediolateral episiotomy, 61.9% had a lower degree perineal tear, and 38.1% had a higher degree perineal tear. At α=0.05, This difference was statistically significant between those who did not have an episiotomy on one hand, and those who did have an episiotomy on the other and between those who did not have an episiotomy and those who had a mediolateral episiotomy on one hand, and those who had a median episiotomy on the other.

Table 8: Association between type of episiotomy performed and degree of tears

			Type of Episiotomy			Total
			No episiotomy	Median	Mediolateral	
Tears Degree	Lower degree tears (1st and 2nd degree)	N	205	23	39	267
		% of type of episiotomy within lower degree tears	76.8%	8.6%	14.6%	100%
		% of lower degree tears in relation to type of episiotomy	97.2%	45.1%	61.9%	82.2%
	Higher degree tears (3rd, 4th and more)	N	6	28	24	58
		% of type of episiotomy within higher degree tears	10.3%	48.3%	41.4%	100%
		% of higher degree tears in relation to type of episiotomy	2.8%	54.9%	38.1%	17.8%
Total		N	211	51	63	325
		% within degree of tears	64.9%	15.7%	19.4%	100.00%
		% within type of episiotomy	100.00%	100.00%	100.00%	100.00%

In summary, below are our findings for our third research objective. No association was found between post-partum hemorrhage and episiotomy. When looking at the association between perineal tears and episiotomy, it was found that the percentage of perineal tears was higher in patients who did not have an episiotomy than in those who had an episiotomy. Thus, patients who had an episiotomy had a lower risk of having perineal tears. However, patients with higher degree perineal tears were more likely to have had an episiotomy. Mediolateral episiotomies were more common than median episiotomies and patients with median episiotomies had more perineal lacerations than patients with mediolateral episiotomies. In addition, patients with a median episiotomy were more at risk for higher degree perineal tears than mediolateral episiotomies.

In conclusion, the main findings of the analysis of the data collected through the electronic health records review showed that although the current rate of episiotomies at the hospital is 73.3%, there has been a significant decrease in the rate over the past 5 years. In addition, I present a model which illustrated a significant association between episiotomy and parity (the odds of having an episiotomy decreased when parity increased) between episiotomy and maternal age (the odds of having an episiotomy for mothers who were of greater than or equal to 35 years of age was 2.536 that of mothers who were less than 35 years of age) , and between episiotomy and fetal weight (the odds of having an episiotomy increased by 1.001 with every 1 gram increase in fetal weight). And finally, when it came to outcomes, post-partum hemorrhage was not found to be associated with episiotomy; perineal lacerations were found to be more common in patients who did not have an episiotomy, and when the types of episiotomies was compared, patients with a mediolateral episiotomy had a higher percentage of perineal tears when compared to patients with a median episiotomy. However, when the degree of perineal tears was analyzed, it was found that patients who had an episiotomy were more at risk to have higher degree tears than patients who did not have an episiotomy. In addition, patients with a median episiotomy were more at risk of perineal lacerations and of higher degree perineal tears than mediolateral episiotomies.

CHAPTER V

RESULTS–QUALITATIVE SECTION

In this chapter, the main findings of the qualitative analysis of data from the interviews conducted with ObGyns at AUBMC are presented. The aim of these interviews is to explore the physicians' views and perspectives on episiotomy practice.

A. Sample Description

A total of 25 physicians from the university hospital were approached during the recruitment session through emails describing the study and inviting them to contact the study coordinator, if interested, to be interviewed. Emails were sent weekly for a period of one month. Only 4 of these physicians replied to the emails and agreed to set up an interview. They were all male but had different levels of experience. They will not be referred to by their real names to maintain confidentiality. Interviews were conducted at a time, date and location of their choosing and they all agreed to have the interviews voice recorded. The 4 physicians were as follows:

Dr. Karim is a resident at the university hospital; his interview took 12 min and was conducted in a conference room in the ObGyn department. Dr. Samer is a senior practicing attending; his interview took 15 min and was conducted in his clinic. Dr. Firas is a junior attending; his interview took 10 min and was conducted in his office. And finally, Dr. Toufic is a senior attending who no longer performs surgeries and/or deliveries but still treats patients; his interview took 20 min and was conducted at his clinic.

B. Retrieved themes

1. The whys and hows of performing an episiotomy

a. Episiotomy vs. lacerations

When asked whether they prefer to perform an episiotomy over a second degree laceration, three of the interviewed physicians stated that they prefer to perform an episiotomy. Two of them said that having a clean surgical cut is preferred since a laceration is rough and cannot be controlled like an episiotomy since it will extend by itself. Dr. Karim, resident, said that he does an episiotomy prophylactically for all primiparas since they will have a laceration, regardless.

