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Do Symptoms of Pelvic Floor Disorders Bias Maternal Recall of Obstetrical Events Up to 10 Years After Delivery?

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Abstract

Objectives—The aim of this prospective study was to investigate whether symptoms of incontinence and prolapse bias maternal recall of obstetrical events up to 10 years after delivery.

Methods—In this secondary analysis of data gathered from the Mothers' Outcomes After Delivery study, we compared obstetrical medical records with maternal recall of delivery events. We calculated the agreement between maternal recall and the medical record across 1821 deliveries from 1011 participants for events including macrosomia, mode of delivery, prolonged second of labor, episiotomy, spontaneous laceration, anal sphincter laceration, and operative delivery. Women with symptomatic pelvic floor disorders were identified through administration of the Epidemiology of Prolapse and Incontinence Questionnaire or a clinical history of therapy for a pelvic floor disorder. We determined whether agreement between maternal recall and the medical record differed for those with or without symptoms using the medical record as a criterion standard.

Results—Agreement between maternal recall and the medical record was excellent for macrosomia and forceps deliveries ($\kappa > 0.8$), fair to good for episiotomy ($\kappa = 0.61$) and anal sphincter laceration ($\kappa = 0.57$), and poor for spontaneous perineal laceration ($\kappa = 0.41$). Symptomatic pelvic floor disorders did not impact maternal recall of macrosomia, prolonged second stage, episiotomy, spontaneous laceration, or operative delivery. However, recall of anal sphincter lacerations was biased by symptoms of pelvic floor disorders. Specifically, symptomatic women were significantly more likely to report a history of anal sphincter laceration, regardless of whether a sphincter laceration was documented ($P = 0.025$).

Conclusions—Maternal recall of anal sphincter laceration may be biased by symptomatic pelvic floor disorders. In research based on maternal recall of obstetrical events, this could strengthen the apparent association between sphincter laceration and pelvic floor disorders.

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Keywords

pelvic floor disorders; recall bias; obstetrical anal sphincter laceration; Epidemiology of Prolapse and Incontinence Questionnaire

An accurate patient medical history, whether obtained from the patient's interview or medical record, is integral to clinical decision making. The National Health Interview Surveys, performed over 50 years ago, suggested that patient recall of medical diagnoses and interventions 1 year after hospitalization was greater for childbirth events than for other types of hospitalizations.^{1,2} However, recall declines over time. Individuals have difficulty recalling 20% of critical details related to autobiographical events after 1 year and 60% after 5 years.³ This can be problematic for the provision of quality health care and for research that relies on self-report of historical information.

Although recall of obstetrical events may be better than recall of other health care events, several studies have demonstrated limited concordance between patient-reported information and the obstetrical medical record. Maternal recall is excellent for some details of the obstetrical history (eg, cesarean vs vaginal birth) but poor for other aspects (eg, use of forceps vs vacuum, delivery lacerations requiring repair, and oxytocin use).^{4–14} An important question is whether maternal recall of obstetrical events is likely to be biased by subsequent health outcomes. For research investigating obstetrical risk factors for pelvic floor disorders, it is critical to determine whether maternal symptoms of such disorders bias recall of obstetrical events.

This study investigated the agreement between long-term maternal recall of obstetrical events and the medical record, using data abstracted from the Mothers' Outcomes After Delivery (MOAD) study.¹⁵ Participants were asked to report their obstetrical history up to 10 years after delivery. Our specific aims were to describe agreement between maternal recall and the medical record and to investigate whether recall differed by presence or absence of symptomatic pelvic floor disorders.

MATERIALS AND METHODS

The MOAD study is an ongoing prospective cohort study of pelvic floor outcomes in women after childbirth.¹⁵ To be eligible for enrollment, women must have given birth to their first child at Greater Baltimore Medical Center (GBMC) 5 to 10 years before enrollment. The recruitment methods and exclusion criteria have been described in detail elsewhere.¹⁵ Institutional review board approval was obtained for this research, and all participants provided written informed consent.

