

# Evidence-based intrapartum practice and its associated factors at a tertiary teaching hospital in the Philippines, a descriptive mixed methods study.

**Chisato Masuda**

Nagasaki University School of Tropical Medicine and Global Health

**Shirley Kristine Ferolin**

Southern Philippines Medical Center

**Ken Masuda**

Nagasaki University School of Tropical Medicine and Global Health

**Chris Smith**

Nagasaki University School of Tropical Medicine and Global Health

**Mitsuaki Matsui** (✉ [mmatsui@nagasaki-u.ac.jp](mailto:mmatsui@nagasaki-u.ac.jp))

Nagasaki University School of Tropical Medicine and Global Health <https://orcid.org/0000-0003-4075-1266>

---

## Research article

**Keywords:** Evidence based practice (MeSH Terms), Intrapartum care, Second stage labor (MeSH Terms), Third Stage Labor (MeSH Terms), Episiotomy (MeSH Terms), Fundal pressure, Obstetric anal sphincter injuries

**Posted Date:** January 15th, 2020

**DOI:** <https://doi.org/10.21203/rs.2.16741/v2>

**License:**  This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

---

**Version of Record:** A version of this preprint was published on February 5th, 2020. See the published version at <https://doi.org/10.1186/s12884-020-2778-5>.

# Abstract

Background Evidenced-based practice is one of the key components of quality care. However, previous studies have identified gaps between evidence and actual maternity practices in the Philippines. This study aims to describe practice of evidence-based intrapartum care and its associated factors, as well as exploring the perception of healthcare providers in a tertiary hospital in the Philippines. Methods A mix-methods study was conducted, which consisted of direct observation of intrapartum practices during the second and third stages; semi-structured interviews and focus group discussions with care providers to confirm the reasons to perform episiotomy or fundal pressure and their perception. Univariate and multivariate logistic regression were used to analyse the relationship between observed practices and maternal, neonatal and environmental factors. Qualitative data were extracted and categorised to identify themes related to the decision-making process of practices. Results A total of 170 deliveries were included. Recommended care, such as prophylactic use of oxytocin and controlled cord traction in the third stage, were applied in almost all the cases. However, harmful practices, such as intramuscular or intravenous oxytocin use in the second stage (14.1%) and lack of foetal heart rate monitoring (57.1%) were also observed. 92.0% of primiparas received episiotomy and 31.2% of all deliveries received fundal pressure. The following factors were associated with implementation of episiotomy; primipara (adjusted Odds Ratio [aOR] 62.3), duration of the second stage more than 30 minutes (aOR 4.6) and assisted vaginal delivery (aOR 15.0). Factors associated with fundal pressure were primipara (aOR 3.0), augmentation with oxytocin (aOR 3.3) and assisted vaginal delivery (aOR 4.8). Healthcare providers believe these practices can prevent laceration. Women who got obstetric anal sphincter injuries (OASIS) was 17.1% in this study. Assisted vaginal delivery (aOR 6.0), baby's weight more than 3500g (aOR 7.8), episiotomy (aOR 26.4) and fundal pressure (aOR 6.2) were associated with OASIS. Conclusions Our study found potentially harmful practices were still conducted, contributing to the occurrence of OASIS. The perception of these practices was divergent with the current evidence, with empirical knowledge having more influence. Scientific evidence and its underlying basis should be understood among providers to improve practices.

## Background

Quality of care has been the focus area of improvement to reduce avoidable mortality and morbidity both in mothers and newborn babies [1]. Since most fatal complications occur during the intrapartum period, it is crucial to ensure quality of care during the delivery and childbirth process. According to the WHO Quality of Care Framework for maternal and newborn health, evidence-based practice is one of the key components of quality of care [1]. There are two entities regarding implementation of evidence-based care. The first is provision of 'recommended' practices which have evidence of effectiveness, which generally facilitate the physiological process of birth. The second is avoidance of 'not recommended' practices, which are often invasive medical interventions, necessary only for those who require it, and proved ineffective or harmful if provided in a routine manner.

However, previous studies have identified gaps between recommended and actual practices [2]. Essential routine monitoring and assessment during labour as well as key practices are not sufficiently conducted, compounded by inappropriate infrastructures and supplies [3-5]. Mistreatment and abusive actions including unnecessary interventions are also common in health facility deliveries [4, 6].

The Ministry of Health in the Philippines adopted a policy on Essential Intrapartum and Newborn Care (EINC) in 2009 [7]. The vital part of the policy is implementation of evidence-based practices, which consist of recommended practices during the intrapartum period. Recommended practices for newborn care are time-bound interventions at the time of birth and elimination of unnecessary interventions. Over 14,000 health workers in 252 hospitals have

been trained since the end of 2015 [8]. Whereas this country-wide effort resulted in an improvement of newborn care practices, inappropriate maternal care practices persisted at tertiary level hospitals according to an evaluation of EINC practices conducted [9]. The effectiveness of didactic training approaches for maternal care were questioned in this report, however, the reasons and context behind the poor compliance with guidelines were not well explored. Therefore, this study aims to describe the practice of evidence-based intrapartum care and its associated factors, as well as exploring the perception of healthcare providers in a tertiary teaching hospital in the Philippines.

## **Methods**

### ***Study Design***

This study was a mix-methods study with a convergent parallel design. Quantitative and qualitative data were concurrently collected and then merged later for analysis.

### ***Study setting***

This study was conducted at a maternity unit in the Southern Philippines Medical Centre in Davao city, the Philippines. This medical centre manages both low- and high-risk pregnancy cases and accepts referrals from all over Mindanao Island. There were 16,054 deliveries in 2017, including 11,292 normal spontaneous vaginal deliveries. This hospital also has an educational function for training of medical, nursing and midwifery students, as well as staff from primary and secondary healthcare facilities.

