

Practice and its associated factors of evidence-based care during second and third stage of labour at tertiary teaching hospital in the Philippines, a descriptive mixed methods study

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Research article

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Abstract

Background Evidence-based practice is one of key components of quality maternal care. However, previous studies have identified gaps between evidence and actual practices at maternity in the Philippines. This study aims to describe practice of evidence-base intrapartum care and its associated factors in a tertiary teaching hospital.

Methods A mix-methods study was conducted, which consists 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. Descriptive statistics, and univariate and multivariate logistic regressions were used to analyse the relationship between observed practices and maternal, neonatal and environmental factors. Qualitative data was extracted and categorised to identify themes on 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. Following factors were associated with implementation of episiotomy; primipara (adjusted Odds Ratio 62.3 [16.3-237.1]), duration of the second stage more than 30 minutes (aOR 4.6 [1.2-17.7]) and assisted vaginal delivery (aOR 15.0 [1.2-192.0]). Factors associated with fundal pressure were; primipara (aOR 3.0 [1.4-6.7]), augmentation with oxytocin (aOR 3.3 [1.5-7.0]) and assisted vaginal delivery (aOR 4.8 [1.3-18.0]). Healthcare providers believe these practices can prevent laceration or proceed delivery. 17.1% of women got OASIS in this study. Assisted vaginal delivery (aOR 6.0 [1.6-22.4]), baby's weight more than 3500g (aOR 7.8 [1.7-36.6]), episiotomy (aOR 26.4 [2.3-299.0]) and fundal pressure (aOR 6.2 [2.1-18.2]) were associated with OASIS.

Conclusions Our study found potentially harmful practices were still conducted and they contributed to the occurrence of OASIS. The perception of these practices was divergent with the current evidence, empirical knowledge had more influence. Scientific evidence and its underlying knowledge should be understood among providers to improve practices.

Background

Quality of care has been the focus as areas for 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 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 key components of quality of care [1]. There are two entities regarding implementation of evidence-based care. The first is provision of 'recommended' services which have evidence of effectiveness, which generally facilitate the physiological process of birth. The second is avoidance of 'not recommended' services, which are often invasive medical interventions, necessary only for those who require it, and proved ineffective or harmful if provided in routine manner.

However, previous studies have identified gaps between available evidence and actual practices [2]. Essential routine monitoring and assessment during labour as well as key practices are not sufficiently conducted, with 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 in 2015 [9]. The effectiveness of didactic training approaches for maternal care was 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 practice of evidence-base intrapartum care and its associated factors in a tertiary teaching hospital in the Philippines.

Methods

Study Design

This study was a mix-methods study with a convergent parallel design, the quantitative and qualitative data were concurrently collected and 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, and primary and secondary healthcare facilities.

Study participants

Women entering the delivery room with singleton pregnancy were recruited in this study. Intrauterine foetal death at admission, breech or other abnormal presentations, and epidural analgesia cases were excluded. 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. Emergency caesarean section cases were withdrawn. Healthcare providers (medical doctors, nurses and midwives) who assisted deliveries at the maternity unit during the study period were interviewed.

Data collection

Quantitative strand

Intrapartum practices by healthcare providers during the second and third stages of labour were directly observed between May 6th and June 9th 2018. Observed practices during the second stage of labour were selected from the latest WHO recommendations on intrapartum care [10]. 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. 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.

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 intended to be conducted immediately after the delivery. In addition, Focus Group Discussions (FGD) were conducted with selected healthcare providers to explore their experience and perceptions regarding episiotomy and fundal pressure. The result of observation were shared with the participants together with the evidence behind the guidelines of those practices. Some questions were asked to discuss how they recognize the benefit and adverse effects of those practices and evidence behind the guidelines.