At the MOAD baseline study visit, women completed a questionnaire addressing the obstetrical histories for each of their deliveries. The medical record for each delivery was reviewed by 1 of our obstetrically trained investigators. Maternal recall, as obtained from the questionnaire, was compared with the medical record. Only delivery records from GBMC were available to investigators; thus, non-GBMC-based deliveries were excluded from this analysis. Multigestational deliveries were also excluded from analysis.

Obstetrical outcomes of interest for comparison for all deliveries included route of delivery (vaginal vs cesarean) and macrosomia (birth weight >4 kg). Some of the variables of interest were relevant only to women who delivered by cesarean. For each cesarean delivery, women were asked, “Was your cesarean performed before you went into labor?” Their responses were compared with medical documentation of labor (defined as spontaneous rupture of membranes, regular contractions with cervical change, or a diagnosis of labor by the obstetrical team).

All women who experienced labor were asked, “Was your labor induced?” For cesarean deliveries with self-reported labor, women were further asked, “When you had your cesarean, how many centimeters dilated was your cervix?” For all vaginal deliveries, as well as deliveries with maternal recall of complete cervical dilation before cesarean, women were asked, “How long did you ‘push’ before you delivered the baby, less than 1 hour, 1 to 2 hours, or more than 2 hours?” Maternal responses to each of these questions were compared with documentation in the medical record of pharmacologic initiation of labor, dilation at time of cesarean delivery, and second stage of labor longer than 2 hours, respectively.

Several obstetrical events of interest were relevant only for vaginal deliveries; these are as follows: episiotomy, spontaneous perineal laceration, anal sphincter laceration, forceps delivery, and vacuum delivery. Regarding episiotomy and laceration, women were asked, “When you delivered the baby, did you have an episiotomy?” and “When you delivered the baby, did you have stitches to repair a tear?” Those who answered yes to the episiotomy question were considered to have reported an episiotomy. Those who answered no to the episiotomy question and yes to the “stitches” question were considered to have reported a spontaneous laceration. Therefore, maternal recall of episiotomy and spontaneous perineal laceration were considered mutually exclusive for each delivery. In addition, for all vaginal births, women were asked, “Did you have a tear into the rectum, anus, or ‘anal sphincter muscle’ (third- or fourth-degree tear)?”

The survey was designed with conditional logic. Thus, women were asked questions that build upon their previous answers. Women who reported that they did not experience labor before a cesarean delivery were not asked about labor induction, dilation at time of cesarean, or duration of the second stage. For all questions, women could respond “not sure” or “don’t want to answer.”

For each event of interest, agreement between maternal recall and medical records was quantified by κ statistic. A κ statistic of greater than 0.8 indicates excellent agreement, 0.6 to 0.8 indicates good agreement, and 0.4 to 0.6 indicates fair agreement, whereas a coefficient less than 0.4 suggests poor agreement.¹⁶ Deliveries for which medical documentation of the maternal outcome or maternal recall was missing were reported but could not be included in the statistical analysis quantifying agreement, that is, κ statistic.

We also investigated whether the presence of any symptomatic pelvic floor disorder (eg, present at the time women were asked to recall their obstetrical history) influenced recall. To identify women with symptomatic pelvic floor disorders, we used the Epidemiology of Prolapse and Incontinence Questionnaire (EPIQ). This is a validated self-administered

questionnaire designed to identify symptoms associated with stress urinary incontinence, overactive bladder, anal incontinence, and pelvic organ prolapse.¹⁷ Women with bothersome symptoms were identified using published thresholds for EPIQ scores. In addition, women who reported prior surgery, prior supervised pelvic muscle exercises, or any current therapy for a specific pelvic floor disorder were considered to have a symptomatic pelvic floor disorder, regardless of EPIQ score. A priori, we hypothesized that the presence of bothersome pelvic floor disorder symptoms or clinical history of therapy for a pelvic floor disorder would increase the probability that women would report episiotomies, lacerations, operative delivery, prolonged second stage, and macrosomia, but all aspects of the obstetrical history were considered. This analysis was restricted to first births. For each outcome, κ statistic as well as specificity and sensitivity of the maternal recall were calculated, presuming the medical record to be the criterion standard. Women unable to recall whether they experienced an obstetrical outcome were treated as not reporting the event of interest and were included in the analysis. For each outcome of interest, homogeneity between women with and without pelvic floor symptoms of correct maternal recall (percent agreement between self-report and hospital record) was tested using Fisher exact tests.¹⁸ Because this is a secondary analysis, the study population was predetermined. As such, the sample size was constrained by the number of participants enrolled in the MOAD study, by the proportion with symptoms of pelvic floor disorders, and by the prevalence of each obstetrical outcome in this population.

