

Utilization of a Questionnaire to Provide Follow-Up Services in an Infant Hearing Screening Program

Terrey Oliver Penn*
Brooks Gibson*

Abstract

An important goal of any neonatal hearing screening program is to provide adequate monitoring and follow-up services for all newborns tested. This is often the most difficult component of the program to administer. An attempt was made to obtain follow-up information through the use of a questionnaire modeled after Jacobson and Jacobson (1990). This questionnaire was administered by mail or telephone to 119 parents whose infants had passed a hearing screening as neonates in four hospitals. Forty-four percent of all parents contacted by either means responded to the questionnaire; however, response rates varied by as much as 36 percent, depending on the hospital in which a child was born. Our results suggest that the successful use of follow-up questionnaires depends greatly upon hospital demographics. When limitations are considered, however, they may provide an alternative to on-site follow-up services for infants who pass initial screening.

Key Words: Follow-up services, newborn hearing screening, questionnaires

An important goal of any neonatal hearing screening program is to provide adequate monitoring and follow-up services for all newborns tested. Yet, most professionals involved in infant hearing screening agree that the follow-up is the most difficult component of a program to administer. Parents often neglect to return for follow-up evaluations. Reasons for the poor compliance include reported transportation problems, parental concern for the cost of the testing, and lack of concern for an "invisible" impairment (Hall, 1992). Reports estimate that less than 50 percent of all parents will respond to recommendations for follow-up testing of their infants, even when those infants have failed the initial screening (Galambos et al, 1982; Roberts et al, 1982).

Jacobson and Jacobson (1990) developed a questionnaire in an attempt to overcome some of the obstacles related to screening follow-up. The

questionnaire was mailed to parents whose newborns had passed a hearing screening at birth in a large metropolitan medical center. They reported a remarkable 65 percent return rate of their questionnaire.

The present investigation was conducted to address two issues. First, we sought to determine the return rate of a questionnaire similar to that employed by the Jacobsons in a highly heterogeneous patient population. Our program differs from that used in the Jacobsons' study in that our personnel must travel to a number of city-wide hospitals to screen infants at risk for hearing loss. Therefore, the newborns in our program are not tested by in-house personnel, nor do we often have any direct contact with the parents. Our intention was to determine if this difference in the basis of the two programs would reduce the effectiveness of questionnaire follow-up with our parents. Second, we examined the possibility of improving the response rate through telephone contact. This method would reduce the effort required by the parents. A telephone questionnaire would allow parents to quickly answer the same questions and not require a mailed response to us. This approach could be particu-

*Hearing, Speech, and Vision Services, Arkansas Department of Health, Little Rock, Arkansas

Reprint requests: Terrey Oliver Penn, Hearing, Speech, and Vision Services, Arkansas Department of Health, 4815 West Markham Street, Slot #20, Little Rock, AR 72205

larly efficient and cost-effective for screening programs utilizing volunteers.

METHOD

The files of all newborns screened over a 6-month period in four area hospitals (located in Little Rock, Arkansas) were included for initial study. These four hospitals included a nonprofit corporation (hospital A), a for-profit corporation (hospital B), a church-operated facility (hospital C), and a state-supported institution (hospital D). Information available to us for every infant included: name; sex; estimated gestational age; birthdate; mother's name, address, and phone number; hospital birth site; and identified risk factor(s).

Originally, 169 infants were enrolled in the study. Infants were excluded from further study due to adoption ($n = 3$), multiple birth ($n = 28$), failure on auditory brainstem response (ABR) screen ($n = 10$), or incomplete information recorded on the high risk form, which prevented parental contact ($n = 9$). Adopted infants are typically difficult or impossible to locate; therefore, all were excluded from this study. Further, due to our practice of assigning consecutive file numbers and allocating telephone or mail questionnaires to alternating files, the parents of twins would have received both methods of contact. We eliminated this potential confusion by excluding infants from multiple births. Finally, infants who failed the ABR screen were followed individually and more aggressively than could be accomplished through a questionnaire. Therefore, only infants of nonmultiple births who remained with their birth parents and passed the newborn hearing screening were included ($n = 119$). At the time of parent contact, all infants ranged in age from 14 to 22 months.

Parents were contacted by either mail or telephone. Questionnaires were mailed to all parents whose infants had odd file numbers. Parents whose infants had even file numbers were asked identical questions over the telephone. The questionnaire employed is shown in Figure 1.