> *"I am not afraid of second degree lacerations, but I am more afraid of this laceration extending if there wasn't an episiotomy" Dr.Karim (Resident)*

Nonetheless, Dr. Samer, senior attending, stated that sometimes a 4th degree perineal tear may occur if the episiotomy is not done properly. Dr. Firas, junior attending, was the only one who said that he prefers a spontaneous tear over an episiotomy stating that the evidence supports this practice. As he stated:

> *"[a spontaneous tear] is less painful, and probably better for the perineum, it's more difficult to repair but there is probably less blood loss and probably less pain afterwards." Dr.Firas (Junior attending)*

b. Types of episiotomy:

Three of the interviewed physicians stated that mediolateral episiotomies are better than median episiotomies at preventing 3rd and 4th degree lacerations since they allow for keeping away from the anus and the rectum and preventing extension to those parts. Dr. Firas, junior

attending, also stated that he believes most physicians at the university hospital lean towards mediolateral episiotomies rather than median episiotomies.

c. Signs of impending tears:

When asked about what they considered were signs of impending perineal tears, physicians' answers were mostly consistent. Three physicians (a resident, a junior attending, and a senior attending) cited a short perineum as a sign of an impending tear. Two physicians (a resident and a senior attending) cited a big baby as a sign of an impending tear. One physician mentioned the amount of stretching as the only sign for an impending tear. And finally, Dr. Firas, junior attending, referred to three signs which are consistent with the WHO's recommendations on when is episiotomy advised to prevent impending tears.

> *"…expecting shoulder dystocia, or if the baby's position is Occiput Posterior, these are mainly the indications and of course when we're doing operative delivery i.e. forceps or vacuum" Dr.Firas (Junior attending)*

d. Understandings of a "Big baby":

During the interviews, three physicians (a resident, a senior attending, and a junior attending) stated that a "big baby" was one of the reasons they considered for performing an episiotomy. When asked on what they considered was a big baby, their definitions of a big baby were not 100% consistent. One physician said that the baby should be more than 3.5 kg; one physician said that the baby should be more than 4 kg, and finally one physician said that a big baby is more than 3.5 kg, and that everyone agrees that 4 kg is a big baby.

e. Physicians 'decision making process about episiotomy:

When asked about the decision making process they follow when performing an episiotomy, the physicians had very varying answers. They ranged from choosing to perform it prophylactically on all women to restricting it to when needed only. Indeed, Dr. Firas, junior attending, said that he restricts it to when there is an impending tear or another emergency. Dr. Karim, resident, said that he definitely assesses the perineum first to check whether the woman lacks introitus* or not. Although he mentioned that he leans more towards performing an episiotomy, Dr. Samer, senior attending said that he believes that:

> *"…the truth lies in between. It is neither that an episiotomy ought to be done even if the head is going out very easily nor trying to avoid an episiotomy at any cost. For me the standards of practice lie in between" Dr. Samer (Senior attending)*

Finally, Dr. Toufic, senior attending, stated that he used to do episiotomies on all of his patients, even on their 4th or even 6th pregnancy because he believes episiotomy should be done routinely.

f. Senior vs. junior physicians' influence on the practice of episiotomy:

In the topic guide aimed towards residents, there was a specific question inquiring about how much influence they believe they have on the decision making process when performing episiotomy. Dr. Karim, the only resident who was interviewed, said that he believes he has 20% influence. The differences between senior and junior physicians also came up in other interviews. Dr.Firas, junior attending, said that, unlike junior physicians, senior physicians at the hospital do prophylactic episiotomies. Dr.Toufic, senior attending, also said that the residents and junior attendings recommend doing an episiotomy to primis only. And finally, in follow up to his answer on how much influence he believes he has, Dr. Karim, resident, stated that indeed senior physicians have higher rates of episiotomies, but one cannot ignore their years of experience.

**Vaginal opening*

2. Training vs. evidence

a. Impact of medical training:

The impact of the training that each physician had received was very apparent in their approach towards episiotomy. Although they all went to the same medical school, their residency training had the most effect on their practice, even decades later. Although he agreed that mediolateral episiotomies are better in order to prevent 4th degree lacerations, Dr. Firas, junior attending, said that he: "goes for median because this is how I got trained and it is easier to repair". Dr. Samer, senior attending, stated that during his training, it was almost a routine to have an episiotomy. And finally, Dr. Toufic, senior attending confirmed that during his training episiotomy was a must and all women who came to deliver would have an episiotomy, even if it was their 3rd or 4th delivery.