### ***Study participants***

Women entering the delivery room with singleton cephalic pregnancy and a vital foetus were recruited in this study. The sample consists of parturient women at the second stage of labour observed by the first author [CM] who attended sequential deliveries as per order of admission, separated by resting periods. Epidural analgesia cases were excluded as they may have been associated with increased assisted vaginal delivery [10]. Emergency caesarean section cases were withdrawn. All the mothers were informed before entering into the delivery room that observation of care during their delivery as well as data collection from their medical records were going to be conducted, and that all the data would be treated anonymously. Women provided verbal consent and had the opportunity to opt out.

Healthcare providers (medical doctors, nurses and midwives) who assisted deliveries at the maternity unit during the study period were invited. The study protocol was discussed and confirmed in the staff meeting at the study site. Written consent to participate in the study was obtained from the health care providers.

### ***Data collection***

#### **Quantitative strand**

Intrapartum practices by healthcare providers during the second and third stages of labour were directly observed between May 6<sup>th</sup> and June 9<sup>th</sup> 2018. Observed practices during the second stage of labour were selected from the latest WHO recommendations on intrapartum care [11]. Five practices (duration of the second stage, birth position, method of pushing, episiotomy, and fundal pressure) out of six in the second stage, and all four practices (prophylactic uterotonics, delayed umbilical cord clamping, controlled cord traction (CCT), and uterine massage) in the third stage of labour were evaluated. One practice in the second stage (techniques for preventing perineal trauma) was excluded from our observation, because it is not commonly taught and utilised in the study site. A list

of the recommendations is attached in Annex-1. In addition, frequency and method of foetal heart rate (FHR) monitoring and application of labour augmentation were observed. Medical records were reviewed to systematically collect the following information on the parturient and the newborn baby: parity, age, gestational week, fundal height on admission, complication(s) during current pregnancy, past medical history, mode of delivery, degree of perineal laceration, and the baby's weight and condition at birth. We calculated the sample size, assuming that the episiotomy rates in primiparas and multiparas were 80% and 25%, respectively. With a 10% error range and 5% level of significance, samples of 62 primiparas and 73 multiparas were required. Considering 10% of missing data, we planned to observe 69 primiparous and 81 multiparous women.

#### Qualitative strand

Semi-structured interviews were conducted with health care providers in order to confirm the reason for either episiotomy or fundal pressure during observation. Interviews were conducted immediately after the delivery by posing several questions: *What was the reason to conduct 'episiotomy' and/or 'fundal pressure' for the woman?* In addition, Focus Group Discussions (FGD) were conducted with selected healthcare providers to explore their experience and perceptions regarding episiotomy and fundal pressure. All of the FGD sessions were conducted after the completion of all the observation. The results of observations and interviews were shared with the participants together with the existing evidence of those practices during FGDs. Some questions were asked to discuss how they recognize the benefit and adverse effects of those practices and evidence behind the guidelines. Information from the participants reached saturation both in the interview and FGD sessions.

#### **Data analysis**

#### Quantitative strand

Descriptive statistics were used to show the participants' and the observed intrapartum care characteristics. Chi-squared and the Mann-Whitney *U* tests were used to compare proportions and continuous variables without a normal distribution. Univariate and multivariate logistic regression analyses were performed to identify maternal, foetal and environmental factors associated with non-recommended care (episiotomy and fundal pressure) [11]. We selected the two practices because they are potentially harmful when routinely applied to pregnant women, and are frequently misused [12-15]. Explanatory variables were selected based on findings in the literature and frequent reasons to perform them reported in the qualitative strand in this study. Additional analysis was performed to explore the association between potential risk factors and occurrence of obstetric anal sphincter injuries (OASIS), which includes both 3<sup>rd</sup> and 4<sup>th</sup> degree lacerations. Odds ratio with ninety-five percent confidence intervals were calculated in the analyses. Statistical analyses were performed using STATA software version 14 (StataCorp LLC, Texas, USA).

#### Qualitative strand

Narrative data from the semi-structured interviews and FGDs were divided into the smallest pieces of meaningful information [16]. Those pieces were categorised and those categories were linked together to identify themes on the decision-making process of medical providers [17]. No specific software was used for these steps. The qualitative data were merged with the quantitative results, then similarity or convergence between qualitative and quantitative data were examined for further interpretation of findings.

## Results

### *Characteristics of mother and delivery*

A total of 178 deliveries were observed out of 1090 eligible vaginal deliveries at the study site during the one-month observation period. Eight cases were withdrawn due to switching to emergency caesarean section, therefore 170 cases were eligible for analysis. During the study period, 25 medical doctors, 28 midwives and 25 nurses were observed throughout their intrapartum practice out of 28 doctors, 31 midwives and 27 nurses working in the ward, respectively. A comparison of the characteristics of study participants (n=170) and non-observed cases (n=920) is shown in Table 1. The proportion of primiparous women was significantly higher in the observed group than in the non-observed group. There were no statistical differences in median age and proportion of assisted vaginal delivery in the two groups.

The characteristics of parturient woman, delivery process, and maternal and neonatal outcomes are shown in Table 2. Proportions of term deliveries and women without any complications were 88.8% and 78.2%, respectively. Duration of the 2<sup>nd</sup> stage was categorized as more or less than 30 minutes according to a consensus among the health providers interviewed. The median duration of the 2<sup>nd</sup> stage was 19 minutes. Most mothers delivered spontaneously, while vacuum extraction or forceps were applied in 16 cases (9.4%). Time of delivery at dayshift (6am to 6pm) or night shift (6pm to 6am) were almost equivalent. A midwife was the most common birth attendant for vaginal delivery. The prevalence of 3<sup>rd</sup> or 4<sup>th</sup> degree of perineal or vaginal lacerations (OASIS) was 17.1%. Twenty-eight babies (16.5%) required resuscitation or admission to neonatal intensive care unit due to asphyxia, tachypnoea or mother's comorbidity. There was one intrapartum foetal death.

### *Description of intrapartum care during the 2<sup>nd</sup> and 3<sup>rd</sup> stage of labour*

Table 3 presents a description of intrapartum care during the 2<sup>nd</sup> and 3<sup>rd</sup> stages of labour.