RESULTS

At the time of analysis, 1011 women had enrolled in the MOAD study, reporting a total of 1938 deliveries. We excluded 98 deliveries that occurred at hospitals other than GBMC and an additional 19 multigestational deliveries. Thus, analysis was based on 1821 singleton deliveries from 1011 participants. Because of the design of the parent study, cesarean births were overrepresented (1053 cesareans and 768 vaginal births). At enrollment, 830 women (82%) identified themselves as white, and 728 (72%) were multiparous. Four hundred thirty-four (43%) participants self-reported graduating from college, and an additional 344 (34%) reported a graduate degree as their highest level of education. More than one quarter (283, 28%) were older than 35 years of age at their first delivery.

Table 1 shows the distribution of the delivery-specific obstetrical characteristics, as documented in the medical records, for all 1821 deliveries. The median maternal age at the time of delivery was 33 years, with a median duration of 6 years between delivery and enrollment into the study. Of the 1053 cesarean deliveries, 576 (55%) occurred during labor, and a quarter of these occurred during the second stage of labor (ie, after 10-cm dilation).

Agreement between maternal recall and medical records is shown in Table 2. As shown in the table, in some cases, the medical records were missing data—most notably for anal sphincter laceration (78/768, 10%), episiotomy (43/768, 6%), and perineal laceration (43/768, 6%). Maternal uncertainty (the mother could not recall the information) is also indicated. Maternal uncertainty was highest for complete cervical dilation before a cesarean delivery, as almost half of women with labor before a cesarean delivery could not report whether their cervix was fully dilated before the delivery (267/576, 47%). High rates of

uncertainty were also reported for episiotomy (120/768, 16%), spontaneous laceration (134/768, 17%), and anal sphincter laceration (155/768, 20%). Deliveries for which medical documentation of the maternal outcome or maternal recall was missing could be not included in the calculation of the κ statistic.

Table 2 also presents agreement and disagreement for each obstetrical outcome. Agreement was best for report of macrosomia and cesarean delivery. These outcomes had low rates of uncertainty (<5%) and excellent agreement ($\kappa > 0.8$). Recall was good for labor induction ($\kappa = 0.73$) and prolonged second stage of labor ($\kappa = 0.65$). Among cesarean deliveries, agreement was excellent for labor before cesarean ($\kappa = 0.82$) and for dilation to 10 cm before cesarean ($\kappa = 0.89$), although maternal recall uncertainty regarding cervical dilation was high in this group, as previously noted.

Among vaginal deliveries, recall was excellent for the use of forceps ($\kappa = 0.85$), fair to good for vacuum delivery ($\kappa = 0.77$) and episiotomy ($\kappa = 0.61$), and was only fair for spontaneous laceration ($\kappa = 0.41$) and anal sphincter laceration ($\kappa = 0.57$). Episiotomies were overreported, with 89 women recalling an episiotomy that was not documented in the medical record (false positives). Conversely, spontaneous lacerations were underreported; of the 252 deliveries complicated by spontaneous lacerations, 135 were not reported by the mothers (false negatives). Similarly, 32 of the 69 deliveries that resulted in anal sphincter lacerations were not reported by the mothers.

Of the 1011 participants, 208 had at least 1 symptomatic pelvic floor disorder, defined as an EPIQ score above the threshold for “bothersome” symptoms or a history of treatment for pelvic floor disorders. This included 112 women with stress urinary incontinence, 79 with overactive bladder, 26 with prolapse, and 107 with anal incontinence. For most of the variables considered, sensitivity, specificity, and κ was similar between women with and without symptoms of pelvic floor disorders. The presence of any of symptomatic pelvic floor disorders did not appear to modify maternal recall with respect to macrosomia, delivery type, labor induction, prolonged second stage of labor, complete dilation before cesarean, episiotomy, spontaneous laceration, or forceps delivery (Table 3).

