

ABSTRACT

Background: Newborn hearing screen prior to nursery discharge is mandatory in NYS since October 2001. Newborns are screened using Otoacoustic Emission (OAE) method and retested using Auditory Brainstem Response (ABR) method if the newborn fails initial OAE. Studies comparing OAE with mode of delivery in newborns showed higher failure rates after cesarean section delivery. There are limited data regarding duration of labor, mode of delivery and hearing screen in term and postterm newborns.

Objective: To explore any relationship between duration of labor, mode of delivery, time of hearing screen in newborns >36 weeks.

Design/Methods: Retrospective chart review of well newborns >36 weeks delivered in Flushing Hospital Medical Center between July 2014 and July 2016. Exclusion criteria included gestational age (GA) <36weeks, neonatal intensive care unit admission and having risk factors for hearing loss. Data collected included multiple pregnancy, amniotic fluid index (AFI), duration of labor (DOL), mode of delivery, GA, birthweight (BW), gender, and hours of life at initial hearing test (HOL). Data were analyzed using SPSS software, Mann-Whitney U test, Fischer-exact/chi-square test and odds ratio, p <0.05 was considered significant.

Results: Of 2660 charts reviewed, 2624 met inclusion criteria, 51.3% were males, 99% singleton, 99.8% term and 31.9% were delivered by cesarean section. Total of 90 (3.4%) newborns failed initial OAE, 23/90 (25%) also failed the final ABR. Those who passed and failed OAE were compared for BW, HOL, DOL and AFI in Table 1. For every HOL increase at OAE, the odds of having a passed OAE increase as well (OR 0.976, 95%CI 0.967-0.986), p <0.001. This model is significant explaining 2.4% in the variation of the OAE results, p < 0.001.

Conclusion(s): The older the newborn at initial screening, the higher the likelihood of passing OAE. Gender, mode of delivery, DOL, GA, BW and AFI did not affect OAE screen.

INTRODUCTION

- Newborn hearing screen prior to nursery discharge is mandatory in NYS since October 2001.
- Newborns are screened using Otoacoustic Emission (OAE) method and retested using Auditory Brainstem Response (ABR) method if the newborn fails OAE.
- American Academy of Pediatrics as well as National Institutes of Health and American Academy of Otolaryngology/Head and Neck Surgery recommend early identification and treatment before age six months for better development of speech, language and cognitive abilities compared to children identified and treated at a later age.
- Approximately 1-2% of newborns have significant hearing loss.
- Studies comparing OAE with mode of delivery in newborns showed higher failure rates after cesarean section delivery. There are limited data regarding duration of labor, mode of delivery and hearing screen in term and postterm newborns.

OBJECTIVE

To explore any relationships between duration of labor, mode of delivery, time of hearing screen in newborns >36 weeks.

METHODS

- Design:** Retrospective chart review
- Setting:** Flushing Hospital Medical Center
- IRB:** Approved by Flushing Hospital Medical Center
- Time Frame:** July 2014 and July 2016
- Inclusion criteria:** Well newborns >36 weeks of gestation
- Exclusion criteria:** Gestational age (GA) <36 weeks, neonatal intensive care unit admission and having risk factors for hearing loss
- Tools:** Otoacoustic Emission test prior to hospital discharge
- Statistical analyses:** Data were analyzed using SPSS software, Mann-Whitney U test, Fischer-exact/chi-square test and odds ratio, p <0.05 was considered significant

RESULTS

- Total charts:** 2624/2660 met inclusion criteria
- Gender:** male 51%, female 49%, figure 1
- Pregnancy type:** 99% singleton, figure 2
- Delivery method:** 32% cesarean section, 68% vaginal delivery, figure 3
- Initial OAE results:** 96.6% passed, 3.4% failed
- Characteristics of mothers and newborns with passed and failed OAE:** BW, HOL, DOL and AFI, Table 1
- Result:** for every HOL increase at OAE, the odds of having a passed OAE increase as well (OR 0.976, 95%CI 0.967-0.986), p <0.001