Initially, 60 of the parents were contacted by mail and 59 were contacted by telephone. All questionnaires returned undelivered were remailed if a forwarding address was provided. Attempts for telephone contact were made once during normal work hours and once on a Saturday. Messages were left with family members or on answering machines when necessary, requesting that the parents return our calls. All

parents who could not be contacted by telephone after two attempts were then mailed a questionnaire ($n = 46$). As a result, 106 parents were mailed questionnaires. Parents who were initially mailed questionnaires but did not respond were not contacted by phone.

RESULTS

Response Rates

Fifty-two questionnaires (44%) were either completed and returned through the mail or were answered via telephone. Eighteen of the 60 questionnaires (30%) were returned from the initial mailing. Thirteen of the 59 questionnaires (22%) were completed over the telephone. Twenty-one of the 46 questionnaires (46%) that were mailed after the parents could not be contacted by telephone were also completed and returned, resulting in an overall response rate of 38 percent for all mailed questionnaires.

Figure 2 shows the response pattern of contact type (mail or telephone) for each of the hospitals. Response rates by mail were substantially better than by telephone contact for hospitals A ($\chi^2 = 3.03$, $p = .08$) and C ($\chi^2 = 4.83$, $p = .03$) and approximately the same for hospitals B ($\chi^2 = 0.01$, $p = .93$) and D ($\chi^2 = 0.06$, $p = .81$). Total response rates for infants born in each of the four hospitals were 49 percent-hospital A, 53 percent-hospital B, 48 percent-hospital C, and 17 percent-hospital D.

Responses to the Questionnaire Items

Question 1

The average age of the infants at the time the questionnaire was completed was 17.8 months and ranged from 14 to 22 months.

Questions 2 and 3

A total of 39 infants (75%) were reported to have had at least one medically determined ear infection. The percentages were quite consistent for the infants born in the four hospitals: 76 percent, 76 percent, 72 percent, and 75 percent for hospitals A-D, respectively. Twenty-two infants (56%) had three or more episodes. Eight of those experiencing ear infections (20%) had at least one set of pressure equalization (PE) tubes inserted. Only one child had two sets of tubes.

Questions 4-7

Nearly 40 percent of the infants seldom ($n = 19$) or never ($n = 1$) awakened to a loud sound

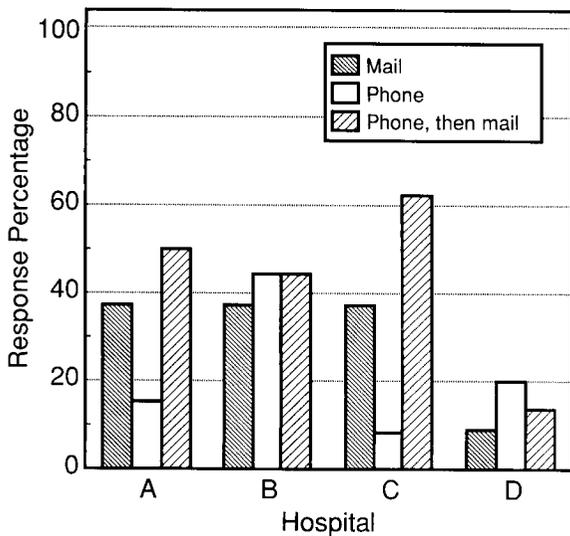


Figure 2 Response rate patterns by contact type (mail or telephone) for each of the four individual hospitals. Hospital A is a nonprofit corporation, hospital B is a for-profit corporation, hospital C is a church-operated facility, and hospital D is a state-supported institution.

DISCUSSION

We believe that the value of this questionnaire lies in its use as a monitor for false negative occurrences. Continued support for infant hearing programs, both financial and theoretical, can be strengthened through this efficacy information. Responses to the items also may help identify later developing conductive or sensorineural hearing loss for infants initially passing the hearing screening. If it were practical to contact these parents by telephone, criterion responses may initiate further evaluation of infants suspect for delayed onset sensorineural hearing loss or fluctuating, conductive hearing loss.

The parents' responses to question 4 arouses some concern. The question, "Does your baby awaken or stir to a loud noise," is typically included as an auditory developmental milestone in brochures to parents. A large number of the parents in this report (40%) responded negatively to this question (i.e., "My baby seldom or never awakens or stirs to a loud noise"). This may suggest that if used as a screen, question 4 may not be a sensitive indicator of possible hearing loss and may result in over-referral of infants for further evaluation. On the other hand, 75 percent of infants reportedly had at least one known ear infection. Question 4 may be *more sensitive* than questions that resulted in nearly unanimous positive responses (e.g., questions 5 and 6).

