Effects of Ethnicity on Hearing Screening Failure Rates in a Newborn, Well-Baby Clinic
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Background
- Early identification and intervention of babies with hearing loss is critical for their development of speech, language, communication skills, and learning.
- Accordingly, hearing of nearly all newborns is screened soon after birth in the USA and in Kansas.
- For example, Wesley Medical Center (WMC), one of the largest birthing facilities in the Midwest, has screened hearing of over 22,000 well babies since 2009.
- Most birthing facilities, including WMC, use a 2-stage hearing screening with (1) Otoacoustic Emissions (OAE) and (2) Automated Auditory Brainstem Responses (AABR).

2-Stage Screening Criteria
- Initial OAE Screening:
  - If baby passes this stage, screening is finished.
  - If baby fails this stage, another OAE is done prior to discharge.
- 2nd OAE screening:
  - If baby passes this stage, screening is finished.
  - If baby fails this stage, an AABR is done prior to discharge.
- AABR Screening:
  - If baby passes this stage, screening is finished.
  - If baby fails this stage, baby is discharged and an AABR is done about two weeks later.

Motivation
Numerous studies have shown that certain socioeconomic, ethnic, and racial groups have poorer health outcomes than others.

The most recent US National Health and Nutrition Examination Survey reported a higher prevalence of hearing loss among 6-19 year old Hispanic children than among non-Hispanic children of the same age;
- These ethnic differences in hearing loss grow larger with age
- No information was reported on children younger than 6 years old in the survey.

QUESTION: When do these differences in hearing loss among ethnic groups start showing up?

A previous study of effects of ethnicity on newborn hearing screening failure rates showed no statistically significant differences among ethnicities; but this study:
- Had relatively low participant size (i.e., 1,407 participants with only 535 Hispanic babies)
- Employed a one-stage screening process
- Was prospective which could have increased examiner bias

QUESTION: Would significant differences in hearing screening failure rates between Hispanic and non-Hispanic newborns be present if a retrospective study was completed with a larger sample size and a two-stage screening process?

Objectives
- **Purpose 1:** To measure effects of ethnicity on hearing screening failure rates among well babies.
- **Purpose 2:** To measure if common risk factors associated with hearing loss in newborns (i.e., low birth weight, male gender, craniofacial anomalies, Cesarean delivery, and certain syndromes) are more prevalent in Hispanic than non-Hispanic newborns.

2 NULL HYPOTHESES:
- Hispanic well babies will not show a higher hearing screening failure rate than well babies of other races and ethnicities.
- No risk factors, either singly or in combination, will significantly predict whether well babies of different ethnicities fail hearing screenings.

Participants
Pre-existing demographic and hearing screening records of 22,179 well babies born at WMC from January 2009 to December 2012.

Experimental Design
Retrospective between-subjects analysis.

Procedures
- Study has been approved by WSU and WMC IRBs.
- Hearing screening results stored in Hi-Track at WMC’s audiology department are now being merged with demographic data from Health Information Management Systems at WMC.

Statistical Analyses
- **NULL HYPOTHESIS 1.** Will be tested by:
  - Comparing odds ratios of hearing screening failures in Hispanic, white, and black newborns.
- **NULL HYPOTHESIS 2.** Will be tested by using a multiple regression analysis of risk factors.

References