However, agreement differed between these groups for anal sphincter laceration. As shown (Table 3), the sensitivity of maternal recall for anal sphincter laceration was higher among those with symptomatic pelvic floor disorders than others (47% [17/36] vs 33% [16/49]). Conversely, the specificity of maternal recall for anal sphincter laceration was somewhat lower among those with symptomatic pelvic floor disorders than others (93% [54/58] vs 97% [222/228]). In other words, although anal sphincter lacerations were underreported among women in both groups, women with symptoms of incontinence or prolapse were significantly more likely than those without symptoms to report having an anal sphincter tear ($P = 0.025$).

The difference in agreement approached significance for vacuum deliveries ($P = 0.056$), primarily due to a difference in sensitivity; among those with a documented vacuum delivery, women with pelvic floor disorders were less likely to report a vacuum birth (sensitivity, 71% vs 87%). This difference did not reach statistical significance, and the

limited number of women with pelvic floor symptoms and a documented history of vacuum delivery (n = 14) makes it difficult to comment on this trend.

DISCUSSION

The results of our current study suggest that long-term maternal recall may be a valid source of information for some, but not all, obstetrical events of interest. This is consistent with other studies of maternal recall.⁴⁻¹⁴ Agreement between maternal recall and the medical record was excellent for macrosomia and forceps birth but only fair for some aspects of obstetrical history, including the occurrence of episiotomy, spontaneous laceration, and anal sphincter laceration (third- and fourth-degree tears). Over-reporting of episiotomies and underreporting of spontaneous laceration suggests that mothers may confuse the 2 obstetrical outcomes during recall. In addition, we observed greater than 10% maternal uncertainty for these variables. This contrasts with another study that showed excellent to good recall for episiotomies and “tears” 3 weeks postpartum.⁵ Our data are more consistent with a study of long-term recall (on average, 30 years after delivery) that showed low sensitivity and positive predictive value for “laceration requiring repair.”⁴ Considered together, these results support the idea that recall of obstetrical outcomes is most reliable soon after delivery. Declining recall with time could be a threat to research that relies on maternal recall for remote health outcomes.

However, the most important finding from this research is that recall of anal sphincter lacerations appears to be biased by symptoms of pelvic floor disorders. Recall agreement was significantly better among women with symptoms of incontinence or prolapse, although both groups underreported the outcome. This bias was not observed for prolonged second stage of labor, episiotomies, or spontaneous perineal lacerations. Because women with symptoms seem to be more likely to remember an anal sphincter laceration, the reported association between pelvic floor disorders and sphincter laceration could be inflated in studies that rely on maternal recall.

Short-term recall of anal sphincter laceration has been examined by Elkadry et al.⁶ Although the median time since delivery was only 10 weeks, women still had poor recall and low specificity of “tears into the rectum.”⁶ Because recall of anal sphincter lacerations is poor regardless of time from delivery and may be biased by later development of symptoms of incontinence and prolapse, providers should review medical records rather than rely on patient recall for this outcome, especially because a prior sphincter laceration may impact care during a subsequent delivery.¹⁹

Strengths of this study include the large overall sample size, the use of a validated questionnaire for pelvic floor disorders, and the comprehensive review of medical records. One study limitation is that our population is highly educated and composed of relatively older mothers. In addition, by design, the participants were selected such that low-risk pregnancies were overrepresented. Thus, our study cohort may not be generalizable to other obstetrical populations.

We acknowledge that the medical record documentation of obstetrical events is known to be imperfect.¹² The medical record may also be incomplete. For example, in the present study, the medical record of 78 of 768 vaginal births did not contain documentation regarding the presence or absence of anal sphincter laceration. Thus, the medical record is inherently an imperfect criterion standard.