Data analysis

Quantitative strand

Descriptive statistics were used to show the participants' and the observed intrapartum care characteristics. Chi-squared test and the Mann-Whitney *U* test were used to compare proportions and for 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). We selected the two practices because they are potentially harmful when routinely applied to pregnant women, and are frequently misused. 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 3rd and 4th 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 [11]. Those pieces were categorised and those categories were linked together to identify themes on the decision-making process of medical providers [12]. This qualitative data was 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 1-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 (54.1% vs 44.2%, p = 0.018). 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. 151 cases (88.8%) were term deliveries. 78.2% of mothers did not have any complications, 14.7% had hypertension disorders, 3.5% had gestational diabetes and 3.5% had other complications. Duration of the 2nd stage was categorized as more or less than 30 minutes according to a consensus among the health providers interviewed. 67.6% of deliveries completed the 2nd stage within 30 minutes. The median duration of the 2nd stage was 19 minutes. Most mothers delivered spontaneously (90.6%), while vacuum extraction or forceps were applied in 16 cases (9.4%). Time of delivery at dayshift (6am to 6pm) and night shift (6pm to 6am) were almost equivalent. A midwife was the most common birth attendant for vaginal delivery (70.0 %), followed by medical doctor (28.8%) and nurse (1.2%). 82.9% of women experienced perineal and vaginal laceration. Its prevalence and degree were 18.2%, 47.6%, and 17.1% for the 1st (mild), 2nd (moderate), and 3rd or 4th (OASIS), respectively. The mean birth weight of the babies was 2940g. 28 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 2nd and 3rd stage of labour

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

Position during the 2nd stage of labour: The position during the 2nd stage was mostly a semi-upright gynaecological position (95.9%). Four cases tentatively took a left lateral or squatting position “to rotate baby”, “to provide oxygen to baby” “to reduce pain” or “to promote the foetal head descending”, but all mothers finally delivered in lithotomy or semi-upright position.

Method of pushing: 25.9% of women were forced to push using the Valsalva Manoeuvre, whereby the healthcare provider counted the number of seconds - more than 10 seconds - to encourage mothers to keep pushing without breathing.

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

Fundal Pressure: Fundal pressure was performed on 31.2% of the 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: 57.1% of mothers did not receive FHR monitoring during the 2nd stage of labour. Healthcare providers conducted intermittent auscultation for 19.4% of mothers using a stethoscope or Doppler ultrasound. The median frequency and interval of the auscultation was once per minute (IQR 1–2) and 19 (IQR 13–32) minutes, respectively. The Cardio-tocograph was used for 23.5% of mothers. The median duration of monitoring was 10 (IQR 5–25.5) minutes.

Labour augmentation by oxytocin: Oxytocin was given during the 2nd stage for 35.3% of mothers. It was administered by drip infusion, injection (intramuscular, or intravenous) and both drip infusion and injection in 36, 21 and 3 women, respectively. During or immediately after the administration, monitoring of the infusion rate of oxytocin and observation of uterine contraction were not conducted in all the cases.

Prophylactic use of oxytocin to prevent PPH: After delivery, oxytocin was administered to prevent postpartum haemorrhage to all 170 cases by intramuscular injection. 21 cases (12.4%) did not receive the 10 IU dose of oxytocin as recommended in the national guideline, since 2 to 5 units of oxytocin were used for augmentation during the 2nd stage by injection.

Delayed umbilical cord clamping: Delayed umbilical cord clamping was observed when babies condition at the birth was good. It was applied in 50.0% of deliveries out of 138 cases observed (there were three missing data out of 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, and that episiotomy is a protective measure against it. Explanation why primiparas need episiotomy is derived from the characteristic of their vagina and perineum, such as *“small”, “not elastic”, “contracted”* and *“tight”*. This representation of the primiparas perineum let them predict the occurrence of the severe, zigzag or multiple laceration if episiotomy was not conducted. Some doctors and midwives also said that such laceration is *“difficult to suture”* and *“takes time to repair”*, while they were treating many delivering women. *“Large baby”* was one of the reasons to perform episiotomy. The providers assessed the size of the baby by the fundal height, however the criteria to evaluate the size of baby differed by each person, ranging from 28cm to 32cm. On the other hand, they 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 is effective to *“help the baby’s head descending”, “accelerate the 2nd stage”* or *“hasten the delivery”* from their experiences. Reported reasons for performing fundal pressure included; *“foetal head descending is not improving”, “long or prolonged 2nd stage”* and *“weak maternal pushing and maternal effort failed”* described as *“mother stopped pushing in few seconds”*. Because they 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 2nd stage: *“Long or prolonged 2nd 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 were performed those practices.