We examined the gestational age, risk factor(s) identified, and age at the time of attempted contact for those infants whose parents did and did not respond to our questionnaire. Although we attempted to screen only those infants who were medically stable, there was a possibility that the most premature infants had a high mortality rate accounting for some of the nonresponses. We found no difference in the average gestational age of infants whose parents responded to the questionnaire from those who did not respond (32.8 weeks and 33.3 weeks, respectively). We also found no obvious differences in the presence of risk factors between the two groups, with the exception of the risk factor of hereditary hearing loss. Fewer parents whose infants had been tested due to a hereditary hearing loss responded to our questionnaire (29%). We have noticed a similar response to letters requesting that parents bring their infants to our clinic for the initial ABR screening. This is very likely due to inappropriate identification. Although the high risk form specifically states "family history of childhood hearing loss," we continue to receive incorrect identifications (e.g., grandparents with presbycusis, parents or siblings who developed a hearing loss after an illness). Finally, there was no significant difference in the infants' age at the time of attempted contact between the respondent and nonrespondent groups.

The prevalence of middle ear disorder in this report is somewhat higher than that reported by others. Howie et al (1975) reported that nearly half of all infants will experience middle ear infection before one year of age. Teele et al (1980) reported similarly and that approximately 35 percent of the infants will experience three or more episodes before 3 years of age. Our figures are somewhat higher at 75 percent and 56 percent, respectively. One explanation for the discrepancy may be that parents of infants who have had middle ear infection are more aware of their children's hearing status. They may be more sensitive to the need for auditory health care and more willing to respond to our questionnaire. Of course, we have no information on the history of middle ear disorder in infants of nonrespondents.

CONCLUSIONS

Our response rate was lower than that reported by the Jacobsons (1990). This result may be due in part to the way in which our program is uniquely structured or to the limited

direct contact of our personnel with the parents. It also may be due to the fact that our infants were older at the time the parents were contacted. As the parents become more experienced and the novelty of a new infant diminishes, they may be far less concerned about their child's hearing, particularly if the child is beginning to develop communication skills.

Our results suggest that high response rates to telephone contacts may be very difficult to attain. Rates may be equal to, but will more likely be significantly lower than, responses to mailed questionnaires in some populations. Intuitively, we expect this finding because of the growing number of families that have both parents employed outside of the home.

The type of hospital will likely influence the response rate that can be anticipated from questionnaires. Infants screened in hospitals serving a large population of indigent clients may not be an appropriate target for this form of follow-up. In this study, the response rate for the state-supported hospital serving a population composed primarily of indigent clients was 17 percent. Response rates from private, for-profit hospitals serving more economically advantaged clients showed a more promising percentage (50%). Even by limiting our patient population in this way, we fail to obtain a response rate equal to that of the Jacobsons' study; however, our percentage is equal to earlier reports using more conventional means for

follow-up (Galambos et al, 1982; Roberts et al, 1982). These results suggest that newborn hearing screening programs may effectively utilize questionnaires to follow up patients who initially pass screening if the limitations discussed herein are considered. In our opinion, such questionnaires are not appropriate for infants who fail initial screening.

Acknowledgment. This manuscript was presented in part at the Annual Mid-South Conference in Memphis, Tennessee, March 1993.

REFERENCES

- Galambos R, Hicks G, Wilson MJ. (1982). Hearing loss in graduates of a tertiary intensive care nursery. *Ear Hear* 3:87-90.
- Hall III JW. (1992). *Handbook of Auditory Evoked Responses*. Boston: Allyn and Bacon.
- Howie VM, Ploussard JH, Sloyer J. (1975). The "otitis-prone" condition. *Am J Dis Child* 29:676-678.
- Jacobson CA, Jacobson JT. (1990). Follow-up services in newborn hearing screening programs. *J Am Acad Audiol* 1:181-186.
- Roberts JL, Davis H, Phone GL, Reichert TJ, Sturdevant EM, Marshall RE. (1982). Auditory brain stem response in preterm neonates: Maturation and follow-up. *J Pediatr* 101:257-263.
- Teele DW, Klein JD, Rosner BA. (1980). Epidemiology of otitis media in children. *Ann Otol Rhinol Laryngol* 89(Suppl 68):5-6.