> *"Let me tell you a joke. Where I trained, a woman came and delivered, it was spontaneous, we didn't have time to take care of her, she delivered without an episiotomy, without needing anything, and one of the students asked are you going to do an episiotomy now? Because it was a taboo to deliver somebody without an episiotomy." Dr. Toufic (Senior attending)*

b. The need to adapt evidence-based practice to local context:

Although some physicians did not fully agree with the current approach of avoiding routine episiotomies that is being followed at the hospital, they all agreed that changes have been taking place in the past few years. Dr. Firas, junior attending, said that the current practice is pretty much evidence-based and that most physicians do episiotomy when medically indicated only. Although Dr. Samer, senior attending, believes that episiotomy should be a routine practice in certain cases, he did agree that things are changing and the trend now is to move away from episiotomy and decrease its incidence. Finally, Dr. Karim, resident, said that the practice should

be indeed evidence-based; and that he is aware that the newest recommendations advise avoiding episiotomy. However, he said that not all studies can be applied in our country and evidence should be proved to be applicable in our country as well before it is adapted.

> *"We cannot apply each study that is being done in other countries. We need studies in our country which prove to me that episiotomy is not decreasing the risk of lacerations, and then I would say that yes I might shy away from episiotomies and only perform it on selected cases." Dr. Karim (Resident)*

3. Views concerning the regulation of the practice of episiotomy

a. Implementing policies:

Physicians were asked on what their views were towards implementing policies that guide the practice of episiotomy. Interestingly, they had very conflicting opinions towards this issue. Junior physicians were much more supportive and receptive of the idea:

> *"I am 100% with having a policy" Dr. Karim (Resident)*

> *"I don't think we have a policy for this, […], especially in a big place like here. You have to have policies, especially in a teaching hospital you have to have a policy to be uniform among everybody" Dr. Firas (Junior attending)*

On the other hand, senior physicians were less approving of the idea of having policies guiding the practice. Dr. Toufic, junior attending, believes that guidance for the practice should come from the attending. And Dr. Samer, senior attending, was also against having a policy for episiotomy saying that:

> *"You cannot put rigid rules in medicine, especially in issues like an episiotomy. We should be more malleable […]. I think some things should be left to the discretion of the obstetrician." Dr. Samer (Senior attending)*

b. Informed consent for episiotomy:

Physicians were also asked about what their views were towards having an informed consent that is specific to episiotomy. Their answers were consistent with their individual views towards implementing policies. Although junior physicians did not specify the need for having an informed consent only for episiotomy, they did say that it is already included in the informed consent for the normal vaginal delivery and that it should be explained to the woman beforehand that she might need an episiotomy. Senior physicians on the other hand completely opposed the suggestion:

> *"I am against that, of course I'm against that" Dr.Samer (Senior attending)*
>
> *"This is ridiculous. If you find that the patient is going to lacerate then why wait to make her sign a paper that you can do an episiotomy" Dr. Toufic (Senior attending)*

c. Women's involvement in childbirth decisions:

Several physicians spoke about whether they feel women should have a say or not in the decision making process for episiotomy. One physician, Dr.Firas, junior attending, said that it is essential to have policies not only because they will guide the practice for the physicians, but they are important for women as well since they would have the opportunity to be provided with better care. Interestingly, both senior physicians who were interviewed did not approve of having women participate in the care being provided to them during delivery.

> *"I think this is ridiculous, when the patient comes to you to deliver she knows that you are an expert and if she needs any procedure […] she is in good hands" Dr. Toufic (Senior attending)*
>
> *"Democracy is very nice in politics but sometimes in medicine it doesn't work" Dr. Samer (Senior attending)*

4. Current state of episiotomy in the hospital and in Lebanon

a. Current condition at the university hospital

All of the interviewed physicians agreed that the rates of episiotomy at the hospital have been decreasing. However they had different opinions about this change. Dr. Karim, resident, stated that the reason behind that change is the recommendations of the chairman in addition to the studies that are being shared which recommend avoiding episiotomies because they do not decrease the risk of lacerations. Dr. Samer, senior attending, also said that the practice of episiotomy has been changing at the hospital, as he believes the trend recently is to try to avoid any operative delivery. Finally, when talking about the new approach towards the practice, Dr. Toufic, senior attending, said that:

> *"Unfortunately, they are not getting enough training now. […] it is unfortunate that the new generations are not getting trained in operative obstetrics" Dr. Toufic (Senior attending)*

b. Practice in Lebanon:

In response to a question in the interview on the practice of episiotomy in Lebanon, the responses of the physicians on the subject were not consistent. Dr. Firas, junior attending, said that he believes most physicians do prophylactic and routine episiotomies in Lebanon. Dr. Toufic, senior attending, on the other hand said that he believes the practice in Lebanon is the same as that in the university hospital; the trend is not to do an episiotomy. Finally, Dr. Samer, senior attending, expressed his disapproval of the current practice of medicine in the country.