One conclusion that could be drawn from this research is that women do not receive enough information from providers about their childbirth experience. A recent review of previous research showed that women were dissatisfied with the amount of information provided to them throughout the delivery process and the months after birth.²⁰ Specifically, women were interested in having more information with regard to tears and episiotomies. Because these are the events that also had poor recall and high maternal uncertainty, providers may want to spend extra time to ensure that women do not feel limited by the information they receive with regards to these obstetrical events. Doing so could lead to better maternal recall and high patient satisfaction overall.²¹

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TABLE 1

Characteristics of 1821 Singleton Births, Among 1011 Women, Based on Data From the Medical Records

Obstetrical Characteristic	Missing	All Births, N = 1821	Cesarean Births, n = 1053	Vaginal Births, n = 768
Maternal age at delivery, median (interquartile range), y	0	33 (30–36)	33 (29–36)	33 (30–36)
Years between delivery and enrollment, median (interquartile range)	0	6 (5–8)	6 (5–8)	6 (5–8)
Macrosomia, birth weight >4 kg	6	12% (214)	14% (150)	8% (64)
Any labor	3	74% (1343)	55% (576)	NA*
Induced labor (among deliveries with any labor)	3	41% (552/1343)	42% (241/576)	41% (311/767)
Cervical dilation at birth	425*			
<3 cm		13% (184)	29% (184)	NA
3–6 cm		11% (157)	25% (157)	NA
6–10 cm		9% (130)	21% (130)	NA
10 cm		66% (925)	25% (157)	NA
Second stage 120 min (among those who reached 10-cm dilation)	12	28% (258/913)	85% (130/153)	17% (128/760)
Episiotomy	43	NA	NA	43% (314)
Spontaneous laceration (without episiotomy)	43	NA	NA	46% (335)
Anal sphincter laceration (with or without episiotomy)	78	NA	NA	15% (101)
Forceps	23	NA	NA	10% (77)
Vacuum	24	NA	NA	8% (57)

* Of deliveries with missing cervical dilation, 308 were scheduled cesarean deliveries and 60 were cesarean delivery for breech or malposition. NA, not applicable.

TABLE 2

Agreement Between Medical Records and Maternal Recall for 1821 Deliveries

	Excluded From This Analysis			Agreement		Analyzed Deliveries		κ Statistic (95% Confidence Interval)
	Missing From Medical Records	Mother Cannot Recall (Missing From Self-Report)	n	Neither Reported by Mother nor Resent in Record (True Negative)	Reported by Mother and Present in Record (True Positive)	Reported by Mother But Not Present in Record (False Positive)	Not Reported by Mother But Present in Record (False Negative)	
All deliveries, N = 1821								
Macrosomia, birth weight >4kg	6	41	1774	1550	196	14	13	0.93 (0.90–0.95)
Cesarean delivery	0	1	1820	767	1053	0	0	1.0
Induced labor*	3	72	1271	607	490	146	28	0.73 (0.69–0.76)
Second stage 120 min [†]	12	98	815	584	131	32	68	0.65 (0.58–0.71)
Cesarean deliveries only, n = 1053								
Any labor before cesarean	2	18	1033	431	508	37	57	0.82 (0.78–0.85)
Cesarean after dilation to 10 cm [‡]	13	267	298	192	92	11	3	0.89 (0.84–0.95)
Vaginal deliveries only, n = 768								
Episiotomy	43	120	605	235	250	89	31	0.61 (0.54–0.67)
Spontaneous laceration	43	134	591	314	117	25	135	0.41 (0.34–0.48)
Anal sphincter laceration	78	155	535	452	37	14	32	0.57 (0.46–0.68)
Forceps	23	60	685	599	66	17	3	0.85 (0.79–0.92)
Vacuum	24	64	680	613	44	16	7	0.77 (0.69–0.86)

* Induced labor excludes 475 deliveries with no indication of labor.

[†] Prolonged second stage excludes 896 cesarean deliveries with no second stage of labor (ie, <10-cm cervical dilation).[‡] Laboring cesarean with dilation to 10 cm excludes 475 cesarean deliveries with no indication of labor before delivery.