*Position during the 2<sup>nd</sup> stage of labour.* The position at the birth of baby was upright in all the mothers.

*Method of pushing:* The Valsalva Manoeuvre, to encourage mothers to keep pushing without breathing, was applied in 25.9% of mothers.

*Episiotomy:* Episiotomy was performed to 57.6% of all mothers by the median method, and to 1.8% by the medio-lateral method. Local anaesthesia for episiotomy was rarely used (only to 1 woman). The episiotomy rate was 92.0% in the primiparas subgroup.

*Fundal Pressure:* Fundal pressure was performed on 31.2% of participating mothers. The manoeuvre of fundal pressure involved the healthcare provider placing their forearm on the fundus and grasping the handle located on the side of the delivery bed with another hand, forming a "T-shape", then applying pressure. 62.3% of the fundal pressure was initiated within 30 minutes of full dilatation or after the mother was transferred to the delivery bed.

*Foetal heart rate monitoring:* More than half of mothers did not receive FHR monitoring during the 2<sup>nd</sup> stage. The median frequency and interval of the intermittent auscultation was once (IQR 1-2) and 19 minutes (IQR 13-32), respectively.

*Labour augmentation by oxytocin:* Oxytocin injection either by intramuscular or intravenous was performed in 24 women. No observation of uterine contraction was conducted in all the cases during or immediately after the injection.

*Prophylactic use of oxytocin during the third stage of labour:* All 170 cases received intramuscular injection of oxytocin. However, 21 cases (12.4%) did not receive the full defined dose (10 IU) as recommended in the national guideline, since 2 to 5 units of oxytocin were already injected for labour augmentation during the 2<sup>nd</sup> stage.

*Delayed umbilical cord clamping:* Delayed umbilical cord clamping is recommended in the national guideline when the baby does not require any resuscitation. However, it was applied in only 50.0% of deliveries out of 138 cases observed (three missing data among 141 cases).

*Controlled cord traction:* Most of the placental deliveries were conducted using CCT (98.8%). Suprapubic counter pressure was applied in 93.4% of the CCT cases.

*Uterine massage:* After the delivery of placenta, uterine massage was performed to 11 women (6.5%).

#### *Perception of the potentially harmful practice and the evidence behind the guidelines*

We conducted semi-structured interviews with 16 medical doctors, 19 midwives and 4 nurses. We recruited all the healthcare providers each time episiotomy or fundal pressure was observed, although one medical doctor was unable to be interviewed because she did not have time. Some providers were interviewed several times. For FGDs, 6 doctors, 5 nurses and 6 midwives participated. The participants were selected using convenience sampling based on their availability. Three sessions were organised separately for medical doctors, midwives, and nurses. Each FGD lasted about 1.5 hours.

Interviews and FGDs with healthcare providers explored their understanding and perceptions of conducting the potentially harmful practices.

*Perception of the episiotomy for primiparas:* Healthcare providers reported that primiparas without episiotomy were at risk for OASIS due to the characteristic of their vagina and perineum, such as “small”, “not elastic”, “contracted” and “tight”, and that episiotomy was a protective measure against severe, zigzag or multiple laceration. Some doctors and midwives also said that such laceration is “difficult to suture” and “takes time to repair”, while they were tending to many deliveries. “Large baby” was one of the reasons to perform episiotomy. Providers assessed the size of the baby by the fundal height, however the criteria to evaluate the size of baby differed by person, ranging from 28cm to 32cm. On the other hand, providers reported recognising negative effects of episiotomy, such as “infection”, “pain” and “blood loss”.

*Perception of fundal pressure:* Although all healthcare providers knew fundal pressure was not recommended in the guidelines, they believed it was effective to “help the baby’s head descending”, “accelerate the 2<sup>nd</sup> stage” or “hasten the delivery” from their experiences. Reported reasons for performing fundal pressure included; “foetal head descending is not improving”, “long or prolonged 2<sup>nd</sup> stage” and “weak maternal pushing and maternal effort failed” described as “mother stopped pushing in few seconds”. Because of trust in its effectiveness, fundal pressure was often selected as the first option to hasten the second stage of labour in order to avoid vacuum extraction or caesarean section. Healthcare providers reported that the equipment for vacuum extraction is single-use and costly, therefore, it is better to avoid using it in order to reduce out-of-pocket payment for the patient. They also mentioned that emergency caesarean section is often difficult because of the lack of operation room availability. Healthcare providers reported recognizing the negative effects of fundal pressure such as “pain”, “uterine rupture” and “hematoma or bruise of abdomen”.

*Long duration of the 2<sup>nd</sup> stage: “Long or prolonged 2<sup>nd</sup> stage”* was one of the reasons to apply fundal pressure, and a “long duration” was described from 30 minutes to 2 hours for primiparas, and 30 minutes to 1 hour for multiparas.

#### *Factors associated with healthcare providers performing potentially harmful practices*

Table 4 and 5 show results of bivariate and multivariable analyses on the relationship between maternal, foetal and environmental factors and episiotomy and fundal pressure, respectively. We arbitrarily selected the explanatory variables in the multiple logistic regression model separately for episiotomy and fundal pressure. The number of explanatory variables were limited to six in episiotomy and five in fundal pressure based on the number of women who performed those practices.

The following factors were associated with episiotomy; primipara (adjusted odds ratio: aOR 62.3), duration of the second stage of labour more than 30 minutes (aOR 4.6) and assisted vaginal delivery by vacuum extraction or forceps (aOR 15.0). Having maternal complications was negatively associated (aOR 0.10). No associations were found with fundal height and foetal heart rate monitoring.

The following factors were associated with implementation of fundal pressure; primipara (aOR 3.0), labour augmentation by oxytocin (aOR 3.3) and assisted vaginal delivery (aOR 4.8). No significant association was found with duration of the second stage of labour and foetal heart rate monitoring.