> *"Unfortunately the practice of medicine in Lebanon leaves a lot to be desired; it is mostly because of the lack of regulations that cover the practice of medicine. Doctors, physicians, and hospitals in Lebanon in general are left to practice with only God and their conscience governing them, and there are some physicians actually who do not pay much attention neither to God nor to their conscience" Dr. Samer (Senior attending)*

C. Reflections

One of the main observations that emerged from these interviews is the extent of differences between senior physicians and junior physicians. Although they all seemed knowledgeable about the latest recommendations and evidence-based practice, their opinions seemed to be more related to their residency training. Differences were also evident in the format of the interview itself. Senior physicians chose to have it in their offices in a formal setting, while junior physicians had a more casual approach and one of these interviews was held in the Obstetrics unit at the hospital with nurses and other healthcare providers present. Senior physicians were also more prone to give lengthy and descriptive answers, often citing examples from their own experience, while junior physicians gave more to-the-point answers and tended to cite the evidence rather than their experience. None of the physicians had questions about either the study or the topic guide and they all agreed to have the interview voice recorded.

In summary, although our sample consisted of only 16% of the current total number of practicing ObGyns at the hospital, we did have some interesting and varied responses from the physicians whom we were able to interview. In terms of avoiding lacerations, most preferred episiotomy over lacerations, even if they were second degree lacerations. And most of them preferred a mediolateral episiotomy over a median episiotomy Senior physicians were more prone to perform episiotomy prophylactically unlike junior physicians who cited the evidence more as a point of reference. Nonetheless, they all had mostly common answers when asked about impending signs of perineal tears. One of the signs they mentioned is having a "big baby". Although it was a common issue amongst them, they did not convey the same definition. Discrepancies between senior and junior physicians were also apparent in other issues. Senior physicians were more reluctant to involve women in childbirth decisions, and they were less

supportive of having informed consents for performing episiotomy and implementing policies to guide the practice. The effect of medical training was apparent on all the physicians interviewed, even if it dated from multiple decades ago. Finally, regardless if they approve of the current state of episiotomy at the hospital, they all agreed that the practice is indeed changing. On the other hand, their views about the practice in Lebanon were inconsistent as some stated that they are following the same approach as AUBMC, while others thought that a more prophylactic and less regulated practice is the norm.

CHAPTER VI

DISCUSSION

In this chapter the findings of both the analysis of data collected through the electronic health records review and the findings of the qualitative analysis of data collected from the interviews conducted with ObGyns at the university hospital are discussed. This discussion aims at understanding the findings and linking the quantitative analysis and the qualitative analysis to each other and to the literature.

A. Findings

1. Rates of episiotomy and trends in the university hospital and in Lebanon

a. Rates and trend in the university hospital over the past 5 years

Both the analyses of the data from the electronic health records and the physicians' comments during our interviews with them revealed that there have indeed been changes in the episiotomy trend at the university hospital. In fact, we did note a significant decrease of around 24% in the rate of episiotomy over the past 5 years from 97.4% to 73.3%. And in our interviews with the physicians, they all agreed that the rates of episiotomy at the hospital have been decreasing. One of the interviews (Dr.Karim, resident) attributed this change to the recommendations of the Chairman of the ObGyn department. Interestingly, when taking a closer look at the yearly trends, the biggest decrease in the rate of episiotomy is of 10% from the year 2011 to the year 2012; and the new Chairman who did not respond to the researcher and therefore was not interviewed was appointed to the department in 2011. Dr.Karim, resident, also said during the interview that studies which recommend avoiding episiotomies are being shared

in the department. In fact, more than one study in the international literature on episiotomy showed the effect of sharing the latest evidence and recommendations on decreasing episiotomy rates. For example, after giving staff an evidence-based practice workshop, Ho et al. (2010) noted a decrease of almost 12% of episiotomy rates among nulliparous women (Ho et al., 2010). And in another study, after implementing educational strategies, the rate of episiotomy in a tertiary care center in Ontario decreased by 11% (Reynolds et al, 1995). Although we do not have detailed information on the strategy that is being adopted at the hospital in order to decrease episiotomy rates, we are indeed noticing significant changes that seem to be due to new recommendations from the ObGyn department. These findings consequently encourage adopting a structured quality improvement approach to maintain this trend and approach WHO's recommended episiotomy rate of not more than 20% (WHO, 1996).

b. Physicians' views on the current trend in Lebanon

Since this study was only conducted in one medical center, AUBMC, we do not have data on the rates of episiotomy in Lebanon; however, we did ask the interviewed physicians on the topic. Their responses were not consistent, but one physician mentioned that the tendency in Lebanon is to perform episiotomies prophylactically and another said that the practice lacks regulations. Indeed, in the only study that we found which looks at episiotomy practice in Lebanon rates varied greatly between hospitals from 5% to 100% (Khayat & Campbell, 2000). And in the 16 of the 39 included hospitals in the study, the reported rate of episiotomy was more than 80% (Khayat & Campbell). Unfortunately, both our findings and the ones from the above study are based on reported rates. We do not have any national registry to keep records and assess the practice and its evolution over the years. Nonetheless, an interesting study that we found is one that was conducted in Australia which looked at episiotomy rates amongst non-

