SIMILARITIES IN MOTHER-DAUGHTER LABOUR AND BIRTH CHARACTERISTICS: A TWO-GENERATION MATCHED COHORT STUDY

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Similarities in Labour and Birth Characteristics

SiLC (2014-2019)



Little is known about intergenerational transmission of birthing status

Pre, intra and post partum health issues have large impacts on maternal/infant life.

Is a mother's birth history at the headwaters of her daughters pregnancy and birth outcomes?



Bearing children, becoming mothers

To explore associations between familial labour and birth characteristics of nulliparous women and the first birth of their biological mothers

We are multitudes

Where does that leave individual identity?

FACT: Ever increasing number of women are rationale for variations undergoing induction, augmentation of labour and Cesarean deliveries.

CHALLENGE: To understand the in clinical practices that are affecting decisions to perform inductions, augmentations or CS.

Global & regional trends in CS, 1990-2014 (Betrán et al., 2016)



Epidemiology of Cesarean Birth





Evidence-based strategy



➤To both monitor and find "best practices"

Use data to help identify opportunities for improvement

New evidence to guide care



Direct influences of mothers on childbirth outcomes across generations. "Pa....l think it's time to go!"

Gestational age (GA) (maternal)

Small for gestational age (SGA) (parent and sibling)

Intra uterine growth retardation (IUGR) (consecutive births in the same mother)

Pre- and post-term pregnancy (parental)

Dystocia (maternal and sibling)

Caesarean section (CS) (maternal and sibling)

Birth weight (BW) (maternal)

Is there a similarity between mothers and daughters length of labour in first births?



BACKGROUND

There is increasing debate about the safe limits of labour length.

- Friedman (1978) defined onset of labour at 4cm cervical dilation rate 1cm/hr.
- Zhang et al. (2010) reported most women enter active phase at 6cm and progress is not linear
- ACOG together with the SMFM (2014) adopted these data obstetric care consensus
- Olufemi et al. (2018) prospectively plotted labour curves for 5606 Nigerian women, along with
 outcomes data, and concluded that average population labour curves do *not* reflect the variability
 associated with labour progress and outcomes for individuals.

It appears that physiological length of labour (LoL) is highly variable; population norms may not be relevant for particular women in labour.

Length of labour in mothers and their daughters: a matched cohort study

Setting	Two maternity hospitals in Israel
Sample	Nulliparous daughters, singleton pregnancies, ≥32 weeks. Mothers who had a 1 st birth in hospital prior to 1997.
Methods	Recruitment between 2014/15. Daughters data collected prospectively by questionnaire and electronic hospital records. Mothers data via retrospective recall questionnaires.
Analysis	M-D LoL were analysed using parametric and non-parametric tests and logistic regression.
Main outcome measure	♦ LoL measured as binary (≤10 hrs and >10 hrs).
	Excluded: elective CS's or CS without labour, incomplete questionnaires and multiple gestations
Data	Data was entered into Excel/SPSS – ethics approval was granted







- Descriptive statistics for the characteristics of the women
- Continuous variables were checked for normality of distribution: age at 1st period, height, weight gain in pregnancy, age at first delivery, fetal BW, and GA.
- •Parametric and non parametric tests were used for comparative analysis of mother-daughter reproductive outcomes. Significance was defined as p < 0.05.

LoL determination, statistical analysis

Univariate logistic regression: mother-daughter LoL

- Daughters dependent variable (≤10hrs/>10hrs) explored with the following independent variables: mothers LoL (binary), fetal BW and GA, and index woman's height, education, age, weight gain, induction, augmentation, use of anesthesia, fetal BW, GA (rounded off to the nearest week), and type of birth.
- The Hosmer & Lemeshow test was used as a goodness of fit test.
- The model was evaluated by sensitivity and specificity
- The predictive model was further analysed using a receiver operating characteristic (ROC) curve.

Results

- 323 paired mother-daughter women who delivered a first birth singleton live infant
- Daughters were 6 years older than mothers at time of first delivery (daughters mean age 30 yrs, *SD* 5.46; mothers mean age 24 yrs, *SD* 3.70).
- The majority of the sample self-classified as Israeli, married, & with a university education.
- The most common sign of labour onset overall was contractions (daughters 48.7%; mothers 56.4%) followed by an equal number of spontaneous rupture of membranes (SROM) or premature rupture of membranes (PROM) (daughters 23%; mothers 24%).