We omitted ‘Birth Attendant’ from the multiple regression analyses, because of collinearity between the birth attendant and mode of delivery. Instrumental delivery, such as vacuum extraction, is usually positively associated with practices of episiotomy and fundal pressure. Therefore, mode of delivery was included *a priori* in our analysis. However, vacuum extraction and forceps delivery can be performed only by medical doctors in the study site. If we include birth attendant, which was categorized as ‘medical doctor’ or ‘midwife or nurse’, in the model, it automatically produced ‘zero cell’, weakening the validity of the analyses.

#### *Associated factors for OASIS*

As presented in Table 2, 17.1% of women got OASIS: 11.8% third degree and 5.3% fourth degree tear. Table 6 shows the result of bivariate and multivariate analyses of the relationship between maternal, foetal and care-related factors and OASIS. Although parity, duration of the second stage and labour augmentation by oxytocin have significant relationships with occurrence of OASIS in the univariate analysis, these factors were omitted in the multivariate model, because these factors have collinearity with the Valsalva manoeuvre (method of pushing), episiotomy and fundal pressure. Assisted vaginal delivery (aOR 6.0), baby’s weight more than 3500g (aOR 7.8), episiotomy (aOR 26.4) and fundal pressure (aOR 6.2) were positively associated with OASIS. There was no association with the method of pushing.

## **Discussion**

This study evaluated quality of intrapartum care in a tertiary teaching hospital in the Philippines referring to international evidence-based guidelines. We found that active management of third stage of labour (oxytocin use and CCT with counter pressure) was conducted in the majority of deliveries. Some practices should to be improved, such as position during second stage (97.6% in gynaecological position); and delayed umbilical cord clamping (applied only to 50%). It has been shown that some practices, which are potentially harmful both to mother and foetus, need to be changed: FHR monitoring (absent in 57.1% and insufficient in 19.4%); augmentation with oxytocin

(14.2% by injection and 21.2% in drip infusion without monitoring); episiotomy in 92.0% of primiparas; fundal pressure in 31.2% and more careful delivery to avoid OASIS.

The reasons for such potentially harmful practices such as systematic episiotomy in primiparas, and frequent use of fundal pressure come from the local culture of health care providers. They believe these are good practices to protect the perineum or proceed delivery. In the following section, we discuss the practices that should change.

#### *Lack of FHR monitoring*

Monitoring of FHR is an essential intrapartum practice to detect signs of hypoxaemia and acidosis. Since frequent and intense uterine contraction is common during the second stage of labour, it is recommended that FHR monitoring should be conducted every 5 minutes by the intermittent method. However, more than half of the cases were not monitored and most of the intermittent auscultation cases were far from the standard interval. It was shown that the risk of stillbirth was 4 to 7 times higher when the FHR was not monitored at least every hour during the 1<sup>st</sup> and 2<sup>nd</sup> stages of labour in a study at a tertiary hospital in Nepal [18]. This study indicates that healthcare workers systematically miss the opportunity to detect foetal asphyxia. This might have been a contributing factor to intrapartum foetal death and the 28 newborn resuscitations and NICU admissions. A possible reason for this malpractice is that the national guideline has no clear recommendation on the frequency of intermittent auscultation [19]. These findings indicate that the lack of FHR monitoring should be improved as soon as possible, and the national guidelines should make a clear recommendation on the method of monitoring and evaluation of FHR with necessary actions in case of abnormality. A nationwide investigation is also recommended to assess the frequency of FHR monitoring and the reason for not monitoring FHR.

#### *Improper use of oxytocin at the 2<sup>nd</sup> stage of labour*

This study found that one in three women received augmentation of labour without appropriate monitoring. Use of oxytocin prior to confirmation of delay in labour may increase the risk of uterine hyperstimulation, tachysystole and foetal heart rate alterations [20]. Risks of uterine rupture, severe foetal asphyxia and foetal death increase when Oxytocin is administered either by intramuscular or intravenous bolus because its effect cannot be controlled. However, 24 women (14.1%) received oxytocin in such a dangerous manner. This practice should be immediately abandoned and strongly discouraged by the national guideline.

#### *Episiotomy*

We found that episiotomy was provided in a routine manner to primiparas. Although it is described that *an "acceptable" rate of episiotomy is difficult to determine* in the WHO recommendation, the observed rate indicates that episiotomy in primiparas was performed almost routinely in the study site. This is contrary to the national policy of selective episiotomy defined as; *no episiotomy unless it is necessary for maternal or foetal reasons* [19]. The scientific evidence behind the guideline is that routine episiotomy is not effective to reduce vaginal and perineal lacerations regardless of the parity [12, 13]. However, this study revealed that the provider's perception is totally different from the existing evidence. They reported that primiparas have higher risk of OASIS without episiotomy due to the rigidity of their perineum. There are similar findings in previous studies in Oman, Cambodia and Vietnam [21-23]. Other previous studies have shown that primiparity is the most common factor associated with episiotomy [22, 24-26]. Findings from both previous and the present studies indicate that healthcare providers conduct episiotomy based on their own experience and recognition rather than recommendations derived from scientific evidence. Our study has also shown that duration of the second stage of labour more than 30 minutes and application of assisted

vaginal delivery were associated with an increase in episiotomy rate. According to the WHO guideline, the duration of the second stage up to 3 hours in primipara is considered as normal [11]. However, our findings indicate that healthcare providers conduct episiotomy in order to expedite the delivery course much earlier than necessary. It may be due to the request of the woman herself to end the labour pain as soon as possible, or environmental constraints such as shortage of providers or limited number of delivery beds [11]. Assisted vaginal birth facilitates rapid descent of foetal head and insertion of equipment extends the vaginal canal. Therefore, these mechanical factors contribute to increase the probability of OASIS. As shown in our qualitative investigation, healthcare providers believed that episiotomy itself was one of the preventive measures for laceration. Therefore, an increase in the episiotomy rate can be explained by the perception, especially when instrumental delivery is conducted.

Both fundal pressure and FHR monitoring did not show any association with episiotomy after controlling for potential confounding factors. Episiotomy is one of the important means to accelerate the delivery course, and can be applied when foetal asphyxia is suspected. Asphyxia can be detected only by relevant FHR monitoring. However, our result has implied that neither fundal height nor FHR monitoring were a source of decision-making regarding the practice of episiotomy.