Australians living in Australia. Lebanese women living in Australia were included in the study; they had the second lowest episiotomy rate at 3.8%. More insight is definitely needed into the reason behind this episiotomy rate difference between Lebanese women delivering in their home country and those living in Australia. Nonetheless, it still begs the question: if Lebanese women are delivering abroad with only 3.6% of them needing episiotomy, why is the procedure being performed in Lebanon on over 70% of them? From the responses that we have received during our interviews, one reason that seems prominent is the effect of medical training. Several physicians had been trained that routine episiotomy is a must and they are not changing their practice despite the newest recommendations. Another reason that might explain this occurrence is the fear of perineal tears. Physicians in Lebanon are apprehensive of perineal tear and prefer performing an episiotomy over ending up with a tear. And finally, another reason that could explain this high rate is the lack of education that women are provided with when it comes to medical practice. In Lebanon, often times the physician is blindly trusted under the explanation that "they know better" and women do not question the care that they are receiving.

2. Risk factors for episiotomy

a. Maternal age

Maternal age is a variable that has been identified in the literature as a risk factor for episiotomy. When treated as a continuous covariate, we did not find an association between episiotomy and maternal age. However, in our final model, we found that mothers who were of advanced maternal age were 2.536 times more likely than mothers who were under 35 year to have an episiotomy. This is consistent with a study which found that episiotomy was significantly associated with age>35 years (Carvalho, Souza, & Filho, 2006). On the other hand, another study found that the mean age of women having an episiotomy was 24.7 years as

compared to those not having an episiotomy whose mean age was 28.5 years (Chigbu et al., 2008). Although these results seem contradictory at first glance, they do seem logical when advanced maternal age is taken into consideration. In fact, the odds of having an episiotomy decrease with age as perineal elasticity increases and episiotomy. In addition, episiotomy is more likely to be performed prophylactically for primiparas than multiparas and logically the latter are more likely to be older than the former. Nonetheless, once women are of advanced maternal age, i.e. ≥35 years their odds of having an episiotomy increase. This could be explained by the fact that, at that age, deliveries are more often high risk and episiotomy may be needed to prevent possible complications. As a matter of fact, although none of the physicians mentioned advanced maternal age as a risk factor, in one of the interviews, one of the physicians spoke about operative delivery which is one of the complications of advanced maternal age delivery.

b. Fetal weight/"Big baby"

Macrosomia is defined as a birth weight of more than 4000g. In our literature review, this variable was identified as a predictor for episiotomy (Ogunyemi, 2006). This finding was supported in both our analysis of data collected from the electronic health records and from the interviews that were conducted with the physicians. Indeed, in our final model, we found that every one gram increase in fetal weight, the odds for having an episiotomy were found to be 1.001 that of not having an episiotomy. This finding could be explained by the fact that greater than usual fetal weight could lead to a more difficult normal vaginal delivery and an episiotomy may be performed to assist the women in pushing and delivering the baby. As previously stated, fetal weight was also mentioned in the interviews as one of the reasons physicians take into account when performing an episiotomy. They all used the term "big baby," although when they were asked to define it, their response ranged from 3.5kg and more to 4kg and more. Not having

a clear definition thus illustrates the need for adapting standardized definitions and guidelines that would encourage an improved standardized care for women in delivery.

c. Parity

Parity was the only covariate in our study whose association with episiotomy was significant both at the binary level and when included in the final model. Our findings showed that as parity increased, the odds of having an episiotomy decreased. These are consistent with both the literature and the findings from the interviews that were conducted. As a matter of fact, in numerous studies it was noted that as parity increased, episiotomy rates decreased (Husic & Hammoud, 2009; Ogunyemi, 2006; Otoide et al., 2000). And primiparous women were more likely to have an episiotomy as compared to multiparous women (Raisanen et al, 2010; Jackson & Dunster, 1984). These are in accordance with some of the statements declared by the physicians that I interviewed. Although one of the physicians said that he restricts episiotomy to when it is needed only, others said that they perform it prophylactically on primiparas. Although primiparity is not an indication by WHO (2007) to perform an episiotomy, these findings could be explained by the fact that at the time of a first delivery, the perineum might not be stretched enough and consequently physicians prefer to perform an episiotomy to allow a smooth delivery.

d. Patients' hospital admission class

Patients' hospital admission class is not a variable which has been previously discussed in the literature; however, it was thought to include it in the review of records to examine whether the type of care that patients received is associated with their medical insurance status and indirectly with socio-economic class of the patient. Fortunately, no association was found between that variable and episiotomy either at the binary level or in the final model. Having an

episiotomy or not was not associated with the women's hospital admission class. In fact, in a study done in Egypt, MD providers' delivery practices did not differ between free and fee-paying sections at the studied hospital (Khalil et al., 2003).