The proportion of women who experienced clinical interventions increased with time

- Daughters had almost three times the rate of inductions
- More than one and a half times the rate of augmentations
- •Five and a half times the rate of epidural analgesia use
- Over **one and a half times** the rate of emergency cesarean, when compared to their mothers

Logistic regression analysis of mother-daughter LoL (<10hrs / >10hrs)

If the mother had had a long labour (>10 hrs), the corresponding probability was almost two-fold for the daughter [OR 1.91 (95% CI 1.19, 3.05, p= 0.007), unadjusted].

The odds ratio was increased to **above three** when mothers and daughters were paired for same gender offspring [OR 3.23 (95%CI 1.55, 6.74, *p*=0.002)].

Other influences on daughters LoL

DAUGHTERS AGE

[OR 1.09 (95%CI 1.04, 1.14, p< 0.001)]

DAUGHTERS WEIGHT GAIN

[OR 1.11 (95%CI 1.05, 1.16, p<0.001)]

■ DAUGHTERS USE OF ANALGESIA [OR 4.5 (95%CI 1.86, 8.52, 〆 0.001)].

Multivariable logistic regression model



- Hosmer & Lemeshow goodness of fit test p=0.943 (>0.05)
- The predictive model using a receiver operating characteristic curve (ROC) showed area under the curve usually the best discriminator at 0.72 (95% CI 0.60, 0.77, p < 0.0005)



Diagonal segments are produced by ties.

The prediction of daughters LoL by the combination of mothers LoL



Sensitivity 74%, specificity 56%, with positive and negative predictive values of 66% and 64% respectively.



Mother-daughter physiological births sub-set

In the full dataset there were 31 daughters and 154 mothers who had had normal physiological labours and births. Only 21 mother-daughter pairs were matched for physiological births.

In the full data set more daughters (n = 171, 51%) laboured for over 10 hours than their mothers (n = 123, 36%).

In the physiological dataset there was an almost equal percentage of mothers and daughters who laboured for less than 10 hours (mothers' n = 18, 86%; daughters' n = 17, 81%).

Interpretation

- Age, weight gain in pregnancy, and use of anesthesia are known to have influences on LoL; our findings are consistent with earlier studies (Greenberg et al., 2007; Mousa et al., 2012; Yazdani et al 2012).
- Predictors that we expected would have an effect on daughters LoL but did not show statistical significance were induction, fetal BW and GA. This may be resulting from the effect of other predictors.
- Dramatic changes in obstetric practices between the cohorts: increased use of inductions, augmentations and epidural anesthesia for the daughters cohort compared with the earlier generation (similar to findings by Laughon et al. 2012).



Strengths	Limitations
Quantitative methodology High response rate	Mothers self-report - the stages of LoL were not available for the mothers deliveries
Use of regression modelling to explore relationships between variables and analyse data	Common in daughters cohort: induction, augmentation and epidural
Overall classification accuracy (66%) suggests that the model was useful.	Data included: vaginal deliveries, vacuum /forceps, inductions, augmentations, pain relief and CS emergency
Tests theory/hypothesis	The quality of the output: the accuracy of the data

Discussion

The relationship between first time mothers LoL and nulliparous daughters LoL may be used as an additional element in labour progression diagnosis by clinical staff.

- Physiological LoL is highly variable. Population norms, may not be relevant for clinical decisionmaking related to particular women in labour.
- Slow progress in labour, particularly in nulliparous women, is not always pathological and may not require medical intervention.

Conclusions

- A consistent association between mothers and daughters lengths of labour in first deliveries was found.
- The association persisted after adjusting for the increased number of interventions in the modern cohort.
- Practitioners could inquire about familial labour patterns as an additional heuristic to guide practice, alongside formal evidence and the signs and symptoms exhibited by individual women.

Unnecessary inductions & augmentations do more harm than good!

Unnecessary C-sections do more harm than good!

Most experts doubt that one in three women need surgery to give birth!

Identifying familial patterns may be a powerful buffer against unnecessary interventions during labour and childbirth within normative sample populations

A nullipara woman's choice for normal birth may now be supported by her mother's first birth history as an additional heuristic to guide practice and increase precision in the clinical management nulliparous women's labour and delivery. Personalised medicine in obstetrics - the potential yet to Progress rates in labour differ between women and may reflect numerous variables. Individualised thresholds based on familial birth history may help differentiate between normal birth and the need for a 'medicalised' birth, especially in nullipara women.

One small step for women, one giant leap for mankind