In addition to the factors related to episiotomy, it should be highlighted that few providers used local anaesthesia when they conducted episiotomy. This absolutely deteriorated quality of care. Provision of effective and sufficient anaesthesia is an essential procedure to reduce unnecessary pain as well as fear of the intervention.

#### *Fundal pressure*

Our study found that fundal pressure was applied in 31.2% of observed cases, and dominant in primiparous women (43.2%). Other associated factors were labour augmentation by oxytocin and assisted vaginal birth. Providers reported that it has been shown that fundal pressure is effective to hasten the 2<sup>nd</sup> stage of labour. These qualitative findings explained our quantitative findings; providers applied fundal pressure as the means to accelerate the delivery and to reduce operative delivery. Contrary to their perceptions, fundal pressure is strongly not recommended in national guideline [19], since it does not change any desirable maternal outcomes such as duration of the 2<sup>nd</sup> stage, instrumental delivery or caesarean section, as well as neonatal outcomes such as low arterial cord pH and Apgar scores [14]. Fundal pressure also may increase the occurrence of severe laceration, cervical tears and the possibility of uterine rupture [15, 27, 28]. Excessive fundal pressure is described as painful, forceful and even an abusive experience by women [29]. These findings also indicate that providers should be aware of the established evidence behind the recommendation and the possible harmful effect of fundal pressure.

Apart from the perception of healthcare providers, our study identified structural reasons for them to perform fundal pressure. The first reason is financial constraints. The Philippine Health Agenda for 2016 to 2022 envisages a universal healthcare system to protect the poor and underprivileged from the high cost of medical services [30]. However, the cost for vacuum extraction is 3000 Philippines Pesos (US\$56.4), which is not reimbursed to the patient. Once the providers found that the parturient is poor but needs an intervention to facilitate the birth process, their first choice is fundal pressure because there are no consumables or equipment to be paid. It is known that approximately 93% of the population were covered by the National Health Insurance Program in 2017 [31]. Vacuum extraction is one important component of basic emergency obstetric and neonatal care, therefore, it is recommended to include it in the insurance system in order to reduce harmful and ineffective interventions such as fundal pressure. Another constraint in the study site was availability of operation theatre including the staff. Although there are independent operating rooms exclusively for the obstetrics and gynaecology department, healthcare providers reported that it was not easy to conduct emergency caesarean section. This may be partly due to large number of deliveries (16,000/year). Furthermore, although it is a tertiary facility, 70% of cases were normal vaginal births. It may be

necessary to decentralise the delivery care to the first-line health services in order to reduce the burden in the hospital and subsequent unnecessary medical interventions.

### *Obstetric anal and sphincter injuries*

There are several major risk factors for OASIS, such as primiparity, gestational diabetes, macrosomia, malpresentation or malposition of foetus, assisted vaginal delivery, and episiotomy. A sub-analysis for primipara and non-instrumental deliveries in a systematic review of randomised controlled trials reported that the OASIS prevalence was between 0 and 15.6% (average 2.8%) in a restrictive episiotomy group; and between 0 and 14.3% (average 4.8%) in a liberal use of episiotomy group [13]. National aggregated data from twenty European countries showed that the OASIS rates were between 0.1% in Romania to 4.9% in Iceland [32]. It is difficult to determine *standard* prevalence of OASIS at facility level since the characteristics of parturient were different in each health facility. However, our study has shown that OASIS prevalence among primipara was 28.4%, which is much higher than previous findings. This present study confirmed that birthweight more than 3500g, episiotomy, fundal pressure and instrumental delivery were significantly associated with the occurrence of OASIS, consistent with previous literature [33-35]. OASIS has both short- and long-term severe consequences, such as pain, infection, dyspareunia, sexual dysfunction and anal incontinence [36, 37]. Therefore, minimising risk factors is very important to avoid OASIS. The rate of instrumental deliveries in our observed cases was 9.4% (16/170). However, it was applied within one hour in the second stage of labour in 13 cases (81.3%). Since FHR was not appropriately monitored, careful observation of maternal and foetal conditions may contribute to reduce the application of instrumental deliveries. Application of episiotomy should be improved and not routinely conducted to primipara. It has been suggested that medio-lateral episiotomy is safer than median incision[11]. Median episiotomy is a known risk factor for OASIS especially in operative deliveries, whereas medio-lateral or lateral episiotomy has a protective effect [38-40]. Fundal pressure should be avoided because of its harmfulness. Another key issue would be careful distinction of risk factors and respectful midwifery care to pregnant women throughout the pregnancy and delivery. It has been reported that the OASIS rate among primipara in midwife-led birth centres in Japan was 0.2% [41, 42]. Midwives in Japan are not legally allowed to carry out invasive medical procedures, including episiotomy. Therefore, they deal with only low-risk cases. They commit themselves to practicing evidence-based and humanized care during pregnancy and birth. These factors may contribute to reduce the risk of OASIS.

### **Limitation and strength**

This study has several limitations. First, there was selection bias of mothers at the sampling stage. Primiparous women were dominant in the observed group. Since observation started when a woman came into the delivery room with a diagnosis of the second stage of labour, we systematically missed cases with immediate delivery, which is more common in multiparas. However, this bias would not affect the relationship between maternal, foetal and environmental factors and medical interventions or risk factors for OASIS.

Second, the potential for Hawthorne effect could not be avoided due to the presence of an observer. Healthcare providers' behaviour may have positively improved if they knew that their practices were being observed. Therefore, the observed performance of recommended practices may be higher and potentially harmful practices may be lower than in reality [43]. However, if the observed practices can be considered as the best performance, this indicates there are still several problems regarding quality of care in the delivery room.

Thirdly, we did not consider the difference among individuals or types of providers. Episiotomy rates can vary considerably within the same group of providers in the same institution [44]. This study cannot draw conclusions on

the effect disaggregated by individual or type of healthcare provider.