e. Type of episiotomy

Two of the most common types of episiotomy are median and mediolateral, and each has its advantages and disadvantages. Median episiotomies are usually more associated with anal sphincter laceration (Pietras & Taiwo, 2012) and severe perineal tears (Sooklim et.al, 2007); while mediolateral episiotomies are more associated with more pain and increased risk of blood loss (Pietras & Taiwo, 2012). Our findings revealed that more mediolateral episiotomies were performed than median episiotomies (27.2% of episiotomies performed were median and 72.8% were mediolateral). As a matter of fact, the physicians interviewed did state that they preferred mediolateral episiotomies over median episiotomies as they aimed at preventing 3^{rd} and 4^{th} degree lacerations, and our findings confirm this reasoning. Through the analysis, it was found that indeed higher degree lacerations were more common in patients who underwent median episiotomy than those who underwent mediolateral episiotomy. This finding is in accordance with a study by Sooklim et al. which showed that severe perineal tears occurred in women with a midline episiotomy more than it occurred in women with a medio-lateral episiotomy (Sooklim et al., 2007). Thus, although episiotomy rates are still high at the hospital, physicians are aiming at avoiding higher degree lacerations. However, whether this approach led to women experiencing more postpartum pain could not be assessed.

3. Consequences of episiotomy

a. Postpartum hemorrhage

One of the main complications of episiotomy is postpartum hemorrhage, as studies did find that episiotomy was associated with increased postpartum bleeding (Husic & Hammoud, 2009; Sosa et al., 2009; Wagner, 1999). Although I did collect data on the frequency of postpartum hemorrhage, I was unable to establish an association as only 0.2% of the women had postpartum hemorrhage.

b. Perineal lacerations

One of the main benefits of episiotomy that the proponents of the practice promote is that it prevents perineal lacerations. As a matter of fact, three of the interviewed physicians in our study chose episiotomy over second degree lacerations and our analysis of the data collected from the medical health records did show that 77.9% of women who did not have an episiotomy ended up with a perineal laceration as opposed to 8.1% of those who did have an episiotomy. But is this the only information we need in order to promote a routine episiotomy approach? Several studies, which included randomized controlled trials, examined the association between episiotomy and higher degree lacerations (3^{rd}, 4^{th} and more) as the latter cause the most complications and episiotomies are as a matter of fact "2^{nd} degree surgical tears". In all of the studies that I have reviewed, women who had routine episiotomies were at more risk of 3^{rd} and 4^{th} degree lacerations than women who had selective episiotomies (Helewa, 1997; Rodriguez et al., 2008; Steiner et al., 2012). As a matter of fact, our findings supported these results as well. Out of all women who suffered from higher degree perineal tears, 10.3% did not have an episiotomy while 89.7% did (48.3% had a median episiotomy and 41.4% had a mediolateral

episiotomy). Thus, as it seems, episiotomy in this study did not prevent high degree lacerations. Therefore, given these findings, encouraging a selective episiotomy practice instead of a routine one is encouraged.

4. Physicians and the impact of training

a. Physicians' gender

Physician gender was another variable which to our knowledge has not been studied in the literature in terms of its association with episiotomy. I included it on our analysis, although no association was found between this variable and episiotomy. In addition, unfortunately, no female physicians replied to our emails and thus we could not examine whether there was a difference in the male physicians' views and the female physicians' views.

b. Physicians' decision making process and implementing policies

Examining physicians' decision making process could only be elicited through the interviews. And the varying responses received illustrate the lack of a common process adapted by physicians to decide on performing episiotomies. In fact, some stated that they only perform it when there is an impending tear; others perform it prophylactically on all patients, while others assess the case as the standards of practice lie between a routine episiotomy approach and a restrictive episiotomy approach. These findings illustrate the lack of and need for clear guidelines to guide the practice as this is essential if the university hospital is to follow the latest recommendations. Consequently, when they were asked about their views towards implementing policies that guide the practice of episiotomy, senior physicians did not approve of the proposition. For example, one physician even stated that one cannot put rigid rules in medicine, however at the same time, they also described the practice of obstetrics in Lebanon as chaotic

and that physicians nowadays are lacking a conscience. These views explain the difference in the decision making process between physicians since guidelines and policies are lacking in the university hospital. And with episiotomy being a surgical procedure with identified complications, it is essential to establish a guiding principle to uniform the approach to delivery care and to ensure compliance with the latest evidence-based recommendations.

c. The impact of medical training

In one of the studies that were reviewed, it was found that women whose physicians had an unfavorable view of episiotomy were more likely to have an intact perineum than other women (Klein et al., 1995). In our study, physicians were asked about their medical training and the effect that this training had on their current practice. It was very apparent that regardless whether this training was a few years back or a few decades back, it did have an impact on how they viewed episiotomy. Indeed, those who were trained that routine episiotomy was a must still adopted the same practice despite of new recommendations or guidelines. Therefore, it is essential that all training in either medical schools or residency programs is updated to the latest recommendations as it may have an effect on medical care for years and years down the road. Not only should that, but the philosophy of adapting the latest guidelines in medical care should be encouraged during training and continuous medical education is needed.