TABLE 3

Comparison of the Agreement Between Maternal Recall and the Obstetrical Record for Those With Versus Those Without Symptomatic Pelvic Floor Disorders*

	Women With Pelvic Floor Disorders [†]	Women Without Pelvic Floor Disorders [†]	P for Difference of % Agreement
All deliveries *			
Macrosomia	$\kappa = 0.98$ (0.93–1.00) Sensitivity, 100% (24/24) Specificity, 99% (183/184) (n = 208)	$\kappa = 0.93$ (0.89–0.97) Sensitivity, 93% (84/90) Specificity, 99% (705/710) (n = 800)	0.48
Cesarean delivery	$\kappa = 1.00$ Sensitivity, 100% (97/97) Specificity, 100% (111/111) (n = 208)	$\kappa = 1.00$ Sensitivity, 100% (496/496) Specificity, 100% (307/307) (n = 803)	0.99
Induced labor	$\kappa = 0.58$ (0.47–0.70) Sensitivity, 69% (66/95) Specificity, 89% (80/90) (n = 185)	$\kappa = 0.66$ (0.60–0.72) Sensitivity, 77% (266/344) Specificity, 89% (316/357) (n = 701)	0.20
Prolonged second stage	$\kappa = 0.44$ (0.29–0.58) Sensitivity, 53% (31/58) Specificity, 88% (74/84) (n = 142)	$\kappa = 0.46$ (0.38–0.55) Sensitivity, 51% (92/181) Specificity, 93% (223/239) (n = 420)	0.82
Cesarean deliveries *			
Any labor before cesarean	$\kappa = 0.73$ (0.58–0.89) Sensitivity, 91% (67/74) Specificity, 87% (20/23) (n = 97)	$\kappa = 0.72$ (0.65–0.79) Sensitivity, 89% (353/395) Specificity, 92% (92/100) (n = 495)	0.99
Cesarean after dilation to 10 cm [‡]	$\kappa = 0.59$ (0.41–0.78) Sensitivity, 61% (19/31) Specificity, 95% (41/43) (n = 74)	$\kappa = 0.60$ (0.52–0.69) Sensitivity, 57% (68/119) Specificity, 97% (268/276) (n = 395)	0.38
Vaginal deliveries *			
Episiotomy	$\kappa = 0.60$ (0.44–0.75) Sensitivity, 83% (50/60) Specificity, 76% (32/42) (n = 102)	$\kappa = 0.59$ (0.50–0.69) Sensitivity, 85% (147/173) Specificity, 74% (91/123) (n = 296)	0.99
Spontaneous laceration	$\kappa = 0.34$ (0.16–0.52) Sensitivity, 41% (17/41) Specificity, 90% (55/61) (n = 102)	$\kappa = 0.46$ (0.36–0.56) Sensitivity, 45% (50/111) Specificity, 97% (179/185) (n = 296)	0.18
Anal sphincter laceration	$\kappa = 0.44$ (0.26–0.62) Sensitivity, 47% (17/36) Specificity, 93% (54/58) (n = 94)	$\kappa = 0.38$ (0.23–0.53) Sensitivity, 33% (16/49) Specificity, 97% (222/228) (n = 277)	0.025
Vacuum	$\kappa = 0.64$ (0.43–0.86) Sensitivity, 71% (10/14) Specificity, 94% (88/93) (n = 107)	$\kappa = 0.83$ (0.72–0.93) Sensitivity, 87% (27/31) Specificity, 98% (266/272) (n = 303)	0.056
Forceps	$\kappa = 0.83$ (0.70–0.95) Sensitivity, 88% (23/26) Specificity, 95% (78/82) (n = 108)	$\kappa = 0.83$ (0.73–0.92) Sensitivity, 90% (37/41) Specificity, 97% (252/261) (n = 302)	0.43

* For multiparous women, only the first birth is considered.

[†] κ Indicates estimated κ (and 95% confidence interval); sensitivity and specificity are calculated presuming the medical record as the criterion standard for true positive and negative.

[‡]Cervical dilation greater than 10 cm is considered for cesarean deliveries with any labor (as described by the medical record).

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