The strength of this study was the prospective data collection of clinical practice by direct observation with concurrent interviews with healthcare providers. Most previous studies on episiotomy and fundal pressure were conducted retrospectively. The direct observation method allowed us to describe the detail of the intrapartum practice and to more accurately measure the performance rate of intrapartum care compared with self-reported measurement [45].

## Conclusion

Our study found four significant gaps between actual intrapartum practice and recommended evidence-based guidelines; lack of FHR monitoring, improper use of oxytocin during labour, excessive use of episiotomy for primiparas and fundal pressure. Our qualitative investigation has revealed that these unreasonable practices were derived from their empirical knowledge and belief. Merely disseminating guidelines and recommendations is unlikely to improve practices, as quality of care will not be ensured. Scientific evidence and its underlying anatomy, physiology and pathology should be well understood among providers. It is particularly important for a teaching hospital to apply national standards, since its practices are reproduced as best practices at different levels of health facilities by different professionals. Therefore, continuous training mechanism with relevant monitoring and supervision should be ensured in order to ensure quality practices.

## Abbreviations

CCT: Controlled cord traction

EINC: Essential intrapartum and newborn care

FHR: Foetal heart rate

FGD: Focus Group Discussion

OASIS: Obstetric anal sphincter injuries

PPH: Post-partum haemorrhage

## Declarations

### Ethics approval and consent to participate

This study protocol was submitted to and approved by the ethics committee in Nagasaki University School of Tropical Medicine and Global Health, Nagasaki, Japan (approval number NU\_TMGGH-048) and the Department of Health XI Cluster Ethics Review Committee in the Philippines (approved protocol number P18032601). Verbal consent was obtained from parturient mothers for this study under the permission and endorsement of the observation from the Department of Health XI Cluster Ethics Review Committee and the Department of Obstetrics and Gynaecology in the Southern Philippine Medical Centre and the ethics review committee in the Philippines. All health care providers at the study site were informed on this study and the written consent for observation and interview were obtained.

### Consent for publication

Not applicable

### **Availability of data and materials**

The datasets generated and used for this study are available from the corresponding author on reasonable request.

### **Competing interests**

All the authors declare that they have no competing interests.

### **Funding**

This study was funded by Nagasaki University School of Tropical Medicine and Global Health, Nagasaki, Japan.

### **Authors' Contributions**

CM, KM, CS and MM designed the study; CM, SKF, KM and MM created the data collection protocol; CM and KM analysed qualitative data and CM and MM performed statistical analysis. CM, CS and MM wrote the manuscript. All the authors have read and approved the final draft of the manuscript.

### **Acknowledgements**

The authors are very grateful to Doctor Jacqueline Kitong for her kind support in planning of this study. The authors are indebted to Professor Vincent De Brouwere for precious comments on the manuscript.

### **Authors' information**

Affiliations

*Department of Global Health, Nagasaki University School of Tropical Medicine and Global Health, Sakamoto 1-12-4, Nagasaki 852-8523, Japan*

Chisato Masuda, Ken Masuda, Chris Smith, & Mitsuaki Matsui

*Department of Obstetrics and Gynaecology, Southern Philippines Medical Centre, JP Laurel Avenue, Bajada, Davao City 8000, The Philippines*

Shirley Kristine Ferolin

*Department of Clinical Research, London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E7HT, UK*

Chris Smith

### **Corresponding author**

Correspondence to Mitsuaki Matsui

## **References**

1. Tunçalp Ö, Were WM, MacLennan C, Oladapo OT, Gülmezoglu AM, Bahl R, *et al.* **Quality of care for pregnant women and newborns-the WHO vision.** *BJOG* 2015, **122**(8):1045-1049.
2. Miller S, Abalos E, Chamillard M, Ciapponi A, Colaci D, Comande D, Diaz V, *et al.* **Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide.** *Lancet* 2016, **388**(10056):2176-2192.
3. Duysburgh E, Zhang WH, Ye M, Williams A, Massawe S, Sie A, *et al.* **Quality of antenatal and childbirth care in selected rural health facilities in Burkina Faso, Ghana and Tanzania: similar finding.** *Trop Med Int Health* 2013, **18**(5):534-547.
4. Sharma G, Powell-Jackson T, Halder K, Bradley J, Filippi V. **Quality of routine essential care during childbirth: clinical observations of uncomplicated births in Uttar Pradesh, India.** *Bull World Health Organ* 2017, **95**(6):419-429.
5. Fisseha G, Berhane Y, Worku A, Terefe W. **Quality of the delivery services in health facilities in Northern Ethiopia.** *BMC Health Serv Res* 2017, **17**(1):187.
6. Kruk ME, Kujawski S, Mbaruku G, Ramsey K, Moyo W, Freedman LP. **Disrespectful and abusive treatment during facility delivery in Tanzania: a facility and community survey.** *Health Policy Plan* 2014:1-8.
7. World Health Organization Representative Office Philippines. **Essential Intrapartum and Newborn Care (EINC) Evidence-based Standard Practices.**  
[http://origin.wpro.who.int/philippines/areas/maternal\\_child\\_nutrition/newborn\\_mother\\_care/einc\\_protocols/en/](http://origin.wpro.who.int/philippines/areas/maternal_child_nutrition/newborn_mother_care/einc_protocols/en/)  
Accessed 14 April 2018.
8. World Health Organization. **Second biennial progress report: 2016-2017 (Action Plan for Health Newborn Infants in the Western Pacific Region: 2014-2020).** Manila: World Health Organization Regional Office for the Western Pacific; 2018.
9. Silvestre MAA, Mannava P, Corsino MA, Capili DS, Calibo AP, Tan CF, *et al.* **Improving immediate newborn care practices in Philippine hospitals: impact of a national quality of care initiative 2008-2015.** *Int J Qual Health Care* 2018, **30**(7):537-544.
10. Anim-Somuah M, Smyth RM, Cyna AM, Cuthbert A. **Epidural versus non-epidural or no analgesia for pain management in labour.** *Cochrane Database Systematic Rev* 2018, **5**:CD000331.
11. World Health Organization. **WHO recommendations: intrapartum care for a positive childbirth experience.** Geneva: World Health Organization; 2018.
12. Carroli G, Mignini L. **Episiotomy for vaginal birth.** *Cochrane Database Systematic Rev* 2009, **1**:CD000081.
13. Jiang H, Qian X, Carroli G, Garner P. **Selective versus routine use of episiotomy for vaginal birth.** *Cochrane Database Systematic Rev* 2017, **2**:CD000081.
14. Hofmeyr GJ, Vogel JP, Cuthbert A, Singata M. **Fundal pressure during the second stage of labour.** *Cochrane Satabase Syst Rev* 2017, **3**:CD006067.
15. Sturzenegger K, Schaffer L, Zimmermann R, Haslinger C. **Risk factors of uterine rupture with a special interest to uterine fundal pressure.** *J Perinat Med* 2017, **45**(3):309-313.
16. Teddlie C, Tashakkori A. **Foundations of mixed methods research : integrating quantitative and qualitative approaches in the social and behavioral sciences.** California: SAGE Publications; 2009.
17. Bernard HR. **Research methods in anthropology : qualitative and quantitative approaches. (4th ed).** Lanham, MD: AltaMira Press; 2006.