d. Senior vs. Junior physicians

Only one of the studies that I have reviewed looked at the difference in care between residents and attendings and I specifically addressed this aspect in the topic guides. Although the study found a moderate difference between the two - residents performed an episiotomy on 64% of their patients and attendings performed an episiotomy on 61% of their patients (Hueston,

1996), it is worth noting since it is the opposite of our finding. Through the interviews, it was noted that senior physicians were more prone to performing episiotomies prophylactically, while junior physicians lean more towards a restrictive approach. This could be explained by the fact that junior physicians are more likely to adapt new recommended practices, while senior physicians apprize their years of experience and personal opinions that they have developed on the practice over the years. The different finding that came up in the reviewed study could be explained by the fact that residents are still training and thus may perform episiotomy on borderline cases (where it is not clear if episiotomy is needed or not) which gives them an opportunity to practice.

5. Regulating the practice

a. Views and knowledge about the latest evidence-based recommendations

Knowing that the latest WHO guidelines on episiotomy have been published in 2007, I was interested in examining whether physicians at the university hospital were aware of these recommendations and whether they adapted them. Although not all of them agreed to the restrictive episiotomy approach, they all were knowledgeable of the latest recommendations. This brings us back to the importance of establishing policies which adapt and encourage following these recommendations.

b. Informed consent for episiotomy

Episiotomy qualifies as a surgical procedure and thus requires informed consent. At the university hospital, an informed consent is available for normal vaginal delivery which covers all possible procedures that could be needed during delivery. Physicians were asked whether there should be an informed consent specifically for episiotomy. Interestingly, the two senior

physicians who were interviewed were completely against having an informed consent as it defies the purpose of trusting the physician's judgement. Which leads us to the final issue, how much should be left to the physician's discretion and how should women be involved in childbirth practice?

c. Ethics and women's involvement in childbirth practice

In a study published in 2001, Enkin et al. stated that if women were properly informed of the evidence about the risks associated with episiotomy, they would not readily consent to it (Enkin et al., 2001). And although they were not specifically asked about their views on involving women in childbirth practice, this issue was brought up in the interview. The only response which seemed in line with the findings of the above study was one by a junior physician who said he encourages having policies since they are important for women and would allow them the opportunity to be provided with better care. At the other end of the spectrum, the two senior physicians gave strong opinions against involving women in the practice; with one physician even saying that he does not allow a family member to be present during the delivery. With the current trend in the West to make childbirth less medicalized and to involve women more and more in the care that they are receiving, women in Lebanon are still hesitant when it comes to questioning the care that they are receiving. And in fact, evidence based recommendations call for involvement of women for a better healthcare delivery.

B. Strengths of this study

The main strengths of this study is that it is the first of its kind in the country as it reviewed medical records to gather exact numbers and data relating to the practice of episiotomy. The only other study on episiotomy in Lebanon examined reported rates by healthcare workers and did

collect data on actual rates. In addition, this study included both a quantitative aspect through medical records review and a qualitative aspect through interviews with physicians. This is a significant contribution as it helps in gaining a better understanding of the situation by linking both numbers and the views of the physicians responsible for those numbers. Third, although it was mentioned that a new approach is being adapted at the university hospital to decrease the rate of episiotomy, there were not any data available to show the effectiveness of this approach. Through our study, I was able to show that rates are indeed decreasing significantly. Fourth, although a restrictive episiotomy practice is being encouraged, I was able to show that the university hospital is not following the latest recommendations as episiotomy was seen to be associated with factors other than the ones indicated in international guidelines. This would then encourage the implementation of a policy that would bring us closer to these recommendations and guidelines. And finally, I was able to show a big gap in the views and the practice between senior and junior physicians. This could encourage training of all physicians for a more common approach to episiotomy across the university approach.

C. Limitations

This study has some limitations. Although the review of records was of 5 years of record, I ended up with a relatively small sample with only 15% of cases not having an episiotomy. This small sample of non-episiotomy cases in comparison to the bigger sample of episiotomy cases (85%) could have limited our analysis. Nonetheless, this relatively low rate of normal vaginal deliveries could be indicative of a high C-section rate at the hospital. In Lebanon overall, the c section rate is over 40% (DeJong et al., 2010). Another limitation was the small number of respondents for the interviews section. This was due to the fact that for ethical reasons, I was not able to approach physicians directly in person and because of a time constraint as I only had one

month to conduct the interviews and thus only sent 4 reminders to participate in the study. If I was able to send out invitations over a longer period of time I could have perhaps ended up with a higher response rate which could have provided us with a better perspective on the practice. And finally, another limitation is that all of the physicians who agreed to participate were males and I was unable to gain insight into the female physicians' perspective. This could also be due to the time constraint issue.