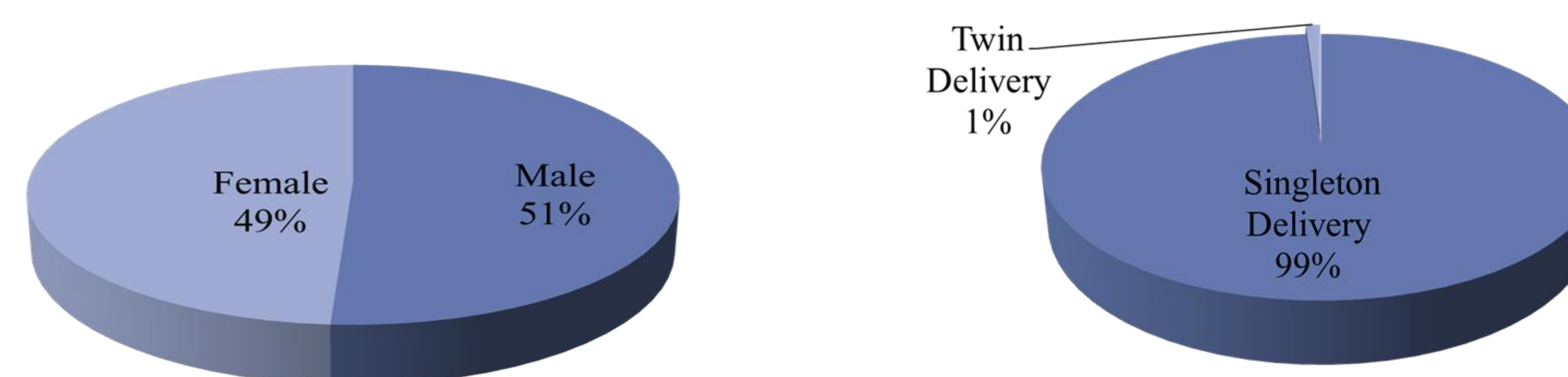


Figure 1. Gender

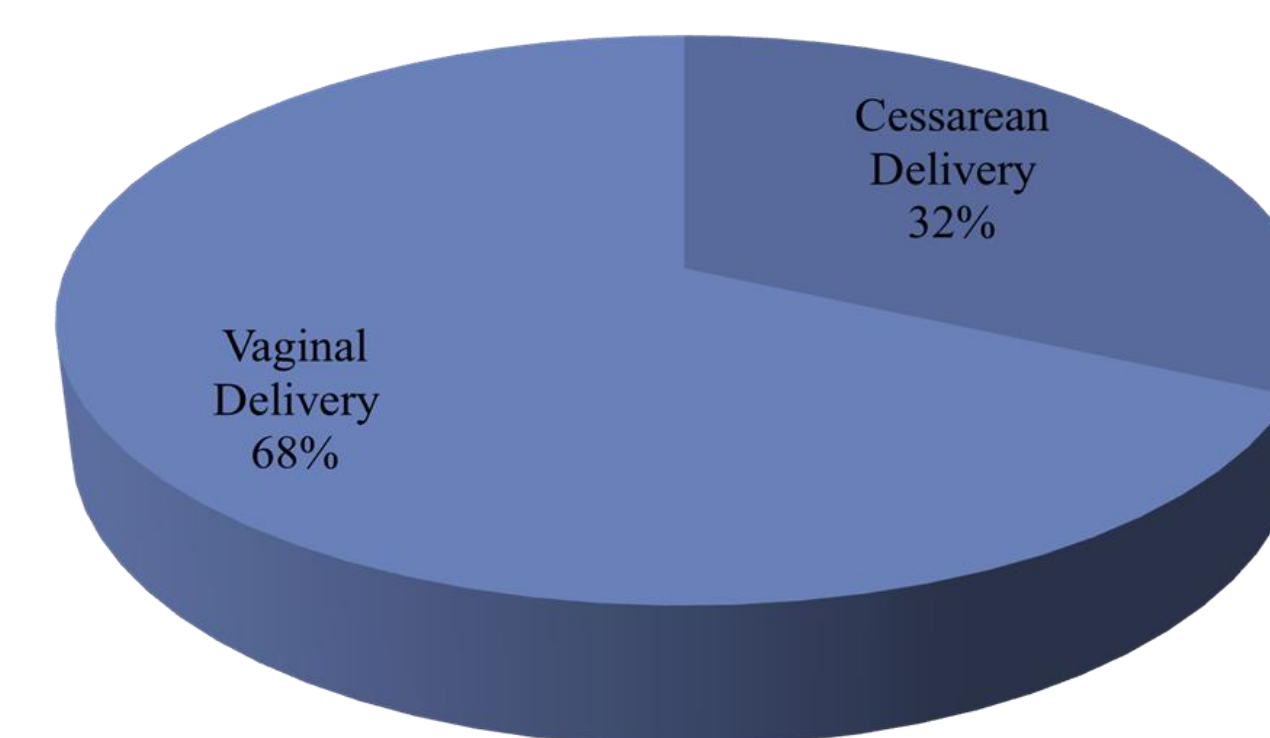


Figure 2. Pregnancy type

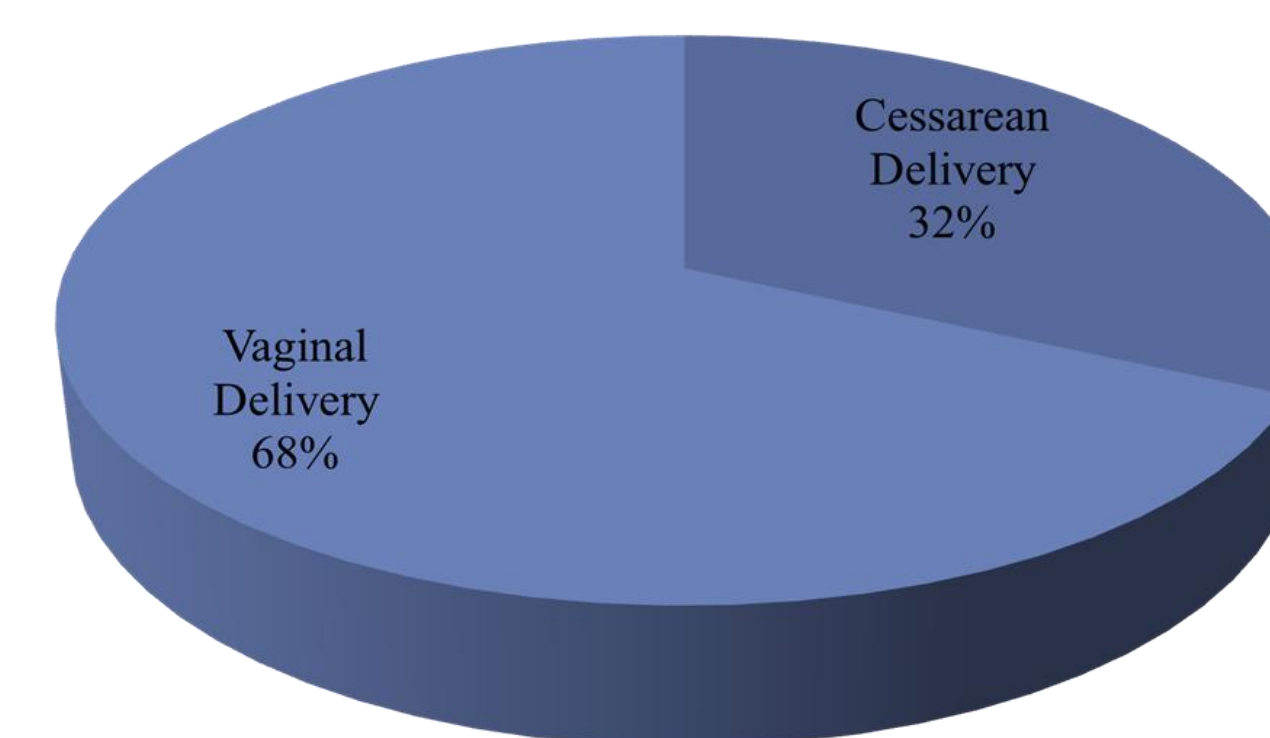


Figure 3. Delivery method

Abbreviations:
OAE: Otoacoustic emission
ABR: auditory brainstem response
GA: gestational age
DOL: duration of labor
BW: birth weight
HOL: hours of life
AFI: amniotic fluid index

Table 1. Characteristics of mothers and newborns with passed and failed OAE

	passed (n= 2534)	failed (n=90)	p value
BW (SD) (grams)	3267 (414)	3190 (358)	0.08
HOL at OAE (range) (hours)	20 (1-292)	30 (4-288)	<0.001
DOL (range) (hours)	1 (0-62)	3 (0-3)	0.017
AFI (SD) (cms)	566 (5.8)	522 (5.7)	0.58

p < 0.05 was considered significant

CONCLUSIONS

- The older the newborn at initial screening, the higher the likelihood of passing OAE
- Gender, mode of delivery, DOL, GA, BW and AFI did not affect OAE screen

ACKNOWLEDGEMENTS

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REFERENCES

- https://www.health.ny.gov/community/infants_children/early_intervention/regulations/su_bpart_69-8.htm
- <https://www.cdc.gov/ncbddd/hearingloss/data.html>
- Smolkin N et al. Birth by cesarean delivery and failure on first otoacoustic emission hearing test. *Pediatrics.* (2012): 130(1) e95-e100.
- Olunsaya BO et al. Is discordance in TEOAE and AABR outcome predictable in newborns? *Int j Pediatr otorhinolaryngol.* (2010) 74(11):1303-1309.
- Farahani F et al. The Effect of Mode of Delivery and Hospital Type on Newborn Hearing Screening Results Using Otoacoustic Emissions: Based on Screening Age. *Indian Journal of Otolaryngology and Head & Neck Surgery.* 2016:1-5. doi:10.1007/s12070-016- 0967-3.
- Xiao T et al. Association between mode of delivery and failure of neonatal acoustic emission test: A retrospective analysis. *International Journal of Pediatric Otorhinolaryngology.* 2015; 79(4):516-9. doi:10.1016/j.ijporl.2015.01.019.
- Ali G et al. Birth by cesarean delivery on newborn hearing screening test: a retrospective study. *International Journal of Life Science & Pharma Research.* 2017; L26-29.