18. Kc A, Wrammert J, Clark RB, Ewald U, Malqvist M. **Inadequate fetal heart rate monitoring and poor use of partogram associated with intrapartum stillbirth: a case-referent study in Nepal.** *BMC Pregnancy Childbirth* 2016, **16**:233.
19. Department of Health, Philippine Obstetrical and Gynecological Society. **Clinical practice guidelines on intrapartum and immediate postpartum care.** Manila: Department of Health; 2012.
20. World Health Organization. **WHO recommendations for augmentation of labour.** Geneva: World Health Organization; 2014.
21. Al-Ghammari K, Al-Riyami Z, Al-Moqbali M, Al-Marjabi F, Al-Mahrouqi B, Al-Khatri A, *et al.* **Predictors of routine episiotomy in primigravida women in Oman.** *Appl Nurs Res* 2016, **29**:131-135.
22. Schantz C, Sim KL, Ly EM, Barennes H, Sudaroth S, Goyet S. **Reasons for routine episiotomy: A mixed-methods study in a large maternity hospital in Phnom Penh, Cambodia.** *Reprod Health Matters* 2015, **23**(45):68-77.
23. Trinh AT, Roberts CL, Ampt AJ. **Knowledge, attitude and experience of episiotomy use among obstetricians and midwives in Viet Nam.** *BMC Pregnancy Childbirth* 2015, **15**:101.
24. Saadia Z. **Rates and Indicators for Episiotomy in Modern Obstetrics - a study from Saudi Arabia.** *Mater Sociomed* 2014, **26**(3):188-190.
25. Ballesteros-Meseguer C, Carrillo-Garcia C, Meseguer-de-Pedro M, Canteras-Jordana M, Martinez-Roche ME. **Episiotomy and its relationship to various clinical variables that influence its performance.** *Rev Lat Am Enfermagem* 2016, **24**:e2793.
26. Hussein SA, Dahlen HG, Duff M, Schmied V: **The barriers and facilitators to evidence-based episiotomy practice in Jordan.** *Women birth* 2016, **29**(4):321-329.
27. Matsuo K, Shiki Y, Yamasaki M, Shimoya K. **Use of uterine fundal pressure maneuver at vaginal delivery and risk of severe perineal laceration.** *Arch Gyneco Obstet* 2009, **280**(5):781-786.
28. Moiety FM, Azzam AZ. **Fundal pressure during the second stage of labor in a tertiary obstetric center: a prospective analysis.** *J Obstet Gynaecol Res* 2014, **40**(4):946-953.
29. Balde MD, Diallo BA, Bangoura A, Sall O, Soumah AM, Vogel JP, *et al.* **Perceptions and experiences of the mistreatment of women during childbirth in health facilities in Guinea: a qualitative study with women and service providers.** *Reprod Health* 2017, **14**(1):3.
30. Cabral E. **The Philippine Health Agenda for 2016 to 2022.** *Phil J Int Med* 2016, **54**(2):1-11.
31. Philippines Health Insurance Corporation. **Annual report 2017.** Manila: Philippines Health Insurance Corporation; 2018.
32. Blondel B, Alexander S, Bjarnadottir RI, Gissler M, Langhoff-Roos J, Novak-Antolic Z, *et al.* **Variations in rates of severe perineal tears and episiotomies in 20 European countries: a study based on routine national data in Euro-Peristat Project.** *Acta Obstet Gynecol Scand* 2016, **95**(7):746-754.
33. Hirayama F, Koyanagi A, Mori R, Zhang J, Souza JP, Gülmezoglu AM. **Prevalence and risk factors for third- and fourth-degree perineal lacerations during vaginal delivery: a multi-country study.** *BJOG* 2012, **119**(3):340-347.
34. Pergialiotis V, Vlachos D, Protopapas A, Pappa K, Vlachos G. **Risk factors for severe perineal lacerations during childbirth.** *Int J Gynaecol Obstet* 2014, **125**(1):6-14.
35. Mahgoub S, Piant H, Gaudineau A, Lefebvre F, Langer B, Koch A. **Risk factors for obstetric anal sphincter injuries (OASIS) and the role of episiotomy: A retrospective series of 496 cases.** *J Gyneco Obstet Hum Reprod* 2019, **48**(8):657-662.
36. Keriakos R, Gopinath D. **Obstetric anal sphincter injuries.** *J Acute Dis* 2015, **4**(4):259-265.