D. Conclusion and recommendations

The first and foremost conclusion that could be inferred from this study is that the university hospital is still behind in terms of approaching the WHO recommended rates of episiotomy of 10% among all normal vaginal births (WHO, 1996) and of no greater than 20% among all normal vaginal births (WHO, 1996).

There are steps that are being taken in this regard as indicated by the statements of the physicians in this study and rates are indeed decreasing; however, these are not enough to achieve the recommended rate. A routine episiotomy approach is still the norm for several physicians and this in clear contradiction with international recommendations and guidelines. I was able to show that episiotomy is not preventing 3rd and 4th degree lacerations and thus this finding should be used to discourage performing prophylactic episiotomies. I recommend encouraging prenatal classes at the university hospital which would include teaching sessions on episiotomy and thus allow women to be more knowledgeable on the issue participate in the childbirth practice. The risk factors for episiotomy that I identified in this study are advanced maternal age, bigger than average fetal weight, and primiparity. By discouraging the prophylactic episiotomy approach, primiparity could no longer become a risk factor for

episiotomy. As for advanced maternal age and macrosomia, increasing training in the management of high risk deliveries without requiring episiotomies could also eliminate these risk factors. I hope that by adopting policies that guide the practice in the university hospital this could set the example for other hospitals in Lebanon and thus encourage a new approach on the issue at the level of the Ministry of Public Health. And I encourage having other studies on episiotomy in Lebanon that could potentially look at rates in different hospitals and medical care centers and also examine other complications that could arise from having an episiotomy such as pain, sexual function, and women's ability to perform daily activities. Finally, one should also keep in mind that episiotomy is part of the overall over-medicalization of delivery. Other practices during delivery (such as lithotomy position, bed rest, enemas and others) should also be considered when addressing practices in labor and delivery.

APPENDIX

I. Topic guide for ObGyn residents

1. Professional status of the caregiver
2. Medical training (Lebanon vs. abroad)
3. What is your view towards the current practice of episiotomy in the hospital?
4. What is your perception about routinely performing an episiotomy for the prevention of late complications of delivery, or restricting it to only when there is an impending perineal tear (Lowenstein, Drugan, Gonen, Itskovitz-Eldor, Bardicef & Jakobi, 2005)
5. What factors do you consider constitute a warning for an impending perineal tear? (Lowenstein, Drugan, Gonen, Itskovitz-Eldor, Bardicef & Jakobi, 2005)
6. Do you prefer a spontaneous 2nd degree tear or a "surgical second degree tear": episiotomy? If yes, why? (Lowenstein, Drugan, Gonen, Itskovitz-Eldor, Bardicef & Jakobi, 2005)
7. What is the role of episiotomy in preventing a grade IV perineal laceration? (Lowenstein, Drugan, Gonen, Itskovitz-Eldor, Bardicef & Jakobi, 2005)
8. How would you describe the decision-making process that you follow when considering performing an episiotomy?
9. What is your view about requesting an informed consent from women that is specific for episiotomy before the delivery should it be needed?
10. What is your view about implementing policies that guide the practice of episiotomy?
11. Question specific for residents: How much influence do you consider you have towards the decision making process concerning whether to perform an episiotomy or not?

12. What is your view towards changing the current practice of episiotomy and how probable is such a change?
13. How do you believe the current practice at the hospital compares to elsewhere in Lebanon?

II. Topic guide for ObGyn attendings

1. Professional status of the caregiver
2. Medical training (whether Lebanon vs. abroad)
3. What is your view about the current practice of episiotomy in the hospital?
4. What is your perception about routinely performing an episiotomy for the prevention of late complications of delivery, or restricting it to only when there is an impending perineal tear (Lowenstein, Drugan, Gonen, Itskovitz-Eldor, Bardicef & Jakobi, 2005)
5. What factors do you consider constitute a warning for an impending perineal tear? (Lowenstein, Drugan, Gonen, Itskovitz-Eldor, Bardicef & Jakobi, 2005)
6. Do you prefer a spontaneous 2nd degree tear or a "surgical second degree tear": episiotomy? If yes, why? (Lowenstein, Drugan, Gonen, Itskovitz-Eldor, Bardicef & Jakobi, 2005)
7. What is the role of episiotomy in preventing a grade IV perineal laceration? (Lowenstein, Drugan, Gonen, Itskovitz-Eldor, Bardicef & Jakobi, 2005)
8. How would you describe the decision-making process that you follow when considering performing an episiotomy?
9. What is your view about requesting an informed consent from women that is specific for episiotomy before the delivery should it be needed?
10. What is your view about implementing policies that guide the practice of episiotomy?
11. What is your view about whether there is a need to change the current practice of episiotomy in this hospital? How might this change come about? How probable is such a change?

12. How do you believe the current practice at the hospital compares to elsewhere in Lebanon?

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