The following factors were associated with episiotomy; primipara (adjusted odds ratio [95% confidence interval] 62.3 [16.3–237.1]), duration of the second stage of labour more than 30 minutes (aOR 4.6 [1.2–17.7]) and assisted vaginal delivery by vacuum extraction or forceps (aOR 15.0 [1.2–192.0]). Having maternal complications was negatively associated (aOR 0.10 [0.02–0.45]). No associations were found with fundal height and foetal heart rate monitoring.

Besides, the following factors were associated with fundal pressure; primipara (aOR 3.0 [1.4–6.7]), labour augmentation by oxytocin (aOR 3.3 [1.5–7.0]) and assisted vaginal delivery (aOR 4.8 [1.3–18.0]) were positively associated with its implementation. Duration of the second stage of labour more than 30 minutes (aOR 2.4 [0.99–5.6]) has a borderline positive association. No association was found with foetal heart rate monitoring.

Associated factors for OASIS

As presented in Table 2, 17.1% of women got OASIS, 11.8% of third degree and 5.3% of fourth degree. 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 [1.6–22.4]), baby's weight more than 3500g (aOR 7.8 [1.7–36.6]), episiotomy (aOR 26.4 [2.3–299.0]) and fundal pressure (aOR 6.2 [2.1–18.2]) 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 apparently or 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 reason 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 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 1st and 2nd stages of labour in a study at a tertiary hospital in Nepal [13]. This study indicates that healthcare workers systematically miss the opportunity to detect foetal asphyxia. This might have been a contributing factor to the intrapartum foetal death and 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 [14]. 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 2nd 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 [15]. 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 for primiparas

We found that episiotomy was provided to almost all primiparas (92.1%). 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* [14]. The scientific evidence behind the guideline is that routine episiotomy is not effective to reduce vaginal and perineal lacerations regardless of the parity [16, 17]. 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 [18] [19, 20]. Other previous studies have shown that primiparity is the most common factor associated with episiotomy [19, 21–23]. Findings from both previous and the present study 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 [10]. However, our result has implied that healthcare providers conduct medical interventions 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 to environmental constraints such as shortage of providers or limited number of delivery beds [10].

Assisted vaginal birth facilitates rapid descent of foetal head and insertion of equipment mechanically extends the vaginal canal. Therefore, these can increase the probability of OASIS. As has been shown in our qualitative investigation, healthcare providers believed that episiotomy itself was one of the preventive measures for laceration, therefore, increase in episiotomy rate can be explained by the perception, especially when instrumental delivery is conducted. Previous studies have revealed that medio-lateral episiotomy has a protective effect against OASIS in primiparas with assisted vaginal deliveries [24, 25]. Therefore, its application is justifiable. Both fundal pressure and FHR monitoring did not show any association with episiotomy after controlling for potential confounding factors. Episiotomy is one important means to accelerate the delivery course, so that it can be applied when foetal asphyxia is suspected. Asphyxia is detected only by 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.

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 2nd 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 [14], since it does not change any desirable maternal outcomes such as duration of the 2nd stage, instrumental delivery or caesarean section, as well as neonatal outcomes such as low arterial cord pH and Apgar scores [26]. Fundal pressure also may increase the occurrence of severe laceration, cervical tears and the possibility of uterine rupture [27–29]. Excessive fundal pressure is described as painful, forceful and even an abusive experience by women [30]. 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 [31]. 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 [32]. 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 OASIS prevalence was between 0 and 15.6% (average 2.8%) in a restrictive episiotomy group and 0 and 14.3% (4.8%) in a liberal use of episiotomy group [17]. National aggregated data from twenty European countries showed that the OASIS rates were between 0.1% in Romania to 4.9% in Iceland [33]. 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 the 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 [34–36]. OASIS has both short- and long-term severe consequences, such as pain, infection, dyspareunia, sexual dysfunction and anal incontinence [37, 38]. 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. In addition, median episiotomy should not be applied when instrumental delivery is considered. Median episiotomy is a known risk factor for OASIS in operative deliveries, whereas medio-lateral or lateral episiotomy has a protective effect [25, 39, 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 OASIS rates 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. It may have positively improved behaviour of healthcare providers. 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 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 guidelines; lack of FHR monitoring, improper use of oxytocin during labour, excessive use of episiotomy for primiparas and fundal pressure. Primiparity and duration of the 2nd stage influenced the healthcare providers decision to perform episiotomy and fundal pressure. The perception of those practices was divergent with the current available scientific evidence, with empirical knowledge having more influence on their practice. These potentially harmful practices contributed to the occurrence of OASIS. Merely disseminating guidelines and recommendations is unlikely to improve practices, as the 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.

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 0048) and approved by the Department of Health XI Cluster Ethics Review Committee in the Philippines (approved protocol number P18032601). Parturient mothers were informed but not required the consent for this study under the permission and endorsement of the observation from 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 consents 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.

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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 read and approved the final draft of the manuscript.

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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	%
Maternal age		
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]	
Parity		
Primipara	88	51.8
Multipara	82	48.2
Gestational week		
Less than 37weeks	16	9.4
37 - 41weeks	151	88.8
More than 42weeks	3	1.8
Fundal height [N=143]		
Less than 32cm	100	69.9
32cm or more	43	30.1
(median) [IQR]	(30) [29-32]	
Complication during current pregnancy		
None	133	78.2
Hypertensive disorders	25	14.7
Gestational diabetes	6	3.5
Others	6	3.5
Duration of the 2nd stage of labor		
30 minutes or less	115	67.6
More than 30mins	55	32.4
(median) [IQR]	(19) [9-35]	
Mode of delivery		
Normal vaginal	154	90.6
Vacuum extraction or Forceps	16	9.4
Time of delivery		
Between 6pm and 6am (night shift)	82	48.2
Between 6am and 6pm (day shift)	88	51.8
Birth attendant		
Midwife	119	70.0
Medical doctor	49	28.8
Nurse	2	1.2
Perineal or vaginal laceration		
None	29	17.1
1 st degree	31	18.2
2 nd degree	81	47.6
3 rd degree	20	11.8
4 th degree	9	5.3
Baby's weight at birth		
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]	
Baby's condition at birth		
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 2nd and 3rd stages of labour (N=170)

	Frequency	%
Position during the 2nd stage		
Supine (0°)	3	1.8
Fowler's positions (less than 45°)	163	95.9
Lateral or squatting	4	2.4
Method of pushing		
Not forced	126	74.1
Valsalva manoeuvre instructed	44	25.9
Episiotomy		
Performed - median	98	57.6
Performed - medio-lateral	3	1.8
Not performed	69	40.6
Episiotomy by parity		
Performed in primiparas [n=88]	81	92.0
Performed in multiparas [n=82]	20	24.4
Fundal pressure		
Performed	53	31.2
Not performed	117	68.8
Foetal heart rate monitoring		
Not monitored	97	57.1
Intermittent auscultation	33	19.4
Cardio-tocograph	40	23.5
Labour augmentation by oxytocin		
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
Prophylactic use of oxytocin to prevent PPH		
Administered	170	100
Dose of oxytocin		
10 IU	149	87.7
Less than 10 IU	21	12.4
Delayed umbilical cord clamping [n=138]		
Performed	69	50.0
Not performed	69	50.0
Controlled cord traction		
Performed	168	98.8
Not performed	2	1.2
Counter pressure during CCT [n=168]		
conducted	157	93.4
not conducted	11	6.6

Supplementary Files

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