37. Preston HL, Fowler GE. **Risk factors for and management of obstetric anal sphincter injury.** *Obstet Gynaecol Reprod Med* 2016, **26**(3):65-71.
38. Kudish B, Blackwell S, McNeeley SG, Bujold E, Kruger M, Hendrix SL, *et al.* **Operative vaginal delivery and midline episiotomy: a bad combination for the perineum.** *Am J Obstet Gynecol* 2006, **195**(3):749-754.
39. Räisänen SH, Vehviläinen-Julkunen K, Gissler M, Heinonen S: **Lateral episiotomy protects primiparous but not multiparous women from obstetric anal sphincter rupture.** *Acta Obstet Gynecol Scand* 2009, **88**(12):1365-1372.
40. Lund NS, Persson LK, Jango H, Gommesen D, Westergaard HB. **Episiotomy in vacuum-assisted delivery affects the risk of obstetric anal sphincter injury: a systematic review and meta-analysis.** *Eur J of Obstet Gynecol Reprod Biol* 2016, **207**:193-199.
41. Kataoka Y, Eto H, Iida M. **Outcomes of independent midwifery attended births in birth centres and home births: a retrospective cohort study in Japan.** *Midwifery* 2013, **29**(8):965-972.
42. Suto M, Takehara K, Misago C, Matsui M. **Prevalence of Perineal Lacerations in Women Giving Birth at Midwife-Led Birth Centers in Japan: A Retrospective Descriptive Study.** *J Midwifery Women Health* 2015, **60**(4):419-427.
43. Oswald D, Sherratt F, Smith S. **Handling the Hawthorne effect: The challenges surrounding a participant observer.** *Rev Soc Stud* 2014, **1**(1):53-73.
44. Graham ID, Carroli G, Davies C, Medves JM. **Episiotomy rates around the world: an update.** *Birth* 2005, **32**(3):219-223.
45. Kawulich BB. **Participant observation as a data collection method.** *Forum: Qualitat Soc Res* 2005, **6**(2):43.

## Tables

Table 1. Comparison of the characteristics of study participants and non-observed cases

Characteristics	Observed (n=178)	Non-observed (n=920)	p-value
Primiparas	54.1%	44.2%	0.018
Age (median and IQR)	23 [19-28]	24 [20-30]	0.074
Assisted vaginal birth	7.7%	7.6%	0.99

Table 2. Characteristic of parturient woman, delivery process, and maternal and neonatal outcomes (N=170)

	Frequency	%
<b>Maternal age</b>		
15-19	43	25.3
20-29	97	57.1
30-39	25	14.7
40-45	5	2.9
(median) [IQR]	(23) [19-28]	
<b>Parity</b>		
Primipara	88	51.8
Multipara	82	48.2
<b>Gestational week</b>		
Less than 37weeks	16	9.4
37 - 41weeks	151	88.8
More than 42weeks	3	1.8
<b>Fundal height [N=143]</b>		
Less than 32cm	100	69.9
32cm or more	43	30.1
(median) [IQR]	(30) [29-32]	
<b>Complication during current pregnancy</b>		
None	133	78.2
Hypertensive disorders	25	14.7
Gestational diabetes	6	3.5
Others	6	3.5
<b>Duration of the 2nd stage of labor</b>		
30 minutes or less	115	67.6
More than 30mins	55	32.4
(median) [IQR]	(19) [9-35]	
<b>Mode of delivery</b>		
Normal vaginal	154	90.6
Vacuum extraction or Forceps	16	9.4
<b>Time of delivery</b>		
Between 6pm and 6am (night shift)	82	48.2
Between 6am and 6pm (day shift)	88	51.8
<b>Birth attendant</b>		
Midwife	119	70.0
Medical doctor	49	28.8
Nurse	2	1.2
<b>Perineal or vaginal laceration</b>		
None	29	17.1
1 <sup>st</sup> degree	31	18.2
2 <sup>nd</sup> degree	81	47.6
3 <sup>rd</sup> degree	20	11.8
4 <sup>th</sup> degree	9	5.3
<b>Baby's weight at birth</b>		
Less than 2500g	14	8.2
2500 - 3499g	137	80.6
3500 - 3999g	18	10.6
4000g or more	1	0.6
(mean) [SD]	(2940) [415]	
<b>Baby's condition at birth</b>		
Well	141	82.9
Resuscitation or/and admission to NICU	28	16.5
Intrapartum foetal death	1	0.6

Table 3. Description of intrapartum care during the 2<sup>nd</sup> and 3<sup>rd</sup> stages of labour (N=170)

	Frequency	%
<b>Position at the birth of baby</b>		
Supine (0°)	3	1.8
Fowler's positions (less than 45°)	167	98.2
<b>Method of pushing</b>		
Not forced	126	74.1
Valsalva manoeuver instructed	44	25.9
<b>Episiotomy</b>		
Performed - median	98	57.6
Performed - medio-lateral	3	1.8
Not performed	69	40.6
<b>Episiotomy by parity</b>		
Performed in primiparas [n=88]	81	92.0
Performed in multiparas [n=82]	20	24.4
<b>Fundal pressure</b>		
Performed	53	31.2
Not performed	117	68.8
<b>Foetal heart rate monitoring</b>		
Not monitored	97	57.1
Intermittent auscultation	33	19.4
Cardio-tocograph	40	23.5
<b>Labour augmentation by oxytocin</b>		
Not conducted	110	64.7
By drip infusion only	36	21.2
By injection (im or iv)	21	12.4
By drip infusion and injection (im or iv)	3	1.8
<b>Prophylactic use of oxytocin in the third stage</b>		
Administrated	170	100
<b>Dose of oxytocin</b>		
10 IU	149	87.7
Less than 10 IU	21	12.4
<b>Delayed umbilical cord clamping [n=138]</b>		
Performed	69	50.0
Not performed	69	50.0
<b>Controlled cord traction</b>		
Performed	168	98.8
Not performed	2	1.2
<b>Counter pressure during CCT [n=168]</b>		
conducted	157	93.4
not conducted	11	6.6

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Additionalfile4Annex1.docx](#)
- [Additionalfile2Table05fundalpressure.docx](#)
- [Additionalfile1Table04episiotomy.docx](#)
- [Additionalfile3Table06lacerations